ICCS: INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS

Energy-Economy-Environment Modelling Laboratory E3M - Lab

"PRIMES modelling for the Impact Assessment of the Commission's 2014 assessment according to Articles 24 (7) and 3(2), (3) of Directive 2012/27/EU on energy efficiency"

Final Report for (ENER/C3/2013-1000)

E3Mlab

24th July, 2014

This report is the revised version of the Final Report for (ENER/C3/2013-1000) which was originally submitted on 22nd May 2014; it is now resubmitted following comments from the European Commission received on 16th July 2014.

Contents

1. Introduction

This project was carried out in close collaboration with the Commission Services, with the deliverables adapted to the Commission requests.

Within this project the following were delivered to the Commission Services:

- Standard PRIMES output for all scenarios runs delivered (see below): delivered to dropbox as agreed with the Commission services
- Additional REPORT_scen.xlsx file including a large number of explanatory graphs and tables for all scenarios delivered: delivered to dropbox as agreed with the Commission services
- Additional outputs (not available in standard output) related to renovation rates: delivered to dropbox as agreed with the Commission services

A report analysing the scenarios and the underlying methodology: delivered on several occasions in electronic format and finalised taking into account all comments from the Commission services received; the report was originally prepared for the scenarios of Task 3, but the final version contains as main scenarios the scenarios of task 4Further throughout the course of the project E3Mlab provided the Commission Services with full support in the form of emails and teleconferences in which substantial additional information and explanations were provided.

This report contains:

- a list of all the scenario runs delivered (section 2);
- the final version of the analysis report -based on scenarios of task 1 and 4- (section 3)
- a comparison of the Reference scenario 2013 –as published- to the National projections (section 4);
- the EU28 summary files for the scenarios of task 4 (appendix B).

This report together with all the scenarios delivered are submitted electronically (1 copy in DVD) to the EC (DG ENER) with this final report and with the most important results reproduced in paper copy and annexed to this report (2 copies).

2. Scenarios runs

2.1.Summary

A total number of 48 scenario variants- instead of the originally planned fourteen (14) variants- were delivered to the Commission Services via dropbox; these have been created following revisions of the scenario specifications by the Commission Services. In total 130 different scenario variants were delivered to the Commission services when including the different cost reporting variants which were prepared for the purpose of this project. The scenarios have received approval by the Commission Services. The modelling results for all scenarios have been delivered to dropbox as agreed with the Commission Services and are also included in the DVD accompanying this final report.

2.2.Main Tasks and scenarios

The tasks carried out within this project and the relevant scenarios are summarised in the following table:

Task	Task description	Scenarios	Settings
Task 1:	Modelling runs based on PRIMES (2012) **reference projections**	REF2012tplus	As specified in the kick-off meeting this scenario contained: • an update on EE regarding: (i) eco design on water and space heater, (ii) EED (especially Art. 7 notification) and (iii) EPBD; s • it further took into account the comparison between national projections and Reference 2013; • update on transport sector;
		EEREF2012tp	Reference_plus and EUA applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030
Task 2:	Modelling runs based on model run described in Task 1 with **modifications of the modelling assumptions**	EEMDRREF2012tpR EEAREF2012tpR EEMDRREF2012tpR EEMDSREF2012tpR EEREF2012tpR EEVAREF2012tpR EEVVAREF2012tpR	• Adjustment of assumptions and reference setting (adjustment of discount rates for the behaviour of economic actors and for the animalization of capital expenditures) to reflect specific economic considerations for energy efficiency; • Revised versions of the scenarios of Task 3 with new assumptions about discount rates and the considerations of the developments of the energy efficiency policies in the time period beyond 2030
Task 3:	Modelling runs based on described in Task 1 and 2 with **tightened energy efficiency measures**	EEMDRREF2012tp EEAREF2012tp EEMDRREF2012tp EEMDSREF2012tp EEREF2012tp EEVAREF2012tp EEVVAREF2012tp	Various tightened energy efficiency measures in different sectors as suggested by the EC and agreed with the Commission Services
Task 4:	Modelling runs with **binding energy efficiency targets** in the Member States	EE25DEC EE28DEC EE30DEC EE32DEC EE35DEC EE40DEC	• RES and ETS targets as in Task 1 • Binding energy efficiency targets in the Member States: the target was set at EU level and the modelling proposed a split of the target by MS (see section 3.4)

2.3.Sensitivities

Further to the main scenarios several sensitivities were requested by the Commission services and delivered to the Commission services:

- Sensitivity of 2030 GHG emission reduction target (**5 variants**): sensitivities of Task 2 and 3 including the 40% GHG emission reduction target in 2030 in addition to the initial scenarios without the target i.e. set 1 and set 2. The first set (noted as S1) does not

assume the achievement of specific GHG emissions reduction post 2020. The second set (noted S2) incorporates a GHG emission reduction target for 2030 of ca. 40% for the first four scenarios, and higher than 40% for the most ambitious scenario. Scenarios of S2 include additional hypothetical policies which impact further non-CO_2 emissions towards achieving the 40% overall emission reduction target in 2030. The cost of these additional non-CO_2 emissions reductions is determined through the same cost curves that have been used for the scenarios of the Impact Assessment for the 2030 framework for climate and energy policies. Each of the energy efficiency scenario within S2 assumes the same intensity of energy efficiency policies as the respective scenario of S1 and achieve the same level of energy savings.;

- Sensitivity with F-gas regulation (**7 variants**): after the introduction of the F-gas regulation all scenarios of tasks 1, 2 and 3 not compatible with the F-gas regulation were re-run in order to ensure full compliance to the newly adopted regulation.

2.4.Binding targets

Six different scenarios were undertaken with binding targets (task 4). As there is currently no indication and no policies for the distinction of binding energy efficiency targets by Member State the scenarios were constructed in a different way by assuming EU wide targets which result in proposals for Member State targets. The Commission services requested scenarios with EU wide binding targets on Primary Energy Savings compared to the Baseline 2007. These scenarios were undertaken with the PRIMES model and fully quantified; these scenarios, as all PRIMES scenarios, include detailed Member State results and therefore include an initial proposal for possible Member State targets depending on the overall EU target. A total of six such scenarios were quantified.

2.5.Costing approaches

Additionally to the tasks as described in the proposal a further task was undertaken within this project. Four different costing approaches of the scenarios were agreed upon with the Commission and all scenarios were finally delivered with two to four different cost approaches. The preparation of the cost approaches required the programming of new routines in the modelling in order to obtain the reports which was additional work not originally foreseen in the contract. A description of the cost approaches can be found in section 3.5.1.

2.6.Complete list of scenarios and their variants delivered

This table replicates the structure of the dropbox folders through which the scenario variants and different cost reporting were delivered.

	Scenario Name	Delivery Date	Scenario Description	Enabling Settings	Cost Approaches Delivered	
			Version 20-MAY-2014			
1	EE25DEC	20/5/2014	25% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A and D	2
2	EE28DEC	20/5/2014	28% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A and D	2
3	EE30DEC	20/5/2014	30% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A and D	2
4	EE32DEC	20/5/2014	32% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A and D	2
5	EE35DEC	20/5/2014	35% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A and D	2
6	EE40DEC	20/5/2014	40% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A and D	2
			Version 09-MAY-2014			
1	EEAREF2012tpS1R	8/5/2014	EEREF2012tp and efficiency policy package of ambitious intensity, discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
2	EEAREF2012tpS2R	8/5/2014	EEREF2012tp and efficiency policy package of ambitious intensity, 40% emission reduction in 2030,discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
3	EEMDRREF2012tpS1R	9/5/2014	EEREF2012tp and efficiency policy package of moderate intensity, discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
4	EEMDRREF2012tpS2R	8/5/2014	EEREF2012tp and efficiency policy package of moderate intensity, 40% emission reduction in 2030,discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
5	EEMDSREF2012tpS1R	8/5/2014	EEREF2012tp and efficiency policy package of modest intensity, discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
6	EEMDSREF2012tpS2R	8/5/2014	EEREF2012tp and efficiency policy package of modest intensity, 40% emission reduction in 2030,discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
7	EEVAREF2012tpS1R	8/5/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3

8	EEVAREF2012tpS2R	9/5/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, 40% emission reduction in 2030,discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
9	EEVVAREF2012tpS1R	8/5/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
10	EEVVAREF2012tpS2R	9/5/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, 40% emission reduction in 2030,discount rates modification-stability of EE policies beyond 2030, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
			FourAddScen (Version 07-MAY-2014)			
1	EE25DEC	7/5/2014	25% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A,C and D	3
2	EE28DEC	7/5/2014	28% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A,C and D	3
3	EE30DEC	7/5/2014	30% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A,C and D	3
4	EE32DEC	12/5/2014	32% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A,C and D	3
5	EE35DEC	7/5/2014	35% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A,C and D	3
6	EE40DEC	13/5/2014	40% energy savings, EE policies, enabling settings 2030 onwards, adjustment of non-CO_2 emissions	YES	delivered with cost reporting A,C and D	3
			Version 11-APRIL-2014			
1	EEAREF2012tpS1	16/4/2014	EEREF2012tp and efficiency policy package of ambitious intensity, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
2	EEAREF2012tpS2	16/4/2014	EEREF2012tp and efficiency policy package of ambitious intensity, 40% emission reduction in 2030, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
3	EEMDRREF2012tpS1	16/4/2014	EEREF2012tp and efficiency policy package of moderate intensity, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
4	EEMDRREF2012tpS2	16/4/2014	EEREF2012tp and efficiency policy package of moderate intensity, 40% emission reduction in 2030, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
5	EEMDSREF2012tpS1	16/4/2014	EEREF2012tp and efficiency policy package of modest intensity, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
6	EEMDSREF2012tpS2	17/4/2014	EEREF2012tp and efficiency policy package of modest intensity, 40% emission reduction in 2030, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
7	EEVAREF2012tpS1	16/4/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
8	EEVAREF2012tpS2	16/4/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, 40% emission reduction in 2030, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
9	EEVVAREF2012tpS1	16/4/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3
10	EEVVAREF2012tpS2	16/4/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, 40% emission reduction in 2030, F gas regulation, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A,C and D	3

11	EEref2012tpF	14/4/2014	reference achieving 27%RES energy savings , 2.2% linear reduction factor, F gas regulation	NO	delivered with cost reporting A,C and D	3
12	REF2012tplusF	11/4/2014	reference scenario , F gas regulation	NO	delivered with cost reporting A,C and D	3
			Version 28-FEBR-2014			
1	EEAREF2012tp	3/3/2014	EEREF2012tp and efficiency policy package of ambitious intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
2	EEMDRREF2012tp	3/3/2014	EEREF2012tp and efficiency policy package of moderate intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
3	EEMDSREF2012tp	3/3/2014	EEREF2012tp and efficiency policy package of modest intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
4	EEREF2012tp	3/3/2014	Reference_plus and EUA applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
5	EEVAREF2012tp	3/3/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
6	EEVVAREF2012tp	3/3/2014	EEREF2012tp and efficiency policy package of third level ambition intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
7	REF2012tplus	3/3/2014	Reference with updated policies in transport sector, fine tuning and update of Version 18-FEBR-2014	NO	delivered with cost reporting A,B,C and D	4
			Version 18-FEBR-2014			
1	EEMDRREF2012tp	20/2/2014	EEREF2012tp and efficiency policy package of moderate intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A	1
2	EEMDSREF2012tp	20/2/2014	EEREF2012tp and efficiency policy package of modest intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A	1
3	EEREF2012tp	20/2/2014	Reference_plus and EUA applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A	1
4	EEVAREF2012tp	20/2/2014	EEREF2012tp and efficiency policy package of more ambitious intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A	1
5	EEVVAREF2012tp	20/2/2014	EEREF2012tp and efficiency policy package of third level ambition intensity, applying the 2.2% rule for linear reduction after 2021 and 27% RES-share in 2030	NO	delivered with cost reporting A	1
6	REF2012tplus	20/2/2014	Reference with updated policies in transport sector	NO	delivered with cost reporting A	1
48	**Total scenarios delivered**				**Total scenarios including cost reporting thereof delivered**	**130**

The following table includes a list of all the additional files which have also been delivered to the European Commission in order to support effective presentation and explanation of results.

File name	Delivery date	Description	Additional comments
		Version 20-MAY-2014	
Balances by fuel	20/5/2014	Energy Balances by fuel type for each scenario	delivered for all 6 scenarios (EE25DEC, EE28DEC, EE30DEC, EE32DEC, EE35DEC,EE40DEC)
AverageRenovation_EEDECv20-MAY-2014	20/5/2014	Renovation rates for buildings at EU level by scenario	
EEperformance_with ETSV20-MAY-2014	20/5/2014	Energy efficiency indicator by country including industry, residential, tertiary by scenario	
EEperformanceV20-MAY-2014	20/5/2014	Energy efficiency indicator by country by scenario	
REPORT ON EE_DEC FILES (one file for each cost reporting)	20/5/2014	Analytical graphs illustrating the performance of a great variety of energy system indexes by scenario (including GIC, GHG Emissions, Elec Prices etc.)	delivered for cost reporting A,C and D
		Version 09-MAY-2014	
Balances by fuel	9/5/2014	Energy Balances by fuel type for each scenario	delivered for all 6 scenarios (Refplus and 5 EE variations)
AverageRenovation_EEv09-MAY-2014	9/5/2014	Renovation rates for buildings at EU level by scenario	
EEperformance_for ETSV09-MAY-2014	9/5/2014	Energy efficiency indicator by country including industry, residential, tertiary by scenario	
EEperformanceV09-MAY-2014	9/5/2014	Energy efficiency indicator by country by scenario	
REPORT ON EE FILES SET 1 case (one file for each cost reporting)	9/5/2014	Analytical graphs illustrating the performance of a great variety of energy system indexes by scenario (including GIC, GHG Emissions, Elec Prices etc.)	delivered for cost reporting A,C and D
REPORT ON EE FILES SET 2 case (one file for each cost reporting)	9/5/2014	Analytical graphs illustrating the performance of a great variety of energy system indexes by scenario (including GIC, GHG Emissions, Elec Prices etc.)	delivered for cost reporting A,C and D
		Version 11-APRIL-2014	
Balances by fuel	17/4/2014	Energy Balances by fuel type for each scenario	delivered for all 6 scenarios (Refplus and 5 EE variations)
EEperformanceV15-APRIL-2014	25/4/2014	Energy efficiency indicator by country by scenario	
REPORT ON EE FILES SET 1 case (one file for each cost reporting)	25/4/2014	Analytical graphs illustrating the performance of a great variety of energy system indexes by scenario (including GIC, GHG Emissions, Elec Prices etc.)	delivered for cost reporting A,C and D
REPORT ON EE FILES SET 2 case (one file for each cost reporting)	25/4/2014	Analytical graphs illustrating the performance of a great variety of energy system indexes by scenario (including GIC, GHG Emissions, Elec Prices etc.)	delivered for cost reporting A,C and D
		Version 28-FEBR-2014	
EEperformanceV28-FEBR-2014	6/3/2014	Energy efficiency indicator by country by scenario	
AverageRenovation_EEv28-FEBR-2014	27/2/2014	Renovation rates for buildings at EU level by scenario	
REPORT ON EE FILES case (one file for each cost reporting)	6/3/2014	Analytical graphs illustrating the performance of a great variety of energy system indexes by scenario (including GIC, GHG Emissions, Elec Prices etc.)	delivered for cost reporting A,B,C and D

Version 18-FEBR-2014		
EEperformance	18/2/2014	Energy efficiency indicator by country by scenario
AverageRenovation_EEv21022014	21/2/2014	Renovation rates at EU level by scenario

3. Scenarios of Energy Efficiency beyond 2020 for the EU

Quantified by E3MLab using the PRIMES model

3.1. Introduction

The present report describes the assumptions, the methodology and the results of a group of scenarios[1] which mirror different degrees of energy efficiency promotion effort in the time period after 2020.

The scenarios are full-scale energy demand and supply projections for each of the EU Member-States and for the Union as a whole. The projections cover the period up to 2050, by 5-years steps, starting from 2010 which is considered as the base year.

The PRIMES model, version 2012-2013, is used for quantifying the scenarios. This version of the model includes the data-base and the calibration data developed during the preparation of the Reference 2013 scenario, which has been endorsed by the European Commission and for which assumptions and data have been consulted with Member-State experts, representatives and stakeholders. The statistical update has been performed around end of 2012 when year 2010 statistics were fully available. Projection of exogenous variables to PRIMES, such as world fossil fuel prices, GDP, population and production by sector of activity, has taken place in the last quarter of 2012, reflecting views and data available at that time. Similarly, the assumptions about future evolution of costs and performance of various energy demand and supply technologies have been consolidated in the beginning of 2013.

The present study also draws on the experience of quantifying scenarios using PRIMES in the context of the 2030 policy exercise for energy and climate targets which has been carried out from July 2013 until end of 2013. This exercise has also built on the PRIMES model and data version 2012 -2013. In the context of this exercise, some of the scenario assumptions have been organized in two groups, one called reference settings and the other enabling settings. The former group assumes that actors in the energy sectors do not anticipate strong GHG emission reduction commitments in the time period after 2020 and so they do not necessarily take all actions that are necessary to achieve optimal levels of infrastructure, technology learning and market coordination. In contrast, the enabling settings mean that because of good anticipation of future GHG emission reduction commitments, all conditions are met in infrastructure, technology learning and market coordination so as to enable – maximize the effectiveness of policy instrument which aim at driving strong GHG emission cuts. In simpler words, GHG emission cuts are more difficult, hence more costly, under reference settings compared to enabling settings. Ensuring that enabling settings do happen in reality is of course part of the policies to put in place, but by definition the actual policy instruments which are conceived for driving GHG emission cuts effectively are not included in the settings, which include only the

[1] This current report is the fourth update of the report submitted to the Commission on the 13th of March, and describes the scenarios that have been developed following updated Commission specifications provided in May 2014, and delivered on May 20, 2014.

background and basic actions which are meant to facilitate the actual drivers of GHG emission cuts.

It is reminded that the European Commission's communication for the 2030 energy and climate targets has proposed 40% GHG emission reduction by 2030 and an EU-wide target of 27% measured by the RES-share indicator. According to the GHG40 scenario quantified using PRIMES, this is achieved assuming the enabling settings and by increasing ETS carbon taxes and equal non-ETS carbon values above Reference scenario levels.

3.2. The reference plus scenario

The purpose of the reference scenario in the study context is to serve as a basis projection from which to build scenarios which add policy assumptions that are subject to assessment.

The reference scenario follows the logic of including only policy measures which have been adopted until a certain cut-off date, without including new policies not yet officially adopted. In the reference 2013 scenario, which has been published in December 2013, the cut-off date was spring 2012.

The reference plus scenario is conceived as a variant of the Reference 2013 scenario. The update consists in including a few additional policy assumptions, which are listed below:

- Transport sector: additional initiatives in the field of transport adopted by the Commission end of 2012 and in 2013 (New EU rules for safer and more environmental lorries; Clean Power for Transport package; Forth railways package; Single European Sky) and few measures at MS level (road charging for Hungary, Belgium and UK and a bonus system for silent wagons for rail freight in the Netherlands and Denmark) as they were specified by DG MOVE in December 2013.
- Small revisions of assumptions for the assessment of the national obligation schemes and alternative measures that the MS notified under art. 7 of the EED, as follows:
    - Sweden does not exclude the energy consumption of the transport sector while calculating the energy savings for 2014 – 2020.
    - Denmark does not use the 25% exception and even goes beyond the obligations of art. 7 EED.
    - France intends implementing 75% of the 10.5%
- Update in regard to eco-design and labelling using an updated bottom-up evaluation of potential savings. The PRIMES model resolution is lower than that followed by eco-design engineering studies. We have checked for a few aggregate consumption categories the energy savings in 2020 of the Reference 2013 scenario relative to a hypothetical scenario without these measures. We found that roughly the savings are in the same order of magnitude as in the new eco-design study. To accommodate small differences, we have slightly modified parameters which induce earlier market penetration of more advanced, hence more efficient, technologies for space heating, including boilers.
- The reference plus scenario reflects the recently agreed revision of the F-gas regulation, adopted in March 2014. The expected F-gas emissions reduction from the regulation has been included for every MS following the Commission's guidance (the applied reduction is presented in Annex A).

The changes from the Reference 2013 projection are small; they mainly show small reduction of energy demand in Reference plus relative to Reference 2013. The impacts on ETS are also small and the modelling found no justification to modify the equilibrium ETS prices which are maintained as in Reference 2013. The additional measures (slightly lower demand in transport, notably in aviation, and slightly lower demand in non-ETS including for electricity) imply very few changes in EUA surplus by 2020 (66 $MtCO_2$ above reference 2013 levels) and a little higher surplus by 2030 (124 $MtCO_2$ above reference 2013) which are projected to be maintained until 2050. The additional amounts in the EUA surplus are small and are not likely to perturb the ETS carbon price projection as projected in the context of the Reference 2013 scenario.

In terms of the overall RES share indicator, the reference plus scenario achieves 20.96% by 2020 which is practically equal to the 20.88% achieved by Reference 2013. In terms of the ratio of energy savings[2] as percentage of 2010 consumption, the reference plus scenario achieves 5.1% by 2020 which is a little above the 5.0% shown in the reference 2013 projection.

In terms of the rate of savings in primary energy consumption relative to PRIMES 2007 projection, the reference plus projection achieves 17% in 2020 and 21% in 2030, which are quite similar to the 16.8% in 2020 and 21% in 2030 ratios projected in the Reference 2013 scenario.

The inclusion of the F-gas regulation in the reference plus scenario leads to higher reduction of non-CO_2 emissions post 2020 relative to the Reference 2013 scenario. In particular, in 2030 the non-CO_2 emissions reduction in the reference plus is 42% relative to 1990, with the respective figure being 38% in the reference 2013 scenario. The difference in total GHG emissions reduction is however small (33% instead of 32% in 2030), as non-CO_2 emissions constitute a small percentage of overall emissions.

So, reference plus is a projection very similar to the Reference 2013 scenario; the only noticeable differences are a very small reduction of energy demand in 2020, which is a consequence of updated assumptions regarding the implementation of the energy efficiency legislation and also of a few additional policies considered for the transport sector, and the reduction of non-CO_2 emissions due to the implementation of the F-gas regulation.

3.3. Reference plus with higher linear reduction factor for EUA (Reference plus LFR2.2 scenario)

The main assumption of the "reference plus LFR2.2 scenario" is to use reference plus and add the changes in future ETS allowances as envisaged in the recent European Commission's communication on 2030 policies and targets.

In the aim of reflecting the assumptions of the European Commission's communication on 2030 policies and targets, DG ENER/C3 specified a time series of EUA cap for the time period 2021-2050 which applies a 2.2% rule to determine the linear reduction amount. The new calculation finds a linear reduction amount of 47.68 Mt CO_2 to apply yearly after 2021 and a total cumulative cap in the period 2008-2050 of 64810 Mt. This is to compare to a linear reduction amount of

[2] The savings are calculated as the difference of energy consumption in the industrial, residential and tertiary sectors in the projection from energy consumption in a hypothetical scenario which does not include the energy efficiency policies.

37.66 Mt in the reference plus scenario (and in reference 2013) and to a cumulative cap of 69473 Mt in the period 2008-2050 (which implies a reduction of 6.75% of EUA cap in cumulative terms).

It should be noted that in the GHG40 scenario quantified using PRIMES for the 2030 policy analysis the assumptions of linear reduction amount was 56.36 Mt, determined according to a 2.6% linear reduction factor, and the total cumulative cap was 60777 Mt. These assumptions have been adopted also for the energy efficiency policies scenarios that are analysed in this report. Table 1 summarizes the allowances trajectories for all scenarios.

The Reference plus LFR2.2 scenario builds on the reference plus scenario, which implies that all assumptions reflect the reference scenario context. This contrasts the GHG40 scenario which was reflecting the enabling settings set of policy assumptions. The enabling settings refer to infrastructure (grids, smart systems, recharging of car batteries, etc.), the pace of technology progress as possibly accelerated by positive anticipation of future strong emission cutting commitments, to the potential of RES which are assumed to be facilitated by grids, permitting procedures, better acceptability, etc., to the potential of CCS, to the better functioning of the internal market enabling maximum use of enhanced grids, and in the long term to advanced storage systems etc.

No reduction targets for overall emissions were considered in the definition of the Reference plus LFR2.2 scenario; it is reminded that the GHG40 had adopted the target of 40% emission reduction by 2030 and 80% by 2050. Similarly, no carbon value was assumed to apply in non-ETS sectors under the "Reference plus LFR2.2 scenario"

A short description of the simulation of the ETS in PRIMES

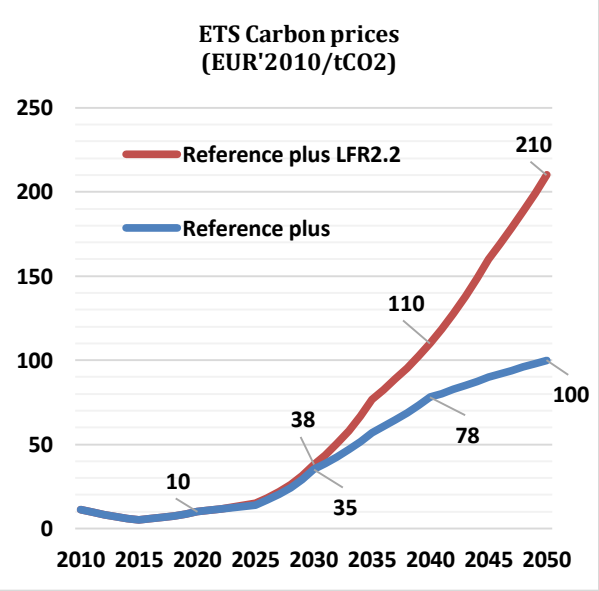
The PRIMES model simulates the current structure of the ETS legislation. EUAs (allowances) are issued every year according to a pre-determined schedule, for example reducing by a linear factor every year (2.2% in the Reference plus LFR2.2 scenario or 2.6% in the EE policies scenarios). The coverage of ETS is currently according to Phase III for the projection years of PRIMES; allowances are given for free to some sectors at certain proportion until a given year and are put on auction for all others who are subject to ETS. Pan-European auctions lead to a single EU-wide market clearing price every year. Emissions can be justified by allowances just purchased or banked; but borrowing allowances to be issued in the future is not permitted. The mathematical problem to be solved is therefore to find a time trajectory of ETS prices such that cumulative emissions are justified by cumulative allowances without borrowing from future. The mathematical problem is a typical optimal control problem resembling to exhaustible resources (cumulative cap of allowances) subject to an extraction cost function which increases with volume extracted and decreases with technology progress as a function of time. Emissions will depend on the ETS prices as emission abatement exhibits decreasing returns to scale (increasing marginal costs with abatement volume), but on the other hand emission abatement possibilities increase over time driven by technology progress. Essentially actors who need allowances to justify emissions compare expected ETS prices with expected marginal cost of abatement which increases because abatement amount increases over time with the increasing rate being moderated by technology progress. Currently the ETS has a large surplus of allowances derived from the lower emissions during the economic crisis. The ETS price trajectory in PRIMES assumes that there is full legislative certainty perceived by all involved actors implying that actors will use their surplus gradually over time. Within the modelling effort is undertaken to maintain a surplus that is consistent with a behaviour where actors maintain a small stock to hedge against price volatility. Within scenarios with high energy efficiency (such as the scenarios within this report) surplus may increase beyond such levels to avoid extremely low ETS prices- with the very high levels of efficiency in the EE35 and EE40 the ETS prices are however very low 13€/t CO_2 and 6€/t CO_2 respectively.

assumptions[3]. Along the same lines as Reference plus, the "reference plus LFR2.2 scenario" assumes no additional RES or EE policies after 2020. The only direct carbon policy in the "reference plus LFR2.2 scenario" is the increase of the EUA linear reduction factor compared to Reference Plus assumptions; this change has consequences for sectors belonging to ETS which will have to meet a reduced allowances cap until 2050. The electricity sector will have to reduce emissions in "reference plus LFR2.2 scenario" which with the implied changes in electricity prices and costs influencing demand for energy, hence energy supply and emissions.

Table 1: Overview of assumptions about future ETS allowances

Issuance of ETS allowances (EUA) (in million tons of CO_2 equivalent)	Scenarios in this study				For comparison
	Reference 2013	Reference plus	reference plus LFR2.2	Energy Efficiency scenarios	GHG40 scenario (2030 policy study)
Year 2015	2232.63	2232.63	2232.63	2232.63	2232.63
Year 2020	2044.32	2044.32	2044.32	2044.32	2044.32
Year 2021	1892.66	1892.66	1882.63	1873.96	1873.96
Year 2022	1855.00	1855.00	1834.94	1817.60	1817.60
Year 2050	800.48	800.48	499.65	239.45	239.45
Linear reduction amount 2021-2050	37.66	37.66	47.69	56.36	56.36
Cumulative cap 2008-2050	69472.66	69472.66	64809.68	60776.68	60776.68

Figure 1: ETS Carbon prices in EUR'2010/t CO2 – PRIMES modelling results

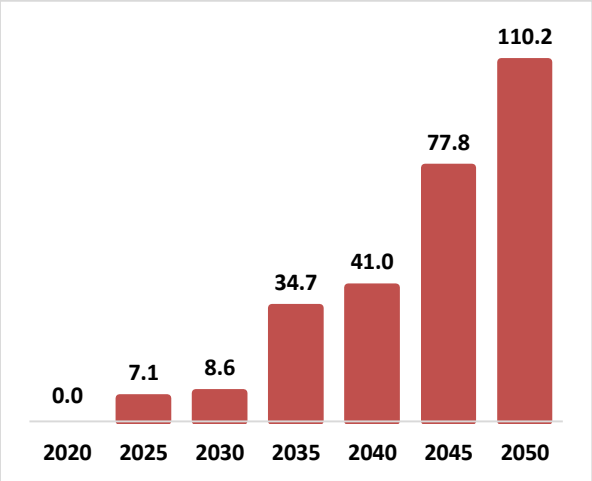


ETS prices are endogenously derived in PRIMES so as the cumulative ETS cap is met; driven by the reduction of the allowances cap, the projection shows a steady increase of ETS carbon prices after 2020, in the "reference plus LFR2.2 scenario" compared to the reference plus scenario. However, the increase in carbon prices is small in the period up to 2030 and prices are shown to escalate only after 2030. The modelling approach in PRIMES assumes risk-averse behaviour of the market-agents and perfect foresight of future high ETS prices; this in combination with the fact that no borrowing from the future is permitted, results in the surplus of allowances remaining at high levels, above 2 billion EUA, until 2030. This is the main reason explaining the small impacts on prices until 2030 even with the assumption of lower allowances. A further increase of prices before 2030 would increase the surplus and

[3] The same applies for the Reference 2013 and Reference plus scenarios.

thus would increase uncertainty about future returns from banking of allowances. Overall, the reduced cap implies less than 10% increase in ETS prices before 2030.

Figure 2: Percentage change of ETS carbon prices due to lower cap in the "reference plus and EUA" scenario – PRIMES modelling results



Consequently at market equilibrium surplus of EUA in 2030 is maintained roughly at 2.1 bn tCO_2 and at that level carbon prices increase only slightly compared to reference plus. The EUA surplus levels have to decrease in the period after 2030, as it is assumed that the surplus has to vanish up to the horizon of 2050. So banked allowances have to be used but at the same time the issuance of new allowances is reduced every year. Consequently to maintain market balance, ETS participants have to reduce emissions and this requires significant increase in carbon prices. The escalation of carbon prices is more pronounced in the period after 2030. Carbon prices increase by 40% in 2040, above reference plus prices, and more than double in 2050.

Another requirement for the "Reference plus LFR2.2 scenario" is that the indicator measuring renewables as percentage of gross final energy consumption (i.e. the overall RES share) gets a value not below 27% by 2030. Both Reference 2013 and Reference plus projections show a value for RES share which is 24.4% by 2030. These scenarios assume phase out of RES supporting policies after 2020 and they project an increasing, but slowing down, trend of RES development based only on competitiveness of RES in the markets which dynamically builds up due to technology learning. The "Reference plus LFR2.2 scenario" projects higher ETS carbon prices than the reference plus scenario, because of lower ETS cap. Higher carbon prices drive higher RES development in the power sector. Nonetheless, the results indicated that the projected carbon prices in the "Reference plus LFR2.2 scenario" are not sufficient to drive RES share up to 27% by 2030.

Under the assumptions of the GHG40 scenario (quantified in the context of the study for the 2030 policies and targets) the RES share got a value slightly below 27% in 2030 because that scenario has assumed enabling settings, which include RES facilitation through grids and better access to remotely located resources, and has also applied carbon values (equal to ETS carbon prices) in the non-ETS sectors.

In order to obtain a RES-share above 27% in 2030 under the assumptions of the "Reference plus LFR2.2 scenario", it was then necessary to increase the RES value[4] both in power sector and in

[4] RES-value is a modelling technique to impose a certain RES target as an obligation. It applies by sector or on the entire energy system and can be differentiated by country or apply at EU-wide level. It acts as a shadow price of the RES target and enters the actors' optimization problems as a marginal benefit of using RES. The RES-value does not imply any direct payment but may entail incremental costs indirectly compared to a scenario with lower RES-value. A RES-value can be interpreted as a policy instrument when

heating/cooling sectors; the increase was applied uniformly on all Member-States, proportionally to the country specific allocation of RES targets for year 2020. On average, RES value increment of 14 EUR/MWh, above level in reference plus, were necessary to achieve the 27% res-share in 2030. In GHG40 scenario there was no need to increase RES values compared to Reference 2013 and the 27% share was achieved mainly as a result of drivers acting directly on emission reduction (carbon prices in both ETS and non-ETS).

3.4.Definition of energy efficiency policy scenarios

Short overview of demand side modelling in PRIMES

For each sector a representative decision making agent is assumed to operate, who optimizes an economic objective function. For households and passenger transport a utility maximisation function is assumed, whereas for industrial, tertiary and freight transport sector a profit maximisation (or cost minimisation) function is assumed. The consumers need to maximise utility from energy services (useful energy); saturation effects are taken into account in the functional forms for utility and marginal utilities are decreasing functions of volumes. The consumer has an operational budget constraint, based on income and uses that money to purchase energy commodities, to maintain and to replace equipment and appliances; the decision is therefore represented as a nested budget allocation problem. Investing for improving the specific energy characteristics of thermal integrity of the building (renovation, new constructions, etc.) is a separate decision which depends on the anticipated average cost of energy consumption (including the effect of carbon values or carbon prices) and on the eventual energy efficiency obligations (mirroring policies such as those in the EED).

The choice of investment level for improving thermal integrity implies comparison of annual capital costs (this is annualisation of investment expenditure using a discount rate) and saved variable operating costs. The modified thermal integrity implies lower requirements for energy consumption but also a rebound effect on useful energy needs. At this stage, the model soles a dynamic cost minimisation problem to meet final energy demand by selecting the optimal mix of fuels and the optimal choice of equipment type. This choice is

The energy efficiency policy scenarios aim to reflect escalating levels of energy efficiency efforts after 2020. A set of six scenarios was quantified; the six scenarios assume a stepwise increase in the intensity of energy efficiency achievements. Measured as primary energy demand savings in 2030 relative to PRIMES 2007 projection, the six energy efficiency scenarios were defined so as to achieve primary energy demand reductions in 2030 within a range of 25% to 40%. These levels compare to 21% projected in the Reference plus scenario which is retained as a basis for comparison. As there was no indication of MS targets from the Commission services the target was set at EU level and the resulting split of the target by Member States is a modelling result.

All energy efficiency scenarios, analysed in the present report, are decarbonisation scenarios, meaning that they incorporate an 80% GHG emissions reduction target in 2050 and a carbon budget constraint, as well as assuming enabling settings: this means that there is good anticipation of strong GHG emissions

the RES obligation is achieved through tradable certificate systems, in which case the RES-value is the certificate price at market equilibrium. It can be seem also as an indicator of marginal intensity of non-identified RES supporting policies of bottom-up nature which lead to a RES amount achievement which has the RES-value as shadow price.

constrained by the existing stock of equipment which is however considered to be replaced prematurely if economic optimality suggests it. When it comes to buy a new equipment (e.g. a boiler) the consumer has various choices which represent different types classified according to energy performance (higher performance implies higher acquisition cost). The choice is simultaneous with choice of fuel type, the possible replacement of old equipment and the rate of use of the equipment (which is lower when thermal integrity improvement is high). As it is a dynamic optimisation, the model has to aggregate present upfront costs for the purchasing of equipment with future variable costs over the lifetime of the equipment, in order to compare alternative choices which have different upfront costs and different variable costs.

This comparison requires present value calculations which use a discount rate. The model considers 10 year anticipation by actors in the demand sectors. The unit costs of alternative choices (equipment types) include factors which reflect uncertainty and perception by the consumer which are associated to the technology type. Such subjective costs are higher for advanced technologies when they are not mature in the market. When they become mature such costs vanish. Policies may decrease these subjective costs, such as through campaigns, technology push measures and standards, such as the eco-design. The model takes the view that the consumers are rational but they behave in a context of uncertainty and lack of information so they can make choices which are sub-optimal compared to a situation where all imperfections are removed. The discount rate reflects opportunity costs of drawing private funds in the presence of uncertainties and a risk aversion behaviour -for use of different discount rates for the decision making and for the cost accounting in the reporting please see section 3.5.1. Limited access to cash flow or eventual funding based on equity or private savings, obviously increase opportunity costs and also the premium of risk reflecting risk aversion.

reduction commitment and that infrastructure, technology and market coordination develop accordingly. This assumption renders emission reduction actions, including energy savings, economically more attractive relative to the reference scenario context and thus induces additional energy savings.

In this context, all scenarios assume the achievement of 40% GHG emissions reduction target, and the achievement of at least 27% RES share in 2030. The trajectory of the ETS allowances as well as carbon leakage assumptions are assumed to be the same as applied for the GHG40 scenario of the 2030 policy analysis (see Table 1). The assumed implementation of energy efficiency policies facilitate the achievement of the required emission reductions; in scenarios where CO_2 emission reductions from energy and processes are not sufficient, additional non-CO_2 policies are assumed,[5] to cover the gap to achieve the 40% GHG emission reduction in 2030. The only scenario which considerably overshoots the 40% GHG emission reduction target is the EE-40 scenario where the intensity of EE policies results in approx. 5 percentage point overachievement of the target.

The assumed structure of energy efficiency policies is similar to the current set of legislation including the Energy Efficiency Directive; it is assumed that in the context of the energy efficiency scenarios the legislation continues after 2020 and further

[5] Sufficient policies to cover the remaining gap are assumed. The related cost of the additional non-CO_2 abatement is determined through the same cost curves, from the GAINS model, that have been used for the 2030 policy analysis scenarios.

intensifies in terms of saving obligations until 2030. The intensity of saving obligations is defined in each energy efficiency scenario, so as to obtain approximately the degree of achievement in terms of primary energy consumption as shown in Table 2. The aim is to explore the range up to 40% for year 2030. The energy efficiency assumptions imply reduced demand for energy by end-users of energy and also reduced demand for electricity. For each scenario the model simulates a new equilibrium in energy markets and also in ETS market taking into account the reduced demand.

The following table summarizes the scenarios that are quantified and the achieved energy savings:

Table 2: Primary energy savings (% change to the respective year value of PRIMES 2007 baseline projection) – PRIMES modelling results

Primary energy consumption savings – excluding consumption for non-energy purposes (% change to the respective year value of PRIMES 2007 baseline projection)	**2030**
Reference 2013	-21
Reference plus	-21
Reference plus LFR2.2	-22
EE – 25	-25
EE – 28	-28
EE – 30	-30
EE – 32	-32
EE – 35	-35
EE – 40	-40

In order to achieve the above energy savings, we varied the intensity of policy instruments (which correspond to a number of exogenously controlled modelling parameters) in the model which drive energy efficiency. Among these policy instruments, the most important regard investment to improve thermal integrity of buildings (efficiency values) and the degree of uptake of best available techniques (BAT) in the industrial sector. The variation of the numerical values of the controlling instruments in every scenario resulted in the energy saving figures shown in Table 2.

The controlling instruments used to drive energy savings are summarized below (following sub-sections describe in more detail the way these controls are varied in every EE scenario):

a) **Energy Efficiency Obligations for Houses and Buildings**: Increasing energy efficiency obligations related to thermal integrity of dwellings is simulated by varying the energy efficiency values, which apply by country and also for the EU as a whole. Energy efficiency values escalate by scenario and drive a faster pace of investments in renovations, as well as increasing deepness of renovations from an energy perspective. New buildings codes are invariant by scenario, however demolishment rate and enforcement of building codes slightly vary by EE scenario (they however have smaller effects than renovations, as building codes are assumed to be very strict already in the reference scenario). National policies towards stronger renovation (mirrored by the efficiency values at national scale) increase gradually across the EE scenarios, and are more harmonized across the EU in the ambitious cases. The energy efficiency values (EUR/toe saved) act in the model only in the sectors of residential and office buildings and exert effects on energy efficiency investment and

behaviour as shadow prices associated to a virtual energy saving obligation. In the context of a scenario building, the modeller has in mind a certain energy saving target (by year, by sector and by country) and varies the numerical value of the efficiency value until the model results are sufficiently close to the hypothetical target. In a more concrete policy perspective, this process is equivalent of having a guess-estimation about the degree of achievement under Article 7 of the Energy Efficiency Directive by country and over time, assuming that EED is implemented and enhanced beyond 2020; this guess-estimation is then mirrored in the model projections by varying the energy efficiency values. It is worth mentioning that there is no direct relationship between the energy efficiency value and the energy saving indicator which is used to monitor implementation of Article 7. This ratio uses total final energy demand excluding transport, and so it depends on all factors and instruments which influence energy consumption. However, because the largest part of energy consumption in these sectors is taking place for heating/cooling purposes, the energy efficiency values and the ensuing investment to improve thermal integrity constitute by far the main driver of increasing energy saving performance measured according to Article 7.

b) **Reduced interest rates due to policy implementation**: Subjective discount rates used by consumers for decision making are modified downwards in the EE scenarios. Discount rates are already lower than default values in the reference scenario due to the assumption of the implementation of the Energy Efficiency Directive (EED), which is expected to promote utilities and ESCOs as carriers of efficiency investment in customer premises, thus reducing the perception of associated (technical for example) risks by potential clients and by easing access to financing (thus decreasing shadow interest rates reflecting potential difficulty of fund raising by individuals). The discount rates decrease in a stepwise manner in all energy efficiency scenarios and get values below reference scenario levels. The decrease of discount rates increase profitability of energy efficiency investment and make possible cases which otherwise would have been rejected by energy end-users. Consequently, houses and buildings are renovated more intensively and energy saving performance increases in absolute terms and also in relative terms as measured against application of Article 7 of EED.

c) **Eco-design regulations**: Regulations that promote or impose energy efficiency standards such as eco-design regulations are included in the EE scenarios but their intensity does not vary between scenarios; in all scenarios eco-design regulations are the strictest possible and are assumed to be implemented. The degree of dynamic uptake of advanced technologies is endogenous in the model and among others it depends on perceived risks of using advanced technologies in early stages of their commercialization. Anticipation factors also influence the perceived risks; for example anticipating strong enforcement of eco-design and strong policy commitments towards ambitious energy efficiency progress incite consumers to believe that technology maturity will be achieved and thus they tend to uptake the advanced technology earlier and more massively than otherwise. This in turn allows learning to be achieved more quickly. In other words, the anticipation of the energy efficiency policy context enables more effective coordination between uptake by consumers and learning/maturity ensured by suppliers; such coordination makes possible to achieve higher levels of energy efficiency at earlier stages. The model parameters which tune this process are assumed to take varying values in every energy efficiency scenario so as to mirror higher degree of technology progress associated to the policy intensity level of each scenario.

d) **BAT techniques in Industry**: The industrial sectors are simulated with detailed decomposition by process. Technology categories which are candidate for choice when

investing for equipment by process type reflect technology progress, hence efficiency increases when investing; in addition early selection of more advanced, hence more efficient technologies, implies more accelerated energy efficiency progress. Such selection depends on expected relative cost and prices of technologies, including costs of fuels and emissions, and on the expected growth of industrial sector's output. In technology selection perceived risk factors influence profitability of advanced technologies: good anticipation about future emission cut commitments and generally the context of a process towards low carbon help removing uncertainties related to advanced technologies and both early uptake and technology maturity are facilitated. Parameters in the model control the influence of anticipation and the low carbon context on uptake of advanced technologies and the related learning degree for technologies. These parameters vary across scenarios reflecting the increasing intensity of the energy efficiency ambition.

e) **Horizontal BAT for energy savings in Industry**: The candidate technologies for investment in industrial equipment have characteristics which are aligned to best available technique (BAT) information. In addition, the model includes horizontal possibilities of investment for the purpose of saving energy; these horizontal technologies are not the same as the technologies for the equipment associated to the various processes. Such horizontal possibilities mainly include energy control systems and heat recovery systems. They also follow BAT specifications. The model database includes engineering estimations of potential amounts of energy savings due to deployment of horizontal BAT, such as control systems and heat recovery. The degree of exploitation of this potential depends on relative costs and prices and also on exogenous model parameters which reflect the degree of anticipation of future emission cutting commitments, the degree of enforcement of BAT promoting policies and generally the intensity of the policy context enabling such savings. The values of the parameters controlling the pace of uptake of BAT technologies in industry for horizontal energy saving purposes is escalating across the EE scenarios, so as to mirror the assumptions about increasing energy efficiency ambition across the scenarios.

f) **DH and CHP**: Promotion of district heating and highly efficient CHP are part of the energy efficiency policy package. They are assumed to be promoted in the reference scenario but the time horizon is limited to 2020. In the energy efficiency scenarios the policy continuous in the long term and for district heating it consists in promoting investment which allows higher number of users to have access to networks. This varies by country depending on saturation factors and spatial possibilities. The parameters expressing expansion of networks slightly escalate across the energy efficiency scenarios. Cogeneration of heat and electricity is a cost effective option which is significantly exploited already in the context of the reference scenario. Small additional developments are foreseen in the energy efficiency scenarios; as these scenarios reduce demand both for heat and electricity, return to scale factors counter-act further development of CHP; this however differs by country depending on specific conditions related to total demand for steam, which further depends on industrial development in the future, the technology mix in power sector and others.

g) **More efficient grids**: Grid losses are semi-endogenous in the model depending on technology progress and on the load factor[6]; a low load factor generally implies higher losses in electricity grids because of higher tension in peak times. It is assumed that in the context of energy efficiency policies also smart metering and grids develop which by allowing higher

[6] The load factor is the ratio of total electricity generated within a period of time over maximum potential generation based on net power capacity.

demand response to time-of-use prices help to smooth out variability of load and thus increase the load factors. This further implies lower losses in the grids. However, there exist limitations on the potential of grid loss reductions depending on load variability, which are captured in the modelling by assuming small variation of grid loss progress across the energy efficiency scenarios.

In the reference scenarios, improvement towards higher energy efficiency is assumed to occur as a result of the EED and are mirrored in the model by the above mentioned controlling instruments (a), (b), (c), (f) and (g) only, which means that BAT in industry was not included as a result of policy push in the context of the reference scenarios. Moreover, these controlling instruments are assumed to act mainly to the horizon of 2020 in the reference scenarios and to gradually phase out thereafter. On the contrary, all EE-scenarios assume continuation of these controlling instruments after 2020, inclusion of additional controlling instruments for industry, such as (d) and (e), and most importantly, intensification of their magnitude after 2020, at varying levels across the scenarios.

It is reminded that the PRIMES model is a complex model and all controlling instruments described above are implemented contemporaneously in all the scenarios analysed within this report therefore acting simultaneously on improving energy efficiency. The reduction of discount rates induces higher investment in efficient (more expensive) equipment and higher renovation rates for buildings as reducing discount rates facilitates more capital intensive investments. The energy efficiency values also act in the same direction driving a faster pace of investments in renovations, as well as increasing deepness of renovations from an energy perspective and are used to simulate policies aiming at increasing energy efficiency obligations related to thermal integrity of dwellings. The change in perceived cost is used to simulate the eco-design directive and applies to energy equipment: more advanced technologies are more expensive than conventional technologies and are often (when the base technology changes) met with reluctance to adopt them from the side of consumers – which in PRIMES is simulated by adding a perceived cost to the technology cost; the eco-design directive as well as the eco-labelling directive aim at improving the perception of the advanced and new technologies from a consumers perspective therefore reducing the perceived cost of technologies. Together with the reduction of discount rates the reduction of perceived cost increases the adoption rates of advanced and new technologies at the decision making level in the model.

Apart from the intensification of the above instruments that impact stationary uses of energy, energy savings are achieved in the EE scenarios through measures for the transport sector. These measures are additional to the measures included in the reference scenarios and contribute to energy savings mainly beyond 2020. These additional measures draw on the 2011 White Paper on Transport and imply that the scope of the EED (Art 7) remains unchanged in relation to transport. The particular specifications, which are presented in detail further in this report, include further tightening of CO_2 standards until 2050 for cars and light commercial vehicles (LCVs) accompanied by the development of recharging infrastructure, improvement of the techno-economic characteristics of batteries and the evolution of the biofuels industry..

Overall, the energy efficiency scenarios achieve higher levels of efficiency and energy savings relative to the reference scenarios because of the additional energy efficiency measures in stationary energy uses and the additional measures in the transport sector. Moreover the good

anticipation of strong emissions reduction commitment (enabling settings) leads people to act earlier and better, and removes market barriers facilitating the achievement of increased energy savings. Finally, it should be noted that the ETS back-loading, the Market Stability Reserve proposal and the revised Energy Taxation Directive have not been taken into account in the energy efficiency policies scenarios.

3.4.1. Efficiency values in the energy efficiency scenarios

Efficiency values are a key modelling instrument used to simulate energy saving obligations in the sectors of houses and office buildings. The efficiency value is measured in EUR/toe-saved and can be seen as a threshold which indicate as profitable all portions of energy saving investment which have an annual marginal energy saving cost equal or below the threshold value. The efficiency value is the additional amount that has to be borne annually for a limited period of time incurring as a unit cost above average fuel price in order to economize over fuel payments for an unlimited period of time due to the energy saving investment. In the model, the efficiency value is perceived by the demand actors as a virtual marginal value stemming from energy savings: it makes profitable all portions of the cost-potential curve (with increasing slope) of energy saving investment possibilities which are positioned below that value and thus the corresponding energy saving investments are selected and deliver energy savings over subsequent periods of time. The logic of setting the levels of efficiency values in a scenario context is to iterate until a certain pre-determined energy saving amount is obtained from scenario results. In this sense, the efficiency values are not policy instruments, but the ensuing energy saving amounts can be considered as targets or obligations and so they are policy instruments. Of course, a model like PRIMES does not cover the details of policies which enforce such a target or obligation. Nonetheless, considerations of accompanying policies which aim at enabling more effective implementation of the target/obligation can be mirrored in the model assumptions, as for example the change in interest rates related to the assumption of implementing the targets as obligations on utilities (see below for more details).

The efficiency values have a national component to represent national policies and an EU-wide component which also applies nationally but is defined at the EU-wide level to ensure harmonization across the Member-States. In the context of modelling the Energy Efficiency Directive, the efficiency values are considered as the shadow prices of energy savings obligations (by country and by sector) according to Article 7 of the EED.

Table 3: Efficiency values assumed by scenario (EUR'10/toe-saved, EU28 wide) – PRIMES modelling assumptions

	2020	2025	2030	2035	2040	2045	2050
Reference 2013	261	213	181	141	139	96	95
Reference plus	270	217	183	142	140	97	96
Reference plus LFR2.2	270	217	183	142	140	97	96
EE - 25	270	298	332	343	360	385	417
EE - 28	270	357	619	641	688	757	847
EE - 30	270	537	991	1,185	1,289	1,442	1,642
EE - 32	270	559	1,173	1,245	1,355	1,517	1,728
EE - 35	270	764	1,768	1,849	2,019	2,271	2,595
EE - 40	270	778	2,937	2,957	3,097	3,402	3,798

The energy efficiency values mainly induce investments which improve thermal integrity of existing and new houses and buildings and secondarily they induce rational use of electric appliances and lighting. In the EE scenarios the efficiency values are increased across scenarios so as to mirror the increasing energy efficiency ambition of the scenarios. Consequently the scenarios show increasing levels of thermal integrity of houses and buildings enabled mainly by acceleration of renovation and also by higher deepness of renovation in energy terms. The efficiency values are maintained the same across all scenarios until 2020, and they are increased in years 2025 and 2030 (see Table 3). Post 2030, an increase of the efficiency values by a very small rate is applied for the remaining modelling years.

Driven by the above mentioned energy efficiency values, and other controlling instruments at a lesser degree, the residential and tertiary sectors reduce energy consumption at rates which increase with the degree of energy efficiency ambition built-in each scenario. To illustrate this, the table below shows an energy saving indicator which is calculated as the difference of energy consumption by residential, tertiary and industry between an energy efficiency scenario and a hypothetical no-policy scenario. The indicator expresses this difference as percentage of energy consumption in 2010. The energy saving indicator has been used also in the context of the Reference 2013 scenario to measure performance in terms of Article 7 of the EED. It can be shown below that the indicator values show impressive energy saving achievements in the final energy demand sectors, excluding transport, which go far beyond expectations for 2020 under Article 7.

Table 4: Reduction of final energy demand in industry, residential and tertiary sectors compared to a scenario without the Energy Efficiency Directive (EED) – PRIMES modelling results

	2020	2025	2030	2035	2040	2045	2050
Reference 2013	-5.0%	-5.7%	-6.1%	-6.4%	-6.7%	-6.5%	-6.7%
Reference plus	-5.1%	-5.8%	-6.2%	-6.4%	-6.7%	-6.5%	-6.7%
Reference plus LFR2.2	-5.1%	-5.8%	-6.6%	-6.7%	-6.7%	-6.8%	-7.0%
EE - 25	-5.7%	-9.4%	-11.9%	-15.4%	-18.0%	-19.7%	-20.6%
EE - 28	-6.1%	-11.5%	-17.4%	-22.4%	-26.0%	-29.3%	-31.7%
EE - 30	-6.6%	-14.4%	-22.0%	-28.4%	-32.4%	-36.2%	-38.9%
EE - 32	-6.6%	-15.2%	-24.5%	-29.5%	-33.5%	-36.9%	-39.4%
EE - 35	-6.8%	-18.2%	-29.8%	-34.5%	-38.6%	-42.4%	-45.2%
EE - 40	-6.8%	-18.4%	-37.6%	-41.5%	-44.9%	-48.6%	-51.2%

It is remarkable that the energy saving performance as measured by the indicator shown in Table 4 change in 2020 although the changes in energy efficiency values are assumed for the time period after 2020. This is due to the anticipation features of the model: the actors in the demand sectors are modelled to have a foresight of ten years ahead and after seeing the increase in intensity of energy saving investment in the future they find optimal to distribute the effort over a longer period of time, enhance the deepness of renovation also in the short term and so avoid locking-in in inefficient renovation intensity in view of the accelerating energy saving requirements in the future. As a consequence, the performance in 2020 in the scenarios applying a long-term energy efficiency policy is found increased at a level of 6-7% which is almost 2 pp above performance under Article 7 in the context of the reference scenario. This can be seen as a benefit of maintaining a long term energy efficiency policy with increasing ambition.

As mentioned the energy efficiency values enable acceleration of renovation of houses and buildings for energy saving purposes. The degree of renovation per year (as % of stock) is historically of the order of 1% but the energy-related part of the renovation works is not necessarily high in the absence of energy-oriented incentives. In other words it matters for energy savings how deep the renovation goes in insulations and other interventions which improve thermal integrity of houses and buildings. Apart renovation pace and its deepness, energy efficiency progress is also influenced by the energy-related strictness of the building codes which concern new constructions and by the rate of demolishment. The latter as well as the rate of new construction are small in the EU and are driven by demographics and economic growth which evolve slowly in Europe. The building codes are already today very strict in most EU countries regarding the thermal integrity of houses and buildings. It is assumed in the projections, already in the reference scenario, that the building code standards become very strict in all countries to a horizon of 2020 and a few years later, and remain at very strict levels until 2050. But because the rate of new constructions is small, achieving significant energy savings in the short/medium term cannot be obtained only through the new constructions; mainly renovation rhythm and its deepness matter for that purpose.

Table 5: Renovation projections (average) in the various scenarios – PRIMES modelling results

(%)	Average renovation rate EU28			Average energy saving % after renovation EU28		
	2015-2020	2021-2030	2031-2050	2015-2020	2021-2030	2031-2050
Reference 2013	1.28	1.37	1.11	20.91	31.47	35.68
Reference plus	1.32	1.38	1.07	21.43	36.01	37.75
Reference plus LFR2.2	1.30	1.38	1.07	21.43	36.04	37.79
EE - 25	1.39	1.59	1.10	21.68	39.44	41.36
EE - 28	1.48	1.84	1.15	21.94	43.54	45.77
EE - 30	1.62	2.20	1.23	22.08	45.83	48.49
EE - 32	1.63	2.25	1.25	22.10	46.05	48.66
EE - 35	1.64	2.40	1.32	22.12	46.34	49.01
EE - 40	1.65	2.43	1.33	22.11	46.36	49.07

The projected renovation rates escalate across scenarios mainly in the time period until 2030 reflecting the assumption that the efficiency ambition varies in the scenarios mainly for 2030. The deepness of renovation in relation to energy is projected to double in the decade of 2020 compared to the previous decade.

3.4.2. Discount rates in the energy efficiency scenarios

The widespread penetration of ESCOs or similar institutions and mainly the legislation provision that savings obligations apply on utilities which have to make sure efficiency investment at their consumer premises are expected to change the environment for decision making of services and households on energy saving investment. Individuals perceive a series of risk factors, lack information and have limited access to funding when considering energy saving investment in their premises. The risk factors are technical, administrative and institutional. Lack of information is important concerning the future performance and robustness of interventions when renovating a house. Barriers also stem from the different interests and competences

between owners and tenants of houses. One of the most important barriers is the limited access that individuals have to capital markets. Access to funding and cash flows depends on individual's income and is particularly difficult for the majority of individuals which have income below a threshold. Using individual savings for energy saving renovations is hardly possible in most cases as individuals associate very high opportunity costs (shadow interest rate) to savings and in general to the drawing of funding. According to the empirical literature, all the above barriers but most of all the lack of access to funding, explain why individuals use very high values of subjective discount rates when assessing costs and benefits of energy saving investments. The involvement of utilities and ESCOs implies removal of risk factors regarding technical, administrative and institutional issues, and also implies lower interest rates as these large organizations collectively bargain with banks the funding of energy investment projects and also collectively manage the individual project risks.

As a result the subjective discount rates which prevail in capital-budgeting decisions when such decisions are taken solely by individuals are reduced, moving closer to business interest rates.

In PRIMES, discount rates are assumed by sector following extensive literature review; the aim is to use discount rates which reflect reality. In the reference scenario, it is assumed that implementation of the EED implies reduction of discount rates from the default model values in the period after 2015 and mainly from 2020 onwards. As the reference scenario mirrors only currently adopted policies, it is assumed that the values of discount rates remain constant in the long term at the reduced levels reached by 2020 (see Table 6). The discount rates presented in Table 6 do not apply to transport sector.

In the context of the energy efficiency policy scenarios, it is assumed that the energy efficiency policies continue and intensify after 2020 following the same approach as the EED regarding energy saving obligations applied on utilities and the wide participation of ESCOs in energy saving investment projects. These assumptions are reflected in the design of energy efficiency scenarios where the discount rates, notably for households and the tertiary sector are progressively decreased after 2020, depending on the assumed intensity of efficiency policies by scenario.

The discount rates applied in the EE policies scenarios correspond to the discount rates that were used for the scenarios developed for the 2030 policy framework Impact Assessment. In particular, the EE – 25 scenarios assumes the same level of discount rates as the GHG40 scenario of the IA, which is the same as the reference scenario. The EE – 28 scenario applies the same discount rates as the GHG35/EE® scenario. This implies that discount rates decrease in 2025 from 2020 by 0.3 percentage points for both households and services; which are further reduced by 1.2 percentage points for households and 0.5 percentage points for services in 2030. In 2035, discount rates reduce by a further 0.3 points for households and by 0.2 points for services and remain stable thereafter. The EE – 30 and EE – 32 scenarios have the same discount rates as the GHG40/EE scenario of the 2030 IA. For households, discount rates decrease by 1 pp in 2025 and 2030, and 0.5 pp lower in 2035, extending also in 2040. For services, a 0.5 pp decrease is assumed for years 2025, 2030 and 2035 and stabilization thereafter.

The EE – 35 and EE – 40 scenarios the decrease in 2025 reaches 2 pp for households and 1 pp for the tertiary sector. The discount rates decrease further in 2035 by 1 pp for households and 0.5 pp for tertiary and remain at that level until the end of the projection period.

Table 6: Discount rates in the energy efficiency policies scenarios – PRIMES modelling assumptions

Discount Rates of the Residential Sector (%)	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Reference 2013	17.5	17.5	14.75	12	12	12	12	12	12	12
Reference plus	17.5	17.5	14.75	12	12	12	12	12	12	12
Reference plus LFR2.2	17.5	17.5	14.75	12	12	12	12	12	12	12
EE - 25	17.5	17.5	14.75	12	12	12	12	12	12	12
EE - 28	17.5	17.5	14.75	12	11.7	10.5	10.2	10.2	10.2	10.2
EE - 30	17.5	17.5	14.75	12	11	10	9.5	9	9	9
EE - 32	17.5	17.5	14.75	12	11	10	9.5	9	9	9
EE - 35	17.5	17.5	14.75	12	10	10	9	9	9	9
EE - 40	17.5	17.5	14.75	12	10	10	9	9	9	9
Discount Rates of the Tertiary sector (%)	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Reference 2013	12	12	11	10	10	10	10	10	10	10
Reference plus	12	12	11	10	10	10	10	10	10	10
Reference plus LFR2.2	12	12	11	10	10	10	10	10	10	10
EE - 25	12	12	11	10	10	10	10	10	10	10
EE - 28	12	12	11	10	9.7	9.2	9	9	9	9
EE - 30	12	12	11	10	9.5	9	8.5	8.5	8.5	8.5
EE - 32	12	12	11	10	9.5	9	8.5	8.5	8.5	8.5
EE - 35	12	12	11	10	9	9	8.5	8.5	8.5	8.5
EE - 40	12	12	11	10	9	9	8.5	8.5	8.5	8.5

As regards transport sector, different discount rates apply between decision making for private and for public transport modes. For the latter, the model uses lower discount rates (8-12%) reflecting either business practices (e.g. heavy duty trucks and aviation) or policies in sectors regulated by the state (e.g. rail, busses). For private cars the model assumes higher discount rates (17.5%) which reflect perception of risks by individuals and eventual limited access to cash flow. The high discount rates in car choices has consequences for market penetration of electric vehicles which have significantly higher upfront costs but much lower operating costs than conventional cars. The discount rates for the transport sector are assumed to remain constant over the whole projection period and across scenarios.

For the industrial and energy supply sectors the discount rates assumed in the reference scenario are in line with business practices and range between 7 and 9% (the lower end applies to infrastructure subject to state regulation). A WACC at that level is reasonable and can be seen as a weighted sum of an interest rate applied on equity and a bank lending rate, the latter being lower than the former. As there is no reason to justify lowering of these WACC values, they are kept unchanged in the energy efficiency scenarios for industry and energy supply sectors.

3.4.3. Eco-design regulations and modelling of technology choice in the residential and tertiary sectors in the energy efficiency scenarios

The eco-design policy aims at reducing energy consumption of energy-using equipment and appliances by promoting product varieties which embed higher energy efficiency. Depending on implementing measures and voluntary agreements, the eco-design regulations certify specific energy consumption by product variety and eventually provides for mandatory requirements for certain products. The requirements impose a minimum bound on energy performance of products. The bounds are set for the next two to five years. This implies that the menu of technologies for consumer choices in the future is restricted to product varieties which have performances exceeding the minimum threshold value. Obviously the menu of choice will allow selecting technologies which perform above minimum threshold value; the choice will depend on relative costs, perception of technical risks and the policy context. The eco-design regulations, combined with the labelling directive, are playing an important role to remove uncertainties regarding technical risks and those stemming from lack of information.

The model represents a generic set of technologies (ordinary, improved, advanced, future, etc.) by product type. The technologies have increasingly higher energy efficiency performance at higher upfront cost. Choice of technology by product type is simulated within the economic optimization problem which drives actors' decision making. Technology costs are perceived to be higher than under conditions of market maturity, so as to reflect learning, scale return and subjective risk factors. All these elements improve under active efficiency policies implying that advanced technologies are adopted earlier than under reference conditions and that learning is accelerated. The technical characteristics of projected technologies are modified in a scenario if they are inferior to eco-design regulations as assumed in this scenario.

The reference scenario is assumed to include the currently adopted eco-design regulations to a horizon of 2020. This implies that technologies until 2020 comply with the regulations and that beyond 2020 all projected technologies perform equally or better than the regulations. The menu of choice obviously includes technologies that perform above the regulations' thresholds. As mentioned their uptake by consumers depend on economic conditions.

For the energy efficiency scenarios, it is assumed that beyond 2020 the eco-design regulations increase the performance requirements and also that the policy context, including the beneficial effects from labelling, is such that the consumers increasingly trust in advanced technology and perceive lower costs by neglecting risk factors. In the modelling, this mechanism has been simulated by reducing the perceived cost of high efficiency technologies (only). The reduction escalates in a range from reference to the most ambitious energy efficiency scenario to reflect escalating intensity of the performance requirements.

The resulting early uptake of advanced technology is modelled to induce acceleration of learning making them cheaper and more efficient as they are getting towards commercial maturity. So, the dynamic uptake of advanced technologies by consumers has subsequently effects on the progress of these technologies. As higher volumes of advanced technologies are chosen by consumers, production of such technologies moves further on the learning curve; thus efficiency improvements occur faster. At the same time, with increasing efficiency performance the cost of investment in these technologies is increasing. We can distinguish therefore two aspects of

technology performance that are affected, efficiency and investment costs, which both increase due to eco-design. PRIMES includes parameters that represent these two aspects, which are modified increasingly across scenarios.

In the following table (Table 7) we provide with examples of how the efficiency and investment cost parameters have been modified across scenarios. In particular, the table shows the characteristics of the most efficient technology that is available in 2030 for five different energy uses and compares to the characteristics of the technology that is used in 2010 for the respective energy uses. We remind that the uptake of technologies is endogenous in PRIMES, hence the average efficiency of the equipment that is utilised is a result of the model and is presented in a different table (Table 8). The figures that are presented on investment costs are the costs as perceived by consumers, hence, they include the effect of both drivers that have been discussed: a) the increase in costs that occurs because of increasing efficiency and b) the decrease that results from the reduction/elimination of perceived risks.

Table 7: Efficiency and cost of investment (as perceived by consumers) for five indicative energy purposes[7]- PRIMES modelling assumptions

Energy purposes	Space heating in central boiler households using natural gas	Cooking in households using electricity	Air conditioning in households using electricity[8]	Space heating in offices using gas	Air cooling in offices using electricity[8]
Average efficiency of all equipment in 2010					
All scenarios	0.66	0.79	2.5	0.68	2.5
Efficiency of the most efficient technology available for choice in 2030					
Reference	0.90	0.85	4.74	0.88	4.41
EE-25	0.90	0.89	4.97	0.88	4.41
EE-28	0.90	0.90	5.07	0.88	4.41
EE-30	0.90	0.92	5.17	0.88	4.41
EE-32	0.90	0.92	5.17	0.88	4.41
EE-35	0.90	0.93	5.22	0.88	4.41
EE-40	0.90	0.93	5.22	0.88	4.41
Average cost of investment in ECU per toe in 2010, as perceived by consumers					
All scenarios	246	424	552	53	332
Cost of investment in ECU per toe of the most efficient technology available for choice in 2030, as perceived by consumers					
Reference	699	933	1772	135	1066
EE-25	441	624	1167	101	743
EE-28	381	554	1004	90	644
EE-30	335	504	901	81	572
EE-32	335	504	901	81	572
EE-35	316	483	857	77	540

[7] The figures that are presented are for Germany, and differ across Member-States.
[8] For air-conditioning the figures presented for efficiency are the coefficients of performance.

EE-40	316	483	857	77	540

Overall, the effect of the eco-design regulation and other measures can be summarized in increased uptake of efficient technologies due to removal of barriers in respect to consumer information (reduction of perception cost) and in increased rate of improvements of the technical characteristics of technologies due to learning effects. Therefore, the average efficiency of equipment used by the residential and household sectors is improving both because more efficient technologies penetrate the market and because the technologies themselves are becoming more efficient faster. These benefits are partly offset by rebound effects which are inherent in the modelling and are of course limited by technical potential of performance improvement by type of product. So in very ambitious energy efficiency scenarios, the projections show some degree of saturation in the rate of improvement of performance of energy using equipment and appliances.

It should be reminded that the eco-design policy was already included in the reference scenario EE-policies package, with considerable effects on the uptake of more efficient technologies and the technology progress. In the EE scenarios the intensity of eco-design policy is assumed to increase after 2020 which adds effects on the modelling of a context with intense energy efficiency measures, which induce further uptake of advanced technologies. Therefore, as mentioned, across the EE scenarios the perception of the cost is reduced and techno-economic characteristics are improved.

To the 2030 horizon, the effects of eco-design are simulated to intensify relative to the reference scenario and across the EE scenarios. Moving from 2030 to 2050, the effects are simulated to intensify further and approach technical potential in the very ambitious cases. The learning effects are modelled to be relatively lower until 2030 than after 2030.

In the tables below we show indicators of energy efficiency improvement (relative to 2010) by category of equipment or appliance grouped by purpose of use. For example, according to Table 8 for the EE – 25 scenario, the efficiency of lighting equipment used in the residential sector in 2050 has improved on average by approximately 400%; in practice, this efficiency improvement can be delivered by replacing an average light bulb (of approximately 50W) with a CFL bulb (of approximately 10W). The resolution of the model is lower than the list of products considered in the eco-design regulations. In addition, the model has limited representation of engineering bottom-up information regarding the use of each equipment. Therefore, direct comparisons of model projections with eco-design regulations is hardly possible. Comparisons can be drawn from the projection of energy efficiency improvements by category of energy use.

Table 8: Indicative ratios of efficiency improvement of energy using equipment in residential sector[9] – PRIMES modelling results

Avg. Energy Efficiency improvement in equipment as effectively used by scenario, relative to 2010 (in % change)

	2020	2030	2050	2020	2030	2050
	Heating			Cooling		

[9] The figures presented are EU averages; results differ by MS.

Reference 2013	7.7	18.8	28.8	17.6	28.3	62.1
Reference plus	7.8	19.1	29.1	17.6	28.3	62.1
Reference plus and EUA	7.8	19.0	29.0	17.6	28.8	66.2
EE - 25	10.0	25.7	40.0	20.9	53.9	104.9
EE - 28	11.4	28.8	46.5	22.5	65.5	115.1
EE - 30	13.2	30.7	49.4	24.5	73.0	124.3
EE - 32	13.2	30.7	49.4	24.5	72.9	124.3
EE - 35	14.2	31.3	50.5	25.9	76.4	129.0
EE - 40	14.1	31.3	50.9	25.9	76.7	129.0
	Water heating			Cooking		
Reference 2013	10.7	17.9	26.5	3.9	6.4	9.3
Reference plus	10.7	18.0	26.6	3.9	6.4	9.3
Reference plus LFR2.2	10.7	17.9	26.5	3.8	6.1	8.8
EE - 25	11.3	19.1	21.2	4.8	10.5	21.3
EE - 28	11.6	19.9	23.1	5.6	15.3	34.2
EE - 30	12.0	20.9	24.7	7.0	18.9	40.5
EE - 32	12.0	20.9	24.7	7.0	19.0	40.6
EE - 35	12.2	21.7	25.9	8.0	21.4	43.5
EE - 40	12.2	21.6	26.1	8.1	21.2	43.6
	Lighting			White appliances		
Reference 2013	163.7	372.9	400.2	45.9	60.5	66.3
Reference plus	181.6	375.9	400.1	44.8	59.0	66.1
Reference plus LFR2.2	182.5	376.5	400.5	44.0	58.9	64.8
EE - 25	181.4	373.2	400.4	45.4	61.3	67.8
EE - 28	184.7	380.2	414.9	47.4	69.3	83.2
EE - 30	185.7	380.7	414.8	48.8	70.9	89.9
EE - 32	185.5	380.6	414.8	48.0	70.5	89.9
EE - 35	186.8	381.2	414.7	48.3	71.0	96.4
EE - 40	186.0	380.7	414.6	48.6	70.9	96.4
	Black appliances			Central boilers		
Reference 2013	18.2	27.9	30.3	11.2	23.6	45.9
Reference plus	18.2	28.0	30.3	11.3	24.2	46.3
Reference plus LFR2.2	18.2	28.0	30.5	11.3	24.1	46.4
EE - 25	18.6	28.8	31.8	13.0	30.1	55.5
EE - 28	19.0	34.6	49.0	14.1	31.6	57.0
EE - 30	19.1	34.7	53.7	15.5	32.7	58.5
EE - 32	19.1	34.7	53.7	15.5	32.7	58.5
EE - 35	19.1	34.9	60.2	16.2	33.6	59.7
EE - 40	19.1	34.8	60.5	16.2	33.6	60.3
	Gas heaters			Heat pumps		
Reference 2013	14.2	28.1	49.1	18.1	35.5	61.5

Reference plus	14.2	28.1	49.1	18.1	35.6	61.5
Reference plus LFR2.2	14.2	28.1	49.3	18.1	35.6	62.0
EE - 25	15.7	32.3	56.4	19.8	42.2	71.4
EE - 28	16.3	33.4	57.5	20.8	44.5	73.1
EE - 30	17.0	34.3	59.0	22.8	46.3	75.3
EE - 32	17.0	34.3	59.0	22.8	46.3	75.4
EE - 35	17.5	34.8	60.1	23.5	47.3	77.0
EE - 40	17.5	34.8	60.7	23.4	47.2	77.9

Table 9: Indicative ratios of efficiency improvement of energy using equipment in tertiary sector – PRIMES modelling results[9]

Avg. Energy Efficiency improvement in equipment as effectively used by scenario, relative to 2010 (in % change)

	2020	2030	2050	2020	2030	2050
	Heating			Cooling		
Reference 2013	15.6	36.7	49.8	16.3	27.2	44.7
Reference plus	15.5	36.7	49.9	16.3	27.2	44.7
Reference plus LFR2.2	15.5	36.0	48.3	16.3	27.2	45.2
EE - 25	17.9	41.6	56.6	17.2	29.0	52.0
EE - 28	19.3	55.0	63.6	17.4	30.1	54.9
EE - 30	21.0	59.3	67.9	17.7	31.1	56.5
EE - 32	21.0	59.5	68.2	17.7	31.1	56.5
EE - 35	22.0	60.3	68.1	17.8	31.5	57.1
EE - 40	22.1	59.5	67.8	17.8	31.7	57.2
	Lighting			Electric appliances		
Reference 2013	156.8	374.3	394.4	5.5	21.3	54.1
Reference plus	158.3	374.0	394.5	5.5	21.3	54.1
Reference plus LFR2.2	156.1	377.1	394.3	5.6	22.2	56.0
EE - 25	208.4	371.8	394.3	6.5	25.5	60.1
EE - 28	225.0	371.6	392.9	6.9	27.3	63.4
EE - 30	236.1	372.6	394.5	7.4	28.9	65.7
EE - 32	235.8	372.4	394.6	7.4	28.9	65.5
EE - 35	242.4	375.5	395.0	7.7	29.8	66.6
EE - 40	240.2	375.1	395.9	7.6	30.4	66.9
	Greenhouses-agriculture			Pumping in agriculture		
Reference 2013	3.9	7.4	9.8	9.8	16.4	28.1
Reference plus	3.9	7.4	9.9	9.7	16.4	28.2
Reference plus LFR2.2	3.9	7.4	9.6	9.6	15.8	27.4
EE - 25	4.8	10.1	18.2	10.1	18.6	67.5
EE - 28	5.3	11.9	22.4	10.3	19.4	68.3
EE - 30	5.8	14.0	26.6	10.5	20.0	68.8
EE - 32	5.8	14.0	26.7	10.5	20.1	68.9
EE - 35	6.2	15.0	28.7	10.6	20.5	68.8

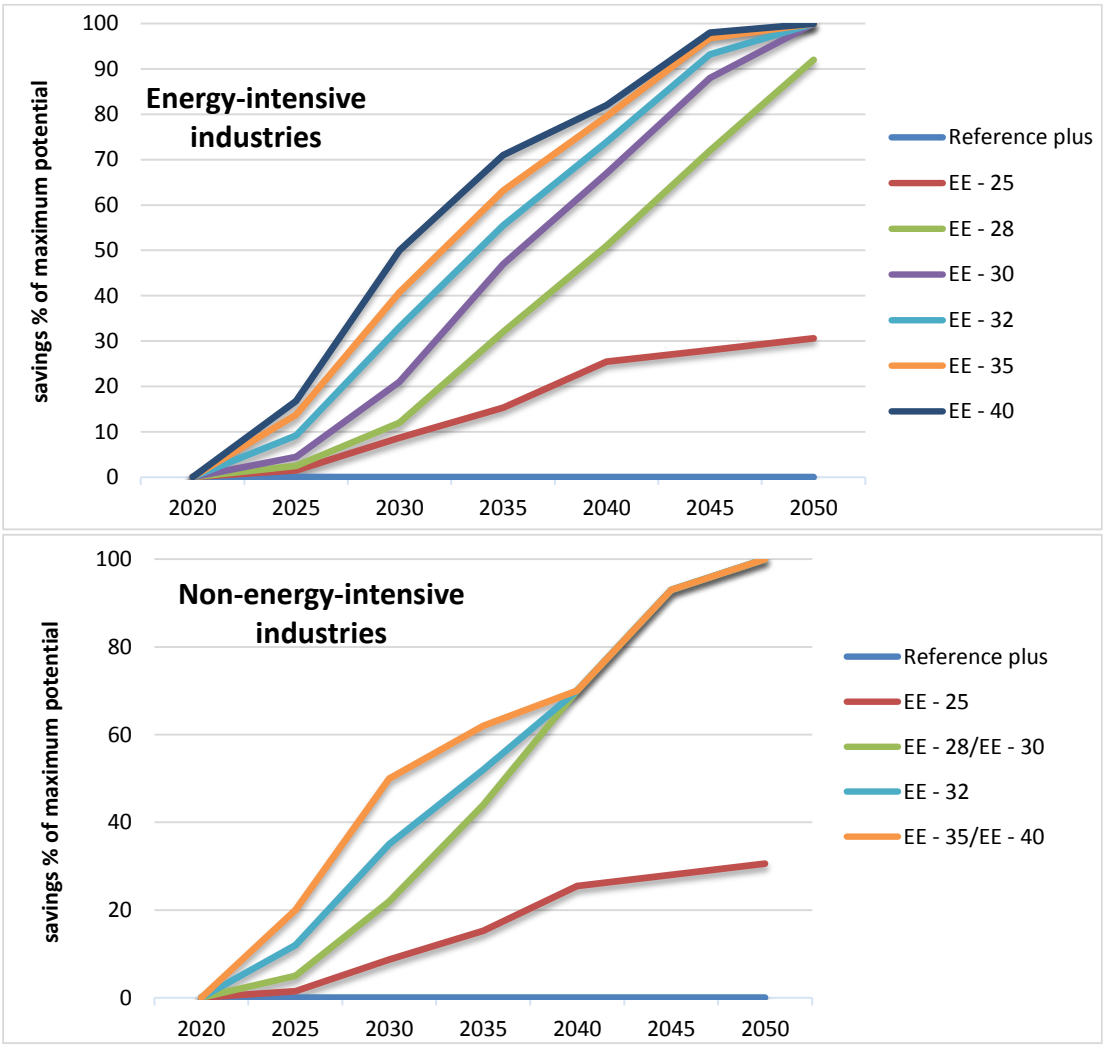
EE - 40	6.2	15.0	28.7	10.8	20.3	68.5

3.4.4. BAT in industry

Energy efficiency progress in the industrial sector in the EE policies scenarios occurs through the deployment of BAT (best available techniques), both vertically and horizontally; vertically refers to technologies associated with the equipment used for specific industrial process; horizontally, refers to systems that affect all industrial processes, such as energy control systems and heat recovery systems.

Regarding the technologies at the level of equipment, the menu of candidate for investment BATs is the same in all EE scenarios. What varies among scenarios is their uptake, depending on the intensity of energy efficiency policies assumed. Similar to what has been described in the previous section for the technologies in the residential and tertiary sectors, anticipation of increased energy efficiency savings results in moderation of the perception of risk associated with advanced technologies, and in acceleration of their maturity and uptake. This effect is represented in the EE – policies scenarios through modifying the parameters that reflect the perception of cost. The risk associated to anticipation does not refer to technical risk or lack of information but rather refers to regulatory risk: in the context of strong efficiency policy, as also in the context of strong emission reduction policies, industry anticipates that enforcement is

Figure 3: Uptake of horizontal energy saving BATs in the industrial sector as % of maximum potential – PRIMES modelling assumption



likely to become more stringent in the future and so in order to avoid locking-in inferior technologies increases the uptake of advance, hence more efficient technologies.

Regarding the horizontal BAT, their deployment leads to energy savings at all process levels. The model considers a maximum potential for energy savings from horizontal BAT adoption, which is different by sector and by country. The energy efficiency scenarios are designed to exploit partly the maximum potential, at a degree reflecting the intensity of energy efficiency ambition by scenario. Therefore the uptake of horizontal BAT increases by scenario but is limited by potential. Moreover, each scenario is assumed to follow a different path towards achieving this potential.

As shown in Figure 3 in the EE – 25 scenario the energy savings potential that industry is able to exploit in 2030 is assumed to be approx. 9% of its maximum level, while by the end of the projection period it reaches 30%. Already in the EE – 28 scenario these figures increase considerably, reaching -12% by 2030 for the energy intensive industries and 22% for the non-energy-intensive, and 92-100% to 2050. In the scenarios with more ambitious energy efficiency policies (EE – 30 to EE – 40) industry can exploit its maximum potential for energy savings by the end of the projection period, with intermediate levels for 2030 of 21-50% depending on the intensity of the efficiency policies. Overall, the uptake of BAT (vertical and horizontal) in industry contributes to decreasing energy intensity of the sector. The incurred benefits in terms of reduced energy intensity are summarized in Table 10. The reduction of energy consumption per unit of industrial output in 2030 relative to 2010 ranges between 24% for the EE – 25 scenario and app. 31% for the EE – 40 scenario. The corresponding figure for the reference scenarios (which do not assume the facilitation of the uptake of BAT technologies) is 19%. In 2050 the reduction reaches 43.6% in the EE - 25 scenario and app. 50% in the other scenarios.

Table 10: Energy intensity indicator of the industrial sector (energy consumed in toe on value added in MEuros'10)- PRIMES modelling results

Energy intensity indicator of industry (2010=100)	2010	2020	2030	2040	2050
Reference 2013	100	91.2	81.1	73.2	68.3
Reference plus	100	91.3	81.1	73.3	68.3
Reference plus LFR2.2	100	91.3	80.5	73.7	68.3
EE - 25	100	91.0	76.0	63.3	56.4
EE - 28	100	90.6	73.6	57.4	48.1
EE - 30	100	90.3	72.0	55.8	47.7
EE - 32	100	90.3	69.9	54.7	47.7
EE - 35	100	90.2	68.4	54.1	47.6
EE - 40	100	90.2	67.7	54.0	47.6

3.4.5. Penetration of district heating and CHP

Energy efficiency policies induce efficiency improvements on the supply side through the promotion of investments in CHP and in distributed steam and heat networks. These investments are combined with incentives on the consumer side to shift towards heating through district heating, both in the residential and the tertiary sectors. This results in a larger number of dwellings in the residential sector having access to distributed heat networks, which in turn allows for further participation of CHP in heat/steam supply.

To simulate this effect, a parameter is utilized that controls the substitution of heating through individual (non-central) heating equipment with district heating; in particular, the parameter is controlling the availability of district heating in the menu of candidate technologies for space heating, which is increasing across the EE-scenarios[10]. The choice of shifting to district heating is however endogenous and depends on its economic viability, i.e. on comparing the total costs and benefits of using district heating instead of other non-central means. PRIMES represents various buildings categories, among which a specific buildings category in which space heating is supplied by district heating networks. This category is more cost efficient than other categories; it benefits from CHP steam injections, thereby offering stable prices to district heating consumers. This has rebound effects on energy efficiency, as houses connected to district heating generally consume more heat than houses which use individual (non-central) heating equipment. All these factors are taken into consideration in the model, which shows that the number of households that are connected to district heating is increasing across the EE scenarios, as demonstrated in Table 11. In parallel the share of CHP in heat/steam supply is increasing, as shown in Table 12. Both are necessary to increase overall efficiency in primary energy trends, because district heating alone, without CHP, can have lower efficiency performance, overall, than other configurations based on individually operating equipment for heating.

It should not be construed that the only factor resulting in increasing CHP in steam generation is the penetration of district heating. In a context with intense energy efficiency policies CHP penetrates both steam and electricity generation as a result of a combination of factors, including the CHP promotion policies and the increased requirements for energy efficiency in general. In the modelling exercise for the EE policies scenarios, CHP penetration was not facilitated through the modification of relevant parameters, as is the case for district heating penetration. The level of facilitation is similar to the reference scenarios, which already assume considerable penetration of CHP. Further penetration in the EE policies scenarios is thus the result of the increasing use of district heating and of increased requirements of the supply side for energy savings.

But CHP penetration depends also on economics which are influenced by scale parameters: the larger the volume of heat/steam and electricity, the more economic CHP projects can be. Increasing energy efficiency reduces volumes of steam/heat and electricity which goes against the economics of CHP projects for reasons of lower return to scale. Variability of load also acts to the detriment of CHP. In the context of high emission reduction targets, clean power solutions such as nuclear and RES are economically and technically superior options than CHP which is obliged to use fossil fuels, at least to a certain degree, given that biomass resources are limited

[10] It should be noted that PRIMES does not include a spatial resolution of the steam/heat networks. Representation of network developments is done through cost-supply curves that are specified by Member-State. These cost-supply curves are constructed so as to reflect in an aggregated way the different possibilities of network expansion and the geographical limitations by MS. The different assumptions between countries have been based in various sources (district heating surveys, buildings and houses statistics and surveys).

and clean hydrogen is not yet a mature option. In this context steam use remains primarily in industry which cannot be substituted with other energy forms in some processes.

Table 11: % of households connected to district heating networks – PRIMES modelling results

% of households connected to district heating networks	2010	2020	2030	2050
Reference 2013	9	10	11	11
Reference plus	9	10	11	11
Reference plus LFR2.2	9	10	11	11
EE - 25	9	10	11	10
EE - 28	9	10	11	16
EE - 30	9	10	12	15
EE - 32	9	10	12	15
EE - 35	9	10	14	15
EE - 40	9	10	14	16

Table 12: Share of CHP in total steam supply (including steam for self-consumption of industrial and refinery boilers) – PRIMES modelling results

Share of CHP in total steam supply including distributed heat/steam (%)	2010	2020	2030	2050
Reference 2013	57	63	61	63
Reference Plus	57	63	61	64
Reference Plus and EUA	57	63	64	61
EE - 25	57	63	65	74
EE - 28	57	63	65	72
EE - 30	57	63	66	73
EE - 32	57	63	66	73
EE - 35	57	63	65	75
EE - 40	57	63	65	77

3.4.6. Grid losses

Modification of specific parameters has been used as an approach to represent the improvement of the rate of grid losses due to smoother load factor in electricity demand enabled by smart metering and generally demand response measures. Energy efficiency implies lower demand for electricity and generally lower electrical charge in power grids thus lower losses. The rate of reduction of grid losses across scenarios is assumed to be small as the potential for reducing grid losses through smoothing the load curve is limited. Table 14 summarizes the modelling results in regard to grid losses across EE scenarios.

The greater potential for improvements exists for the medium voltage electricity distribution grid, which is simulated to improve relative to the reference scenario by approximately 1-2% in 2030 and 2-5% in 2050 (see Table 13). Losses at the low voltage distribution grid are reduced by 0.5-1.5% in 2030 and 0.3-3.6% in 2050. Finally, in the transmission grid (which has the lower rate of losses) the improvements are of the order of 0.6-1.2% in 2030 and 1-3% in 2050.

Table 13: Percentage reduction of the rate of grid losses relative to reference plus scenario – PRIMES modelling assumptions

Reduction of the rate of grid losses (% change from the reference scenario grid losses rate)	*electricity transmission grid HV*		*electricity distribution grid MV*		*electricity distribution grid LV*	
	2030	2050	2030	2050	2030	2050
EE – 25	0.6	1.0	1.4	2.2	0.5	0.3
EE – 28	0.9	2.0	1.8	3.5	0.9	1.6
EE – 30/ EE – 32	1.1	2.4	2.0	4.1	1.3	2.9
EE – 35/ EE – 40	1.2	3.0	2.2	5.0	1.5	3.6

Table 14: Ratio of electricity transmission and distribution losses to electricity supply (in %), excluding self-consumption – PRIMES modelling results

Grid losses (%)	2010	2020	2030	2040	2050
Reference 2013	6.2	6.1	6.4	6.6	6.7
Reference plus	6.2	6.1	6.3	6.5	6.7
Reference plus LFR2.2	6.2	6.1	6.4	6.6	6.7
EE - 25	6.2	6.1	6.5	6.4	6.6
EE - 28	6.2	6.1	6.4	6.3	6.6
EE - 30	6.2	6.1	6.1	5.8	5.8
EE - 32	6.2	6.1	6.1	5.9	5.8
EE - 35	6.2	6.1	5.6	5.3	4.9
EE - 40	6.2	6.1	5.5	5.2	4.9

3.4.7. Additional measures for the transport sector

Following the specifications for the transport sector provided by the Commission, the transport sector in the energy efficiency scenarios has been modelled to include the following:

- CO_2 standards for cars and LCVs are assumed to vary across scenarios as shown in Table 15:

Table 15: Assumptions on CO_2 standards for cars and LCVs across scenarios

Vehicle category (new vehicles) g CO_2/km		2020	2025	2030	2035	2040	2045	2050
Passenger cars (overall efficiency of all new passenger cars including electric vehicles assumed as 0 gCO_2/km)	EE - 25	95	85	78	65	38	33	27
	EE - 28	95	85	75	63	37	32	26
	EE - 30	95	85	72	60	35	30	25
	EE - 32	95	85	70	50	25	18	17
	EE - 35	95	85	70	50	25	18	17
	EE - 40	95	85	70	50	25	18	17
LCVs (vans) (overall efficiency of all new vans including electric vehicles assumed as 0 gCO_2/km)	EE - 25, EE - 28, EE - 30, EE - 32, EE - 35, EE - 40	147	130	110	90	70	65	60

- All EE scenarios assume improvement in specific fuel consumption of heavy duty vehicles of about 1.1% per year between years 2010 and 2030, as well as for the period 2030 to 2050.
- Charges for external costs in the transport sector are at the same level as in the IA on the White Paper on Transport (the central values from the "Handbook on estimation of external costs in the transport sector"). The revised tables with the coverage by Member state are shown in the following table:

Table 16: Modelling assumptions related to the internalization of local externalities in the EE scenarios

Internalisation of local externalities - modelling assumptions							
	HGV (buses and coaches not covered)				CARS		
	Air pollution	Noise	Congestion	Infrastracture charge	Air pollution	Noise	Congestion
2020-2025							
Notes	On the whole inter-urban network.	On the whole inter-urban network.	On the motrways network.	On the whole inter-urban network.			On the motrways network.
Countries	All 28 EU MS except LV, FI, CY, MT and Estonia	All 28 EU MS except LV, FI, CY, MT and Estonia	BE, NL, LU, DE, PL, FR, IT, UK	All 28 EU MS except LV, FI, CY, MT and Estonia			BE, NL, LU, DE, PL, FR, IT, UK
2025-2050							
Notes	On the whole inter-urban network.	On the whole inter-urban network.	On the whole inter-urban network.	On the whole inter-urban network.	On the whole inter-urban network	On the whole inter-urban network	On the whole inter-urban network
Countries	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS

Internalisation of local externalities - modelling assumptions							
	PASSENGER TRAINS			FREIGHT TRAINS			IWW
	Air pollution	Noise	Congestion	Air pollution	Noise	Congestion	Air pollution
2020-2025							
Notes							
Countries							
2025-2050							
Notes	On the whole network	On the whole network	On the whole network	The charge to be applied to diesel trains only	On the whole network	On the whole network	On the whole network
Countries	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS	All 28 EU MS

- Regarding vehicle taxation[11], in line with the 2005 Commission proposal, it is assumed that in each Member State that did not introduce a CO2-related element, at least 25% of the total tax revenue from registration and annual circulation taxes respectively should originate in the CO2 based element of each of these taxes starting with 2020. From 2025 at least 50% of the total tax revenue from both the annual circulation tax and the registration tax (pending its abolition) should originate in the CO2 based

[11] Discussions on the COM(2012) 756 final are aimed to give new momentum to the 2005 proposal on car taxation.

element of each of these taxes[12]. The assumptions from the IA on the White Paper have been used. The only difference relates to Greece where the annual circulation tax for cars registered since 1 January 2011 is based on CO_2 emissions[13]. Regarding company car taxation, the EE scenarios include the same assumptions as in the IA on the White Paper on Transport.

- The assumptions on the wide deployment of intelligent transport systems are similar to the White Paper on Transport IA for road and waterborne. For aviation SES2+ is already included in the Reference plus scenario.
- No additional modelling assumptions have been made on fuel labelling[14].
- The assumptions on eco-driving are similar to the IA on White Paper on Transport, i.e. virtually 100% of drivers would be trained by 2050 (for road and rail).

These additional measures in the transport sector, in particular stricter CO_2 standards for cars and LCVs, are accompanied with developments of recharging infrastructure for electric vehicles. These developments are assumed to occur in a timely manner in all the energy efficiency policies scenarios. Learning in regard to batteries and other alternative technologies are also progressing at a faster pace than in the reference scenarios as part of the overall policy that transforms the sector. Biofuels industry also undergoes significant development especially beyond 2030 which results in an important uptake of biofuels in the transport fuel mix.

Compared to the GHG40 scenario of the IA on the 2030 policy framework, there are some differences in the policies considered for transport. Regarding the CO_2 standards, the scenarios follow the approach of the GHG40/EE, therefore standards start decreasing from 2025 onwards instead of 2030 as is the case in the GHG40. Further, compared to GHG40 the scenarios include additional transport measures such as internalisation of externalities, wide deployment of ITS, eco-driving and higher energy efficiency improvements for trucks; these additional measures are also included in the GHG40/EE scenario.

3.5. Main scenario results

Table 17 and Table 18 present a summary of the key results per scenario for the EU28. Detailed results by MS are provided in the Annex B. Cost related results are provided for all different cost accounting methodologies, which are described in the following section.

3.5.1. Cost reporting and discount rates

Generally, the PRIMES model tries to simulate and approximate the real-life behaviour of economic agents when purchasing and consuming energy products[15]. While actors are assumed by the model to behave rationally, perceived costs and risk factors can adjust the model outcomes to mimic more closely true behaviours and limitations of economic agents. The aim is

[12] http://www.acea.be/images/uploads/files/CO2_tax__overview_2013.pdf
[13] See the SWD(2012) 429 final , available at: http://ec.europa.eu/taxation_customs/resources/documents/taxation/other_taxes/passenger_car/swd_2012_429_en.pdf and ACEA overview of CO2-based motor vehicle taxes in the EU, available at: http://www.acea.be/images/uploads/files/CO2_tax__overview_2013.pdf
[14] According to the "EU Transport GHG: Routes to 2050?" project, financed by DG CLIMA, fuel efficiency labelling is unlikely to have a direct impact on reducing GHG emissions, especially when mandatory CO2 emission targets are enforced.
[15] For further details see the PRIMES manual.

to mimic true decision-making by private actors. To simulate this, the discount rates used reflect opportunity costs of drawing funds for the private sector. For individuals PRIMES relies on surveys about values of the so called subjective discount rates[16], for businesses PRIMES assumes weighted average cost of capital (WACC) values as used in common business practices and as set by regulatory authorities for utilities. When projecting the impact of policies (e.g. certain energy efficiency promoting policies) these subjective discount rates are reduced to simulate for instance the reductions in perceived risks influencing investment (through the operation of ESCOs – for instance) or by easing access to capital borrowing (through certification or additional public funding/incentives).

When calculating total costs by year, investment expenditures are annualised to show equivalent annual costs from an end-user perspective (from an opportunity cost perspective). Annual capital costs are estimated as annual fixed payments for principal and interests e.g. with the principal for power plants (but the same applies to all equipment) equal to overnight capital investment cost of the plant (for new plants) and not yet amortized capital cost for old plants (commissioned before 2011). For annuity calculations the standard discount rates of PRIMES are used with no modifications based on policy assumption. Cash payment for investment is also reported by sector and by type of investment, separately including investment in infrastructure.

There are therefore two moments in which discount rates are used within the modelling: at the level of decision making (first paragraph) and at the level of cost accounting for reporting purposes (second paragraph). The methodologies described in the following all refer to the cost accounting for reporting purposes.

Cost methodology A: the cost methodology is the default cost calculation in PRIMES and therefore uses the standard discount rates of PRIMES in all sectors; this methodology allows to maintain comparability across scenarios.

Cost methodology B: This cost methodology modifies the discount rates in the demand side for the accounting of costs. In the case of the scenarios and reporting described within this final report a 4% discount rate was applied to all demand side sectors.

Cost methodology C: This cost methodology additionally to the change in reporting discount rates of the demand side of methodology B, also modifies the discount rates of the supply side.

Cost methodology D: this cost accounting methodology uses the same discount rates in the reporting as used in the decision making process.

[16] Examples of different literature on discount rates: Kesicki Fabian, (2011) "Marginal abatement cost curves for policy making – expert-based vs. model-derived curves", 33rd IAEE International Conference, 6-9 June 2010, Rio de Janeiro, Brazil.
Dale, Larry and K. Sydny Fujita (2008) "An Analysis of the Price Elasticity of Demand for Household Appliances", Energy Analysis Department, Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory, University of California ,Berkeley, CA 94720, February 2008

Table 17: Projections on key elements by scenario for the EU28

	Total final energy consumption (Mtoe)			Energy consumption in heavy industry (Mtoe)		
	2020	2030	2050	2020	2030	2050
Reference plus	1136	1126	1152	198	195	189
Reference plus LFR2.2	1136	1123	1146	198	194	188
EE - 25	1130	1064	964	197	183	159
EE - 28	1126	1020	876	197	178	134
EE - 30	1122	983	818	196	173	132
EE - 32	1122	962	804	196	168	132
EE - 35	1121	920	759	196	165	132
EE - 40	1121	859	712	196	162	132
	Energy consumption in other industries (in Mtoe)			**Energy consumption in residential sector (Mtoe)**		
	2020	2030	2050	2020	2030	2050
Reference plus	109	112	120	299	297	303
Reference plus LFR2.2	109	111	121	299	297	302
EE - 25	108	105	96	297	281	266
EE - 28	108	100	84	296	262	231
EE - 30	107	99	84	294	244	195
EE - 32	107	97	84	294	237	192
EE - 35	107	94	84	293	215	162
EE - 40	107	94	83	293	180	134
	Energy consumption in tertiary sector (Mtoe)			**Energy consumption in transport sector (Mtoe)**		
	2020	2030	2050	2020	2030	2050
Reference plus	172	167	173	358	355	367
Reference plus LFR2.2	172	167	171	358	354	364
EE - 25	170	157	153	357	338	289
EE - 28	169	142	139	357	338	289
EE - 30	168	130	120	357	336	288

EE - 32	168	125	118	357	336	278
EE - 35	168	110	102	357	336	279
EE - 40	168	86	85	357	336	279
	Primary energy savings wrt the 2020 value of PRIMES 2007 baseline projection			**GHG emissions reduction (% relative to 1990)**		
	2020	2030	2050	2020	2030	2050
Reference plus	-17	-20	-18	-25	-33	-45
Reference plus LFR2.2	-17	-21	-19	-25	-36	-49
EE - 25	-17	-25	-24	-25	-39	-76
EE - 28	-18	-27	-31	-25	-40	-78
EE - 30	-18	-29	-36	-25	-40	-79
EE - 32	-18	-31	-37	-25	-41	-79
EE - 35	-18	-34	-41	-25	-41	-79
EE - 40	-18	-39	-44	-25	-44	-80
	Total net imports (Mtoe)			**Natural gas net imports (Mtoe)**		
	2020	2030	2050	2020	2030	2050
Reference plus	909	921	962	266	296	345
Reference plus LFR2.2	909	891	937	266	273	326
EE - 25	904	835	610	264	252	254
EE - 28	900	807	549	262	232	215
EE - 30	897	782	516	260	215	192
EE - 32	897	767	510	260	204	195
EE - 35	897	747	486	260	185	179
EE - 40	897	708	465	260	166	162
	Overall RES share (%)			**Average electricity price (€'10/MWh)**		
	2020	2030	2050	2020	2030	2050
Reference plus	21	24	29	172	172	168
Reference plus LFR2.2	21	27	31	172	175	176
EE - 25	21	28	49	172	177	166
EE - 28	21	28	50	173	174	167

EE - 30	21	28	51	173	173	164
EE - 32	21	28	51	173	174	164
EE - 35	21	27	52	172	172	164
EE - 40	21	27	52	172	176	164
	Carbon price ETS sectors (€'10/ t of CO_2)			**Carbon value non-ETS sectors (€'10/ t of CO_2)**		
	2020	2030	2050	2020	2030	2050
Reference plus	10	35	100	0	0	0
Reference plus LFR2.2	10	38	210	0	0	0
EE - 25	10	42	250	0	0	0
EE - 28	10	33	220	0	0	0
EE - 30	10	25	180	0	0	0
EE - 32	10	23	175	0	0	0
EE - 35	9	13	160	0	0	0
EE - 40	8	6	165	0	0	0
	Average energy efficiency value (€'10/ toe)			**Average renewables value (€'10/ MWh)**		
	2020	2030	2050	2020	2030	2050
Reference plus	270	183	96	49	34	16
Reference plus LFR2.2	270	183	96	49	48	16
EE - 25	270	332	417	49	41	16
EE - 28	270	619	847	49	40	15
EE - 30	270	991	1642	49	42	15
EE - 32	270	1173	1728	49	42	15
EE - 35	270	1768	2595	49	43	15
EE - 40	270	2937	3798	50	43	14

Table 18: System costs results by scenario for the EU28

M€'10	Cost reporting approach a			Cost reporting approach c			Cost reporting approach d		
Total system costs (excl. deductible auction payments) [17]	2020	2030	2050	2020	2030	2050	2020	2030	2050
Reference plus	2111392	2336967	2701071	1716094	1847079	2100221	2042014	2251849	2596468
Reference plus LFR2.2	2110779	2340931	2701704	1715730	1850041	2097684	2041508	2255824	2597289
EE - 25	2107585	2383812	3104261	1710670	1863365	2353096	2037569	2291145	2981982
EE - 28	2108429	2416299	3154854	1709671	1864042	2340102	2037638	2282946	2966761
EE - 30	2106641	2481485	3327814	1706904	1888541	2413098	2035355	2318230	3048367
EE - 32	2106644	2526015	3355417	1706992	1908175	2428303	2035422	2352033	3068597
EE - 35	2105705	2662194	3593353	1705837	1971441	2543636	2034307	2449373	3227246
EE - 40	2106529	3032745	4006278	1706460	2167004	2760924	2034988	2728456	3517587
Capital costs[18,19]	2020	2030	2050	2020	2030	2050	2020	2030	2050
Reference plus	569982	803499	1056801	332102	468864	621386	510025	725572	956796
Reference plus LFR2.2	569570	802060	1048688	331867	467952	616529	509691	724324	949776
EE - 25	574762	835070	1274365	334660	485475	743577.8	514176	755323	1173797
EE - 28	579818	851660	1260504	337387	494173	735064	518416	747891	1127360
EE - 30	583046	856176	1254176	339071	496267	730325	521102	745246	1104795
EE - 32	582725	854842	1251769	338890	495362	728875.7	520841	744597	1103015
EE - 35	584219	844087	1229542	339680	488860	715328.1	522114	735798	1086028
EE - 40	585120	825308	1198547	340194	477246	696642	522850	720370	1062418

[17] Total system costs are equal to the sum of capital costs, energy purchases and direct efficiency investments costs, minus auction payments for energy-related CO_2 emissions, plus additional costs for process CO_2 emissions and non-CO_2 emissions abatement, and disutility costs.

[18] Capital costs, energy purchases and demand-side investment expenditure are the sum of the respective costs for industry, the residential, tertiary and transport sectors.

[19] Direct energy efficiency costs include the costs relating to thermal integrity of buildings, i.e. for building insulation, triple glazing and other devices for energy savings including building management systems. For the industry sector they also include the investments that relate to the horizontal BAT deployment, such as for energy control systems and heat recovery systems. Capital costs include all other investments for appliances, equipment, vehicles, etc. that are caused by increased energy efficiency requirements.

Energy purchases[18]	2020	2030	2050	2020	2030	2050	2020	2030	2050
Reference plus	1495254	1519374	1647398	1361472	1382411	1495393	1494870	1518994	1647048
Reference plus LFR2.2	1495235	1522495	1668033	1361447	1384525	1512709	1494851	1522115	1667682
EE - 25	1487962	1459806	1496958	1354768	1326572	1348683	1487576	1459443	1496524
EE - 28	1483893	1399719	1360183	1351093	1271771	1225045	1483510	1399299	1359722
EE - 30	1479061	1348245	1265222	1346714	1225207	1140195	1478677	1347843	1264793
EE - 32	1479403	1322085	1250858	1346996	1201468	1124801	1479019	1321697	1250438
EE - 35	1476440	1259525	1178151	1344379	1145653	1060013	1476057	1259194	1177815
EE - 40	1475684	1186524	1107275	1343738	1079860	996860	1475301	1186260	1107025
Demand-side investment expenditure (energy related)[18]	2020	2030	2050	2020	2030	2050	2020	2030	2050
Reference plus	3668340	3951608	4502269	3668340	3951608	4502269	3668340	3951608	4502269
Reference plus LFR2.2	3668671	3955984	4497414	3668671	3955984	4497414	3668671	3955984	4497414
EE - 25	3684532	4135222	5034516	3684532	4135222	5034516	3684532	4135222	5034516
EE - 28	3693666	4568886	5354975	3693666	4568886	5354975	3693666	4568886	5354975
EE - 30	3699635	5032700	5623277	3699635	5032700	5623277	3699635	5032700	5623277
EE - 32	3699050	5452397	5671693	3699050	5452397	5671693	3699050	5452397	5671693
EE - 35	3700868	6487715	6021296	3700868	6487715	6021296	3700868	6487715	6021296
EE - 40	3701080	9677276	6272405	3701080	9677276	6272405	3701080	9677276	6272405
of which direct efficiency investment cost[19]	2020	2030	2050	2020	2030	2050	2020	2030	2050
Reference plus	56209	43478	32280	32573	25188	18849	47171	36667	28032
Reference plus LFR2.2	56172	43432	33882	32550	25159	19831	47134	36617	29636
EE - 25	55697	87545	159554	32268	51185	93749	46718	75438	140852
EE - 28	55393	160119	364299	32091	93617	214902	46464	131093	312433
EE - 30	54964	264571	631779	31845	154784	369570	46108	212740	504463
EE - 32	54987	332206	661303	31859	194688	386560	46130	268956	525857
EE - 35	54762	535442	991972	31728	313789	577850	45935	431225	771773
EE - 40	54725	989285	1504469	31705	579751	874789	45898	790975	1154265

Supply side investment expenditure (energy related)[20]	2020	2030	2050	2020	2030	2050	2020	2030	2050
Reference plus	481897	418513	557059	481897	418513	557059	481897	418513	557059
Reference plus LFR2.2	481775	488651	549997	481775	488651	549997	481775	488651	549997
EE - 25	473867	550603	813727	473867	550603	813727	473867	550603	813727
EE - 28	470631	495702	749377	470631	495702	749377	470631	495702	749377
EE - 30	467329	440045	679570	467329	440045	679570	467329	440045	679570
EE - 32	467739	409298	677388	467739	409298	677388	467739	409298	677388
EE - 35	465887	327134	608923	465887	327134	608923	465887	327134	608923
EE - 40	465126	206808	585250	465126	206808	585250	465126	206808	585250

[20] Supply-side investment expenditure is the sum of power grid investment, investment in power plants (including electricity and CHP) and in steam boilers.

4. Comparison to National projections

All scenarios are built taking into account available national estimations, as reported in the national energy efficiency progress reports[21], as well as the national notifications in accordance with Article 7 of the Energy Efficiency Directive[22]. Moreover, as the aim is to explore scenarios where energy efficiency measures are more intense than currently implemented and where energy savings are reaching their limits, special care has been taken to consider the maximum potential on energy savings for every country, to the extent that availability of data renders this possible. As a result, the scenarios with very intense energy efficiency measures entail ambitious energy savings, which however do not fall out of a reasonable sphere for every country, provided of course that the set of assumptions that enable these savings is satisfied.

In the following we briefly discuss the key trends in energy savings of Member-States (except for Croatia, as no NEEAP is available). These serve mainly to assess PRIMES projections in the context of the Reference 2013 scenario and the projections up to 2020. In some Member-States, it appears that current trends are expected to lead to the level of energy savings projected under the more ambitious energy efficiency scenarios of this analysis.

- **Austria:** Austria has already initiated a plan of renovating dwellings built in the period 1945-1980, with a horizon to 2020. This entails ambitious energy savings which are however feasible. The energy savings achieved in 2009 in both the residential sector and tertiary sectors were significant, and the respective target for 2016 is almost three times up. Overall, the potential for energy savings from current planning and the trends so far are consistent with PRIMES projections until 2020. Moreover, potential for further energy savings especially in the public sector is considerable enough to cover for the post 2020 PRIMES projections of the Reference scenario.
- **Belgium:** Belgium has achieved ESD targets for 2010 and is expected to surpass 2016 targets compared to 2001-2005. Belgium is committed to decrease energy consumption significantly by 2020, especially in the residential sector. PRIMES Reference scenario presents similar estimations. Comparing with the projections of PRIMES different efficiency policies scenarios for the residential sector it appears that Belgium has the potential to achieve the energy savings of the moderate (EE-28, EE-30) efficiency policies scenarios.
- **Bulgaria:** Building stock in Bulgaria currently has a very low efficiency rate, due to heating with electric stoves, the use of charcoal and wood, the low promotion of natural gas for heating in the residential sector and finally due to the use of construction products such as prefabricated concrete. The estimated potential for energy savings in the residential sector is very considerable (of the order of 25-35kWh/m^2), and is consistent with PRIMES projections until 2020 and also until 2030 for the Reference scenario.
- **Cyprus:** NEEAP of Cyprus indicates that ESD targets for 2010 have been achieved and it is also expected to achieve its targets for 2016. Although the data provided are not consistent (an amendment of 1st NEEAP is mentioned) with respect to targeted,

[21] http://ec.europa.eu/energy/efficiency/eed/reporting_en.htm
[22] http://ec.europa.eu/energy/efficiency/eed/article7_en.htm

achieved and projected goals, it is expected that developments in Cyprus will be consistent to PRIMES Reference scenario until 2020. It is expected that Cyprus has the potential to achieve the savings of the PRIMES ambitious scenario (EE-32) by 2030 in the domestic sector.

- **Czech Republic:** For Czech Republic, no concrete estimations beyond 2020 exist for either the residential or the tertiary sector. Planning for the period up to 2020 however (0.5% reductions in the residential sector and 0.25% for the tertiary sector for the period 2011-2016) are close to PRIMES Reference projections.
- **Denmark:** Expectations of energy savings until 2020 (app. 10% to 2006) are consistent with PRIMES Reference projections (11% relative to 2005). The achieved energy savings so far and planning until 2050 towards the complete independence from fossil fuels renders the reductions of final energy demand that are projected with PRIMES throughout the projection period reasonable.
- **Estonia:** Estonia has set a 2020 target of maintaining final energy demand at the same level as in 2010. Currently, the minimum efficiency requirements for households are 150-300 kWh/m^2/year and there exists a target of reducing to 120-200 kWh/m^2/year. PRIMES respective energy savings projections fall within this range even for the more ambitious energy efficiency scenarios (EE-30, EE-32).
- **Finland:** The increase in the rate of efficiency that is observed in Finland since 2010 (12.1TWh saved in 2010, expected 24.7 TWh in 2016 and 33.7 TWh in 2020) justify the increased rates that are projected in PRIMES. There already exist a set of measures which set increasingly strict standards for new buildings, equipment as well as energy management for the public sector. Thus it is realistic to expect that the savings objectives will be met with existing measures.
- **France:** France appears to be ahead of its short term targets; the 2010 target of 5Mtoe savings was already achieved in the period 2007-2009, while it is estimated to overcome its energy savings target for 2016 (18Mtoe instead of 12Mtoe). 88% of this target will be achieved from the residential and the tertiary sector. Their goal on specific consumption reductions in buildings is to reach 150KwH/m^2 in 2020, through renovating fully 400000 buildings and partially 9 million buildings. The facilitation schemes for such improvements exist, however due to the economic crisis it can be expected that the situation will be hindered. PRIMES Reference scenario results are consistent with these estimations.
- **Germany:** Germany has set a target of 20% reduction in primary energy consumption in 2020 (relative to 2008) and 50% until 2050. Moreover, it has set ambitious final energy demand reductions towards achieving "climate neutral" (zero carbon emitting) building stock until 2050. These reductions imply a renovation rate of the building stock of 2% per year. These objectives justify PRIMES Reference projections in the period up to 2050.
- **Greece:** Greece's energy savings target has been achieved mainly due to the economic recession. In 2010, Greece had almost doubled the achieved savings compared to 2010 target, but according to the NEEAP it is expected to match 2016 ESD targets. Moreover, according to the NEEAP developments until 2020 are expected to follow the PRIMES reference scenario trends. All PRIMES efficiency scenarios are similar to the reference scenario until 2020 for the domestic sector. It appears that Greece has the potential to achieve the EE-25 scenario developments by 2030 in the residential sector, while in the tertiary sector the potential appears to match the moderate scenarios (EE-28, EE-30).

- **Hungary:** No reliable sources on energy efficiency trends exist for Hungary. It is estimated that app. 70% of its building stock is in very poor condition, efficiency wise. The country's goal in 2011 was to decrease energy consumption by 30% until 2030. From a technical perspective the potential for such ambitious energy savings exists, however the lack of infrastructure, technical expertise and of financial sources pose considerable difficulties. PRIMES Reference projections are less optimistic, reflecting these difficulties.
- **Ireland:** According to the revised 2011 NEEAP, Ireland achieved the 2010 targets for energy saving in residential and services sectors and they are estimating that they will meet the targets set for 2016. They are implementing a series of measures and incentives, which will be in force also after 2016 in order to keep the satisfactory pace of increasing energy savings. Most of the measures have institutional character and are targeting to financing energy saving projects through EPC schemes. Comparing the up-to-date achieved energy savings with the values projected with PRIMES it is concluded that the Reference reduction trend is compatible. Moreover, taking into account the economic crisis and the achieved energy savings so far, it is rational to expect that future developments will follow the trends of the scenarios EE-25 through EE-30.
- **Italy:** Italy achieved its energy saving targets in the residential sector for 2010 but did not manage to do the same in the tertiary sector. That was mainly due to the evolving economic crisis. Italy is planning to continue the implementation of energy saving measures and correct the measures that proved to have small impact. The overall energy saving target for 2016 is expected to be achieved. Taking into consideration the above facts and the continuation of the economic instability, it is concluded that the developments in Italy post 2020 can be similar to the modest scenario of PRIMES (EE-25).
- **Latvia:** According to Latvian NEEAP, the whole energy infrastructure of the country undergoes significant renovations in order to improve its overall efficiency. In particular, there is great potential for improvement in the residential sector. Latvian administration has implemented a series of measures that promote energy efficiency in the residential sector. It has also implemented similar measures to the tertiary sector. The results in the tertiary sector have been positive and the energy efficiency target for 2010 has been overcome. Based on these facts, it is estimated that even the projections from the ambitious scenario (EE-32) of PRIMES may be achieved, if energy efficiency measures continue to be implemented.
- **Lithuania:** Lithuania presents a significant increase in energy consumption in the services sector from 1996 to 2010. The average increase was 5.2% per year from 2000 to 2007. After 2007 the consumption presents a decrease of 4.7%. According to their national plans, they are expecting energy savings of 387 GWh in the services sector. In 2010 they achieved 110 GWh total final energy savings. This implies they are planning to triple the achieved target. This is possible since they are having in force a series of programs that offer initiatives and support to projects related to energy savings in the services sector, mainly in public services. The trends of the moderate energy efficiency scenarios (EE-28, EE-30) appear to be consistent with the Lithuanian NEEAP.
- **Luxembourg:** Luxembourg has managed to overcome the energy saving target for 2010 and has therefore adopted a more ambitious target for 2016 in the revised NEEAP. The achievement of 2010 target was based on a series of measures that were already

implemented since 1995, are still in force, and their results continue to be realized currently. There is also an additional series of measures that were implemented in 2005 and their results will be felt in the coming years. Finally, Luxembourg is planning new national measures that will keep enchasing energy savings in all sectors. Based on the above facts and taking into account the dramatic improvement already achieved up to 2010, it is estimated that the ambitious scenario of PRIMES (EE-32) can be validated.

- **Malta:** Malta has achieved its 2010 ESD target and according to the NEEAP it will achieve the 2016 target as well. The target for energy savings in 2020 will reach 22% with intermediate target in 2014 of 15% (percentage reductions relative to 2008 consumption). Relevant policies and measures are primarily focusing on the residential sector. For the tertiary sector, special emphasis is given on tourism and for the industry the emphasis is on energy efficiency improvements in water distribution networks. Taking the above into consideration, the potential for energy savings in Malta is quite significant, potentially comparable to the ambitious energy efficiency policies scenario developed with PRIMES (EE-32).
- **Netherlands:** The Netherlands is expected to achieve 13% energy savings in 2016 (relative to 2008), while it is estimated (IAGO) that post 2020 considerable energy savings will be achieved from interventions in the building stock. PRIMES projections for 2020 are consistent to national estimations, while national scenarios post 2020 are ambitious enough to cover the energy savings of the EE-25 through EE-35 scenarios.
- **Poland:** Poland has set ambitious targets until 2030 for improving energy efficiency in final energy demand sectors, as well as in production and distribution of energy. The main goal in Poland is that the economy develops without increasing primary energy demand and to reach the same levels of energy intensity as EU-15 countries. These ambitious targets correspond to the projections of even the very ambitious energy efficiency scenario of PRIMES (EE-35).
- **Portugal:** Portugal estimates considerable energy savings already in 2015 while it has updated its 2020 targets upwards, with considerable energy efficiency improvements expected especially in the public sector (the 25% target has been updated to 30% savings in 2016 relative to 2008). These trends are consistent with PRIMES results until 2020, while they cover for the projections in the EE - 25 and EE - 28 scenarios until 2030.
- **Romania:** According to the energy efficiency reporting of Romania, energy savings until 2010 have already covered a considerable part of its 2016 target and it is expected that the 2020 target will be achieved. Their estimation is that primary energy consumption will be reduced by 40% in the period 2004-2015. PRIMES projections for 2020 are consistent with these targets while there is potential for further reductions as projected in the energy efficiency scenarios.
- **Slovakia:** According to the National Energy Efficiency Plan, the actual reduction of energy consumption in recent years cannot be measured with accuracy due to internal difficulties, therefore the quantification and assessment of the efficiency targets is not feasible. However, PRIMES short term projections are consistent to trends observed from national statistical data on energy consumption (2005 and 2010), in particular for the residential sector.
- **Slovenia:** Slovenia has met its targets for 2010, and it is estimated that 2016 target of 9% savings in end-use energy compared to 2008 will also be met. However, current policy setting is not sufficient to overcome these targets, while there are no specific

targets set for 2020 and beyond. The short-term projections of PRIMES are consistent with this context.

- **Spain:** According to country estimations in 2020 final energy demand will be app. 1360 ktoe less than in 2010. These energy savings are mainly expected to come from improvements in heating equipment and electric appliances, rather than interventions which improve thermal integrity of dwellings. Technically, the potential for such energy savings is feasible even for the most ambitious targets; this technical potential however is currently not economically and institutionally supported. Overall, we estimate that with current planning energy savings may reach as far as the EE - 25 and EE - 28 scenarios.
- **Sweden:** Sweden has already covered successfully its 2016 targets (ESD) since 2010, and achievement of the 2020 efficiency target appears to be feasible (including -20% of kWh/m^2 heated in buildings relative to 1995 level and -20% of energy intensity (kWh/SEK) from 2008). PRIMES projections for 2020 are consistent to this trend, which is sufficient to cover also the energy savings projected for the EE – 25 scenario.
- **United Kingdom:** The Reference projection is in accordance with the likely reduction of energy consumption before 2020 as projected in the national reporting. Recently updated national scenarios show increase of energy consumption after 2020, which contrasts PRIMES projections under the assumption of continuation of energy efficiency policies after 2020.

Annex A: F-gas emissions reduction in the reference plus scenario

Proposed (exogenous) reduction of F-gases (in $ktCO_2$) in Reference plus compared to Reference 2013 scenario, resulting from the implementation of the F-gas regulation								
	2015	2020	2025	2030	2035	2040	2045	2050
AU	0	0	427.8689	855.7378	855.7378	855.7378	855.7378	855.7378
BE	0	0	532.3701	1064.74	1064.74	1064.74	1064.74	1064.74
BG	0	0	111.0668	222.1336	222.1336	222.1336	222.1336	222.1336
HR	0	0	86.74938	173.4988	173.4988	173.4988	173.4988	173.4988
CP	0	0	48.00565	96.01131	96.01131	96.01131	96.01131	96.01131
CZ	0	0	239.4545	478.909	478.909	478.909	478.909	478.909
DK	0	0	472.9555	945.911	945.911	945.911	945.911	945.911
ES	0	0	48.63563	97.27125	97.27125	97.27125	97.27125	97.27125
FI	0	0	279.5443	559.0886	559.0886	559.0886	559.0886	559.0886
FR	0	0	4762.649	9525.298	9525.298	9525.298	9525.298	9525.298
GE	0	0	3479.385	6958.771	6958.771	6958.771	6958.771	6958.771
GR	0	0	511.3243	1022.649	1022.649	1022.649	1022.649	1022.649
HU	0	0	175.8153	351.6307	351.6307	351.6307	351.6307	351.6307
IR	0	0	367.2122	734.4244	734.4244	734.4244	734.4244	734.4244
IT	0	0	3002.942	6005.883	6005.883	6005.883	6005.883	6005.883
LA	0	0	28.43387	56.86774	56.86774	56.86774	56.86774	56.86774
LI	0	0	87.83509	175.6702	175.6702	175.6702	175.6702	175.6702
LX	0	0	56.79619	113.5924	113.5924	113.5924	113.5924	113.5924
MA	0	0	18.79494	37.58989	37.58989	37.58989	37.58989	37.58989
NL	0	0	517.7958	1035.592	1035.592	1035.592	1035.592	1035.592
PD	0	0	2375.362	4750.723	4750.723	4750.723	4750.723	4750.723
PL	0	0	270.6896	541.3793	541.3793	541.3793	541.3793	541.3793
RO	0	0	130.9629	261.9258	261.9258	261.9258	261.9258	261.9258
SK	0	0	106.2013	212.4027	212.4027	212.4027	212.4027	212.4027
SN	0	0	30.95708	61.91415	61.91415	61.91415	61.91415	61.91415
SP	0	0	3339.289	6678.579	6678.579	6678.579	6678.579	6678.579
SV	0	0	966.6305	1933.261	1933.261	1933.261	1933.261	1933.261
UK	0	0	4455.16	8910.32	8910.32	8910.32	8910.32	8910.32

Annex B: EU28 Summary results of the scenarios presented in section 3

Cost reporting method: a

EU28: REF2012tplusF												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831587**	**806999**	**774028**	**750386**	**756269**	**758942**	**756325**	**741591**	**-1.2**	**-0.4**	**-0.7**	**-0.1**
Solids	214627	196059	163855	149946	139419	127372	88814	78810	74257	72656	68963	-2.7	-1.6	-4.4	-1.3
Oil	176084	136469	103565	90795	77412	65152	55157	43065	33789	22982	16197	-5.2	-2.9	-3.3	-5.9
Natural gas	209437	190678	158525	149165	140761	124871	110507	103426	97087	84365	71349	-2.7	-1.2	-2.4	-2.2
Nuclear	243841	257516	236563	229091	192194	179601	200958	215101	218499	220909	216248	-0.3	-2.1	0.4	0.4
Renewable energy sources	103944	123918	178977	212589	257212	277033	294950	315867	335310	355412	368835	5.6	3.7	1.4	1.1
Hydro	30818	26817	32208	31687	32181	32955	34082	35124	35706	36025	36580	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136218	150600	151413	152531	154423	160741	163611	162741	6.5	1.9	0.1	0.3
Wind	1913	6058	12829	22663	42406	54639	66346	73718	78176	85525	93351	21.0	12.7	4.6	1.7
Solar and others	430	806	3691	14047	22777	28573	32011	37261	41669	45099	45953	24.0	20.0	3.5	1.8
Geothermal	4712	5354	5888	7974	9248	9453	9979	15341	19017	25152	30210	2.3	4.6	0.8	5.7
Net Imports	**829314**	**988719**	**956735**	**967965**	**909430**	**914865**	**920857**	**911994**	**917314**	**940317**	**961688**	**1.4**	**-0.5**	**0.1**	**0.2**
Solids	98273	125211	110927	116119	95051	87995	85092	61658	54216	54638	54894	1.2	-1.5	-1.1	-2.2
Oil	535238	604030	563977	551754	527894	519346	516402	517466	518318	527807	532886	0.5	-0.7	-0.2	0.2
- Crude oil and Feedstocks	518046	585121	541240	527813	506534	496537	490142	488282	485469	489278	488275	0.4	-0.7	-0.3	0.0
- Oil products	17192	18909	22737	23941	21361	22809	26260	29184	32849	38529	44612	2.8	-0.6	2.1	2.7
Natural gas	193432	257849	276001	286188	266292	285786	295737	308333	317942	330144	345370	3.6	-0.4	1.1	0.8
Electricity	2029	1412	707	-129	-1602	-1507	-1489	-1740	-1819	-1880	-2096	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1746078**	**1660906**	**1631144**	**1611172**	**1605665**	**1611671**	**1628926**	**1632192**	**0.2**	**-0.6**	**-0.3**	**0.1**
Solids	321277	317986	280653	266064	234470	215366	173905	140468	128472	127295	123857	-1.3	-1.8	-2.9	-1.7
Oil	665142	683909	620735	589293	550703	528750	514194	502296	493414	490670	487100	-0.7	-1.2	-0.7	-0.3
Natural gas	396145	448380	444428	435135	406133	408655	403538	407397	409137	406913	407615	1.2	-0.9	-0.1	0.1
Nuclear	243841	257516	236563	229091	192194	179601	200958	215101	218499	220909	216248	-0.3	-2.1	0.4	0.4
Electricity	2029	1412	707	-129	-1602	-1507	-1489	-1740	-1819	-1880	-2096	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226624	279007	300279	320066	342143	363967	385020	399468	5.9	4.2	1.4	1.1
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.2	10.8	8.7	8.0	7.8	7.6				
Oil	38.4	37.3	35.1	33.7	33.2	32.4	31.9	31.3	30.6	30.1	29.8				
Natural gas	22.9	24.5	25.1	24.9	24.5	25.1	25.0	25.4	25.4	25.0	25.0				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.0	12.5	13.4	13.6	13.6	13.2				
Renewable energy forms	6.0	6.8	10.4	13.0	16.8	18.4	19.9	21.3	22.6	23.6	24.5				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3416143**	**3417103**	**3526993**	**3667044**	**3810604**	**3999241**	**4210248**	**4347499**	**1.0**	**0.3**	**0.7**	**0.9**
Self consumption and grid losses	396970	407042	377767	369020	352626	359642	367834	384934	414973	448155	474233	-0.5	-0.7	0.4	1.3
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383279**	**350653**	**338227**	**299628**	**283107**	**287705**	**299279**	**300677**	**0.8**	**-1.7**	**-1.6**	**0.0**
Solids	223038	228941	197605	186789	158213	143833	105916	76434	68124	69913	68236	-1.2	-2.2	-3.9	-2.2
Oil (including refinery gas)	40042	33244	20532	10888	5907	5284	4524	4024	4157	4106	3999	-6.5	-11.7	-2.6	-0.6
Gas (including derived gases)	102844	133713	149190	131860	124637	126186	124553	127862	129233	128779	124793	3.8	-1.8	0.0	0.0
Biomass & Waste	14918	26452	45117	47765	55099	56071	57403	62394	70305	74626	76713	11.7	2.0	0.4	1.5
Geothermal heat	4114	4645	4828	5976	6796	6853	7232	12393	15886	21855	26937	1.6	3.5	0.6	6.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971213**	**907635**	**869885**	**873784**	**869927**	**857971**	**852563**	**841625**	**-0.7**	**-1.0**	**-0.4**	**-0.2**
Refineries	740500	763156	670015	646759	614530	592841	577534	564620	552898	546497	538635	-1.0	-0.9	-0.6	-0.3
Biofuels and hydrogen production	705	3101	13296	18232	26203	26359	26690	26750	26670	27551	28879	34.1	7.0	0.2	0.4
District heating	18667	19517	20813	22289	20164	19238	19339	18308	17120	16930	17867	1.1	-0.3	-0.4	-0.4
Derived gases, cokeries etc.	316475	324348	297391	283934	246737	231448	250222	260249	261282	261585	256244	-0.6	-1.8	0.1	0.1
Energy Branch Consumption	**86990**	**91952**	**88327**	**82447**	**77111**	**73795**	**70810**	**68774**	**68154**	**68439**	**68633**	**0.2**	**-1.3**	**-0.8**	**-0.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119317**	**122300**	**121539**	**121545**	**121156**	**119756**	**119349**	**119926**	**-0.2**	**0.6**	**-0.1**	**-0.1**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170679**	**1135707**	**1129540**	**1125739**	**1126378**	**1134045**	**1145322**	**1151911**	**0.3**	**-0.2**	**-0.1**	**0.1**
by sector															
Industry	332412	330448	290978	304790	306458	305818	306946	304679	304286	307156	309068	-1.3	0.5	0.0	0.0
- energy intensive industries	217920	216886	187894	197097	197798	195317	194779	192244	190028	190299	188589	-1.5	0.5	-0.2	-0.2
- other industrial sectors	114492	113563	103085	107693	108660	110501	112167	112436	114258	116857	120479	-1.0	0.5	0.3	0.4
Residential	286291	311793	311545	311971	298542	299594	296933	298540	301009	303725	303245	0.8	-0.4	-0.1	0.1
Tertiary	166083	179768	187856	181930	172265	171368	167259	168215	169544	172346	172611	1.2	-0.9	-0.3	0.2
Transport	342901	368665	367191	371987	358443	352759	354602	354943	359206	362096	366986	0.7	-0.2	-0.1	0.2
by fuel															
Solids	61779	54424	49673	48396	46049	43058	41182	39790	37899	36225	34454	-2.2	-0.8	-1.1	-0.9
Oil	485890	502788	457366	440656	407882	391518	379332	370260	365014	363481	361555	-0.6	-1.1	-0.7	-0.2
Gas	266925	285438	269920	271580	251689	251363	248334	247896	247261	245785	249377	0.1	-0.7	-0.1	0.0
Electricity	217599	239418	245271	254509	254919	264128	275763	286183	299289	314052	323069	1.2	0.4	0.8	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55316	55781	56041	55856	56417	57242	58019	58386	1.5	0.4	0.0	0.2
Renewable energy forms	49480	56250	81825	100154	119123	123004	124620	124896	125946	125902	122809	5.2	3.8	0.5	-0.1
Other	0	0	0	67	264	428	652	935	1394	1858	2261	0.0	0.0	9.5	6.4
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194876**	**245063**	**264319**	**282449**	**299844**	**316529**	**330560**	**342242**	**5.4**	**5.1**	**1.4**	**1.0**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4624.2**	**4285.8**	**4111.8**	**3785.7**	**3540.4**	**3385.4**	**3208.5**	**3125.4**	**-0.7**	**-1.2**	**-1.2**	**-1.0**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.3	1903.9	1829.4	1603.2	1395.2	1265.6	1097.0	1017.9		-1.3	-1.7	-2.2
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.8	2382.0	2282.4	2182.5	2145.2	2119.8	2111.5	2107.5		-1.1	-0.9	-0.2
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3591.2**	**3254.6**	**3114.0**	**2872.9**	**2644.0**	**2503.9**	**2425.0**	**2357.1**	**-0.5**	**-1.5**	**-1.2**	**-1.0**
Power generation/District heating	1404.5	1483.1	1341.6	1201.0	1037.0	969.8	790.8	618.5	518.0	459.9	400.7	-0.5	-2.5	-2.7	-3.3
Energy Branch	170.1	174.2	159.8	149.8	139.4	130.8	124.3	116.3	110.5	106.1	103.4	-0.6	-1.4	-1.1	-0.9
Industry	693.6	640.7	520.3	538.9	508.4	492.9	483.8	457.0	433.4	425.6	424.0	-2.8	-0.2	-0.5	-0.7
Residential	461.0	491.2	457.9	430.8	392.4	379.8	359.2	350.0	339.2	332.2	323.2	-0.1	-1.5	-0.9	-0.5
Tertiary	255.7	266.4	249.2	220.6	195.4	181.5	159.5	151.7	144.9	140.5	137.5	-0.3	-2.4	-2.0	-0.7
Transport	1001.0	1082.7	1050.9	1050.1	982.0	959.3	955.3	950.4	958.0	960.7	968.4	0.5	-0.7	-0.3	0.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**277.8**	**238.5**	**225.6**	**210.1**	**105.5**	**84.2**	**-1.0**	**1.5**	**-1.4**	**-5.1**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**670.8**	**671.4**	**678.0**	**684.1**	**-1.5**	**-0.9**	**-1.2**	**0.1**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.4**	**75.4**	**72.3**	**66.6**	**62.3**	**59.6**	**56.4**	**55.0**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: REF2012tplusF			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.6	105.6	96.7	89.9	84.2	79.4	74.4	-1.2	-2.1	-1.9	-1.3
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.91	1.78	1.65	1.55	1.49	1.44	-0.7	-0.9	-0.9	-1.0
Import Dependency %	46.7	52.5	52.7	53.8	53.0	54.2	55.1	54.7	54.7	55.4	56.5				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.9	2111.4	2230.0	2337.0	2407.6	2502.4	2609.3	2701.1	3.7	3.0	1.0	0.7
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.4	14.0	13.5	13.1	12.7	12.3				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.3	85.4	81.1	76.9	73.3	70.8	68.3		-0.9	-1.2	-0.9
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	84.0	77.8	71.4	66.8	62.5	58.5	54.1	-0.5	-1.7	-1.6	-1.4
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	78.7	71.8	64.6	60.2	56.2	53.0	49.3	0.0	-2.4	-2.0	-1.3
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.1	29.0	26.8	25.5	24.8	24.3	24.0	-0.6	-1.6	-1.8	-0.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.8	44.2	41.9	40.4	39.4	38.4	37.7	37.1	0.3	-0.9	-0.9	-0.4
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.23	0.18	0.13	0.11	0.09	0.08	-1.6	-2.8	-3.2	-4.1
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.74	1.69	1.65	1.62	1.61	-0.8	-0.7	-0.5	-0.4
Industry	2.09	1.94	1.79	1.77	1.66	1.61	1.58	1.50	1.42	1.39	1.37	-1.5	-0.7	-0.5	-0.7
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.17	1.13	1.09	1.07	-0.9	-1.1	-0.8	-0.6
Tertiary	1.54	1.48	1.33	1.21	1.13	1.06	0.95	0.90	0.85	0.81	0.80	-1.5	-1.6	-1.7	-0.9
Transport	2.92	2.94	2.86	2.82	2.74	2.72	2.69	2.68	2.67	2.65	2.64	-0.2	-0.4	-0.2	-0.1
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.0	22.7	24.4	25.8	27.0	27.9	28.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.2	12.0	12.5	12.9	13.4	14.1				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3416143**	**3417103**	**3526993**	**3667044**	**3810604**	**3999241**	**4210248**	**4347499**	**1.0**	**0.3**	**0.7**	**0.9**
Nuclear energy	945027	997733	916685	887133	744275	700745	798536	868963	899072	923584	925368	-0.3	-2.1	0.7	0.7
Solids	933660	974939	830048	802985	695187	634705	475408	338823	316001	348162	364411	-1.2	-1.8	-3.7	-1.3
Oil (including refinery gas)	181203	141358	86851	46047	26351	24719	20367	20887	21379	22072	21396	-7.1	-11.2	-2.5	0.2
Gas (including derived gases)	514392	699743	795653	752612	707159	724245	738503	771635	789791	800906	787806	4.5	-1.2	0.4	0.3
Biomass-waste	46848	83787	145901	190537	221059	232213	244380	272146	315813	329348	341583	12.0	4.2	1.0	1.7
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383199	396304	408416	415190	418892	425350	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263519	493091	635340	771467	857183	909025	994478	1085475	21.0	12.7	4.6	1.7
Solar	118	1459	22363	96144	143662	176869	206134	250245	305813	332001	347866	68.9	20.4	3.7	2.7
Geothermal and other renewables	5358	5930	6831	8712	12116	14959	15945	22307	27156	40804	48243	2.5	5.9	2.8	5.7
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930091**	**1020608**	**1068184**	**1139437**	**1200565**	**1276176**	**1332501**	**1384829**	**2.6**	**2.0**	**1.1**	**1.0**
Nuclear energy	136924	134494	131323	123150	111162	96620	107067	115262	119221	122229	122236	-0.4	-1.7	-0.4	0.7
Renewable energy	114281	147780	226757	318900	439930	518253	583930	638972	695773	745304	788875	7.1	6.9	2.9	1.5
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122425	124880	128891	130589	132262	134472	1.0	0.7	0.3	0.4
Wind	12893	40510	84512	123698	206837	259330	306665	336105	356156	386066	416514	20.7	9.4	4.0	1.5
Solar	180	1740	29846	76309	110837	133698	149351	170783	205486	220708	230983	66.7	14.0	3.0	2.2
Other renewables (tidal etc.)	0	0	240	586	1655	2800	3033	3193	3542	6268	6906	0.0	21.3	6.2	4.2
Thermal power	398853	429386	480034	488042	469516	453312	448440	446331	461183	464968	473718	1.9	-0.2	-0.5	0.3
of which cogeneration units	92439	98998	101203	102082	112459	114394	114917	120643	127184	136115	138177	0.9	1.1	0.2	0.9
of which CCS units	0	0	0	0	904	904	1614	7554	18146	34422	38409	0.0	0.0	6.0	17.2
Solids fired	186470	180630	175756	163212	141533	121308	103796	90400	87684	86635	81361	-0.6	-2.1	-3.1	-1.2
Gas fired	129190	169054	224922	253067	259228	266067	280845	291675	296751	298216	302087	5.7	1.4	0.8	0.4
Oil fired	67499	59434	54039	42254	33187	27457	23519	19708	20759	19695	21359	-2.2	-4.8	-3.4	-0.5
Biomass-waste fired	15128	19615	24590	28716	34666	37570	39320	42903	53878	57521	65334	5.0	3.5	1.3	2.6
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	960	1645	2109	2901	3576	2.5	2.2	0.6	6.8
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.6	36.2	35.4	35.0	34.5	34.7	34.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.7	41.3	42.7	43.1	43.7	43.9	44.2				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.5	16.1	16.4	16.8	16.7	16.1				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.7	3.4	5.0	6.9				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.2	60.8	66.3	70.3	71.8	72.2	73.0				
- nuclear	31.4	30.4	27.5	26.0	21.8	19.9	21.8	22.8	22.5	21.9	21.3				
- renewable energy forms	14.4	14.4	21.0	27.1	36.4	40.9	44.6	47.5	49.3	50.2	51.7				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6756.2**	**7047.8**	**7494.3**	**7964.8**	**8291.0**	**8630.6**	**8887.9**	**9151.0**	**0.9**	**0.9**	**1.2**	**0.7**
Public road transport	519.6	527.2	512.8	531.4	550.2	574.3	600.9	620.7	642.2	656.8	671.8	-0.1	0.7	0.9	0.6
Private cars and motorcycles	4425.4	4694.5	4893.4	5053.0	5195.5	5454.8	5711.8	5881.1	6051.7	6176.6	6302.7	1.0	0.6	1.0	0.5
Rail	447.8	459.7	496.4	536.6	583.4	647.0	720.7	775.2	829.4	867.0	904.4	1.0	1.6	2.1	1.1
Aviation	459.7	530.7	525.6	595.7	677.8	775.3	886.4	967.5	1059.2	1138.1	1221.5	1.4	2.6	2.7	1.6
Inland navigation	41.7	39.5	38.1	39.4	41.0	42.9	45.0	46.6	48.1	49.4	50.6	-0.9	0.7	0.9	0.6
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.9**	**2937.3**	**3173.4**	**3426.8**	**3564.2**	**3709.0**	**3806.2**	**3904.6**	**1.1**	**1.7**	**1.6**	**0.7**
Trucks	1522.0	1803.3	1764.4	1921.1	2074.7	2232.5	2397.2	2492.9	2593.3	2659.8	2731.0	1.5	1.6	1.5	0.7
Rail	405.5	416.0	392.5	435.7	486.0	540.3	601.9	631.8	663.1	684.1	702.1	-0.3	2.2	2.2	0.8
Inland navigation	300.1	325.9	336.6	356.1	376.6	400.6	427.6	439.5	452.6	462.3	471.5	1.2	1.1	1.3	0.5
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369510**	**355913**	**350138**	**351907**	**352189**	**356402**	**359261**	**364112**	**0.7**	**-0.3**	**-0.1**	**0.2**
Public road transport	7580	7663	7522	7716	7793	7841	7915	7986	8113	8157	8235	-0.1	0.4	0.2	0.2
Private cars and motorcycles	178015	181818	182270	176044	157092	145691	141615	140285	140674	141079	142285	0.2	-1.5	-1.0	0.0
Trucks	95660	111643	112043	117814	120021	122576	127381	129214	131227	132138	133971	1.6	0.7	0.6	0.3
Rail	8093	7855	7399	7954	8553	9177	9823	9955	10003	9856	9635	-0.9	1.5	1.4	-0.1
Aviation	45492	50512	49820	53837	56062	58139	58115	57554	59065	60644	62563	0.9	1.2	0.4	0.4
Inland navigation	5973	6575	5892	6145	6392	6715	7059	7195	7320	7386	7423	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EEREF2012tp												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831603**	**807039**	**768617**	**759481**	**762551**	**773611**	**772270**	**756520**	**-1.2**	**-0.4**	**-0.6**	**0.0**
Solids	214627	196059	163855	149978	139407	124742	85254	68644	68188	65787	70844	-2.7	-1.6	-4.8	-0.9
Oil	176084	136469	103565	90791	77413	65119	55076	43039	33760	22939	16155	-5.2	-2.9	-3.3	-5.9
Natural gas	209437	190678	158525	149149	140909	124742	107197	99034	94013	82152	69868	-2.7	-1.2	-2.7	-2.1
Nuclear	243841	257516	236563	229092	192130	172826	184787	189566	194621	197371	194952	-0.3	-2.1	-0.4	0.3
Renewable energy sources	103944	123918	178977	212593	257179	281188	327166	362268	383030	404022	404702	5.6	3.7	2.4	1.1
Hydro	30818	26817	32208	31687	32181	33035	34543	35845	36525	36945	37347	0.4	0.0	0.7	0.4
Biomass & Waste	66071	84883	124361	136223	150582	151760	170091	174442	181727	186996	179818	6.5	1.9	1.2	0.3
Wind	1913	6058	12829	22662	42384	58213	74562	84338	88134	95665	100008	21.0	12.7	5.8	1.5
Solar and others	430	806	3691	14047	22785	28727	33075	38333	43412	46834	47258	24.0	20.0	3.8	1.8
Geothermal	4712	5354	5888	7974	9247	9453	14895	29310	33231	37582	40271	2.3	4.6	4.9	5.1
Net Imports	**829314**	**988719**	**956735**	**967983**	**909455**	**911750**	**890923**	**885671**	**892039**	**906624**	**937124**	**1.4**	**-0.5**	**-0.2**	**0.3**
Solids	98273	125211	110927	116118	94901	86721	75633	56766	46073	42460	48371	1.2	-1.5	-2.2	-2.2
Oil	535238	604030	563977	551740	527919	519052	515366	517145	518000	526469	531046	0.5	-0.7	-0.2	0.1
- Crude oil and Feedstocks	518046	585121	541240	527800	506550	496323	489514	488315	485583	488871	487639	0.4	-0.7	-0.3	0.0
- Oil products	17192	18909	22737	23940	21370	22729	25852	28830	32417	37597	43407	2.8	-0.6	1.9	2.6
Natural gas	193432	257849	276001	286216	266445	284172	273437	283704	297630	305955	326010	3.6	-0.4	0.3	0.9
Electricity	2029	1412	707	-129	-1602	-1507	-1492	-1742	-1819	-1880	-2103	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1746112**	**1660971**	**1622617**	**1590334**	**1585625**	**1601066**	**1611178**	**1622558**	**0.2**	**-0.6**	**-0.4**	**0.1**
Solids	321277	317986	280653	266096	234308	211463	160887	125410	114262	108248	119215	-1.3	-1.8	-3.7	-1.5
Oil	665142	683909	620735	589276	550730	528423	513078	501948	493067	489287	485218	-0.7	-1.2	-0.7	-0.3
Natural gas	396145	448380	444428	435148	406434	406912	377929	378376	385751	380511	386774	1.2	-0.9	-0.7	0.1
Nuclear	243841	257516	236563	229092	192130	172826	184787	189566	194621	197371	194952	-0.3	-2.1	-0.4	0.3
Electricity	2029	1412	707	-129	-1602	-1507	-1492	-1742	-1819	-1880	-2103	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226630	278971	304500	355144	392066	415184	437641	438502	5.9	4.2	2.4	1.1
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.0	10.1	7.9	7.1	6.7	7.3				
Oil	38.4	37.3	35.1	33.7	33.2	32.6	32.3	31.7	30.8	30.4	29.9				
Natural gas	22.9	24.5	25.1	24.9	24.5	25.1	23.8	23.9	24.1	23.6	23.8				
Nuclear	14.1	14.0	13.4	13.1	11.6	10.7	11.6	12.0	12.2	12.3	12.0				
Renewable energy forms	6.0	6.8	10.4	13.0	16.8	18.8	22.3	24.7	25.9	27.2	27.0				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3416273**	**3417499**	**3512449**	**3635152**	**3768975**	**4006180**	**4174632**	**4325409**	**1.0**	**0.3**	**0.6**	**0.9**
Self consumption and grid losses	396970	407042	377767	369057	352584	355557	360733	379366	423931	450668	490285	-0.5	-0.7	0.2	1.5
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383287**	**350708**	**332646**	**288803**	**277186**	**288098**	**292659**	**303342**	**0.8**	**-1.7**	**-1.9**	**0.2**
Solids	223038	228941	197605	186820	158055	139972	94843	63404	54962	53043	66290	-1.2	-2.2	-5.0	-1.8
Oil (including refinery gas)	40042	33244	20532	10882	5905	5166	4432	4145	3946	3881	3933	-6.5	-11.7	-2.8	-0.6
Gas (including derived gases)	102844	133713	149190	131875	124913	124644	107638	104907	112247	110239	109159	3.8	-1.8	-1.5	0.1
Biomass & Waste	14918	26452	45117	47734	55038	56010	69740	78362	86837	91211	86960	11.7	2.0	2.4	1.1
Geothermal heat	4114	4645	4828	5976	6796	6853	12149	26368	30105	34285	37000	1.6	3.5	6.0	5.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971267**	**907652**	**863046**	**853513**	**842500**	**833304**	**827128**	**817913**	**-0.7**	**-1.0**	**-0.6**	**-0.2**
Refineries	740500	763156	670015	646746	614553	592625	576768	564502	552799	545771	537607	-1.0	-0.9	-0.6	-0.4
Biofuels and hydrogen production	705	3101	13296	18232	26203	26358	26693	26752	26670	27518	28765	34.1	7.0	0.2	0.4
District heating	18667	19517	20813	22356	20225	19400	20165	19713	19207	18301	19022	1.1	-0.3	0.0	-0.3
Derived gases, cokeries etc.	316475	324348	297391	283933	246672	224664	229887	231533	234629	235539	232520	-0.6	-1.9	-0.7	0.1
Energy Branch Consumption	**86990**	**91952**	**88327**	**82441**	**77114**	**73358**	**69035**	**67496**	**68305**	**68067**	**69841**	**0.2**	**-1.3**	**-1.1**	**0.1**
Non-Energy Uses	**117117**	**120718**	**114884**	**119319**	**122303**	**121539**	**121555**	**121161**	**119760**	**119345**	**119914**	**-0.2**	**0.6**	**-0.1**	**-0.1**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170647**	**1135779**	**1128931**	**1122601**	**1123096**	**1133454**	**1140807**	**1146350**	**0.3**	**-0.2**	**-0.1**	**0.1**
by sector															
Industry	332412	330448	290978	304797	306480	305658	304669	303472	306200	306833	309171	-1.3	0.5	-0.1	0.1
- energy intensive industries	217920	216886	187894	197107	197778	195190	193640	191295	192262	189981	188173	-1.5	0.5	-0.2	-0.1
- other industrial sectors	114492	113563	103085	107689	108701	110468	111029	112177	113938	116852	120998	-1.0	0.5	0.2	0.4
Residential	286291	311793	311545	311942	298600	299525	296866	298046	300500	302878	302160	0.8	-0.4	-0.1	0.1
Tertiary	166083	179768	187856	181920	172256	171034	166580	167238	168512	171020	171155	1.2	-0.9	-0.3	0.1
Transport	342901	368665	367191	371988	358443	352714	354487	354340	358241	360076	363863	0.7	-0.2	-0.1	0.1
by fuel															
Solids	61779	54424	49673	48387	46039	43054	40853	39199	37796	35424	33225	-2.2	-0.8	-1.2	-1.0
Oil	485890	502788	457366	440593	407865	391561	379259	370256	364917	362479	359464	-0.6	-1.1	-0.7	-0.3
Gas	266925	285438	269920	271625	251721	251100	239185	241483	241473	238544	244010	0.1	-0.7	-0.5	0.1
Electricity	217599	239418	245271	254518	254958	263298	273814	283397	299364	311037	319921	1.2	0.4	0.7	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55313	55800	56261	57373	57090	57454	57545	56575	1.5	0.4	0.3	-0.1
Renewable energy forms	49480	56250	81825	100144	119133	123229	131465	130736	131057	133922	130898	5.2	3.8	1.0	0.0
Other	0	0	0	67	264	428	652	935	1394	1856	2257	0.0	0.0	9.5	6.4
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194777**	**245087**	**269100**	**315349**	**338256**	**357293**	**373697**	**372667**	**5.4**	**5.1**	**2.6**	**0.8**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4624.3**	**4285.9**	**4088.6**	**3657.4**	**3380.7**	**3093.8**	**2980.3**	**2920.6**	**-0.7**	**-1.2**	**-1.6**	**-1.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.6	1903.8	1806.5	1491.9	1244.5	981.4	885.9	826.5		-1.3	-2.4	-2.9
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.7	2382.1	2282.0	2165.6	2136.2	2112.4	2094.4	2094.2		-1.1	-0.9	-0.2
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3591.3**	**3254.7**	**3091.1**	**2748.3**	**2487.2**	**2316.4**	**2227.3**	**2173.0**	**-0.5**	**-1.5**	**-1.7**	**-1.2**
Power generation/District heating	1404.5	1483.1	1341.6	1201.3	1037.1	948.5	700.2	488.8	348.8	291.3	246.1	-0.5	-2.5	-3.9	-5.1
Energy Branch	170.1	174.2	159.8	149.8	139.5	130.2	118.8	113.4	108.9	104.9	102.7	-0.6	-1.4	-1.6	-0.7
Industry	693.6	640.7	520.3	538.8	508.3	491.3	454.5	432.6	417.1	400.8	401.0	-2.8	-0.2	-1.1	-0.6
Residential	461.0	491.2	457.9	430.8	392.4	379.8	359.1	349.9	339.1	332.2	323.2	-0.1	-1.5	-0.9	-0.5
Tertiary	255.7	266.4	249.2	220.6	195.5	182.1	160.7	153.8	147.1	143.1	140.3	-0.3	-2.4	-1.9	-0.7
Transport	1001.0	1082.7	1050.9	1050.1	982.0	959.2	955.0	948.7	955.3	955.1	959.7	0.5	-0.7	-0.3	0.0
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**277.5**	**234.8**	**222.7**	**106.0**	**75.0**	**63.6**	**-1.0**	**1.5**	**-1.5**	**-6.3**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**670.8**	**671.4**	**678.0**	**684.1**	**-1.5**	**-0.9**	**-1.2**	**0.1**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.4**	**75.4**	**71.9**	**64.3**	**59.5**	**54.4**	**52.4**	**51.4**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EEREF2012tp			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.6	105.0	95.4	88.7	83.6	78.5	73.9	-1.2	-2.1	-2.0	-1.3
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.90	1.73	1.57	1.45	1.38	1.34	-0.7	-0.9	-1.2	-1.3
Import Dependency %	46.7	52.5	52.7	53.8	53.0	54.3	54.0	53.7	53.6	54.0	55.3				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.9	2110.8	2233.7	2340.9	2415.7	2521.6	2615.4	2701.7	3.7	3.0	1.0	0.7
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.5	14.0	13.5	13.2	12.7	12.3				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.3	85.4	80.5	76.6	73.7	70.7	68.3		-0.9	-1.2	-0.8
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	84.0	77.8	71.4	66.7	62.4	58.3	53.9	-0.5	-1.7	-1.6	-1.4
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	78.7	71.7	64.3	59.8	55.9	52.6	48.9	0.0	-2.4	-2.0	-1.4
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.1	29.0	26.8	25.5	24.7	24.2	23.7	-0.6	-1.6	-1.8	-0.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.8	44.2	41.9	40.4	39.4	38.4	37.7	37.1	0.3	-0.9	-0.9	-0.4
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.16	0.11	0.07	0.06	0.05	-1.6	-2.8	-4.4	-5.8
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.72	1.68	1.64	1.61	1.59	-0.8	-0.7	-0.6	-0.4
Industry	2.09	1.94	1.79	1.77	1.66	1.61	1.49	1.43	1.36	1.31	1.30	-1.5	-0.8	-1.1	-0.7
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.17	1.13	1.10	1.07	-0.9	-1.1	-0.8	-0.6
Tertiary	1.54	1.48	1.33	1.21	1.13	1.06	0.96	0.92	0.87	0.84	0.82	-1.5	-1.5	-1.6	-0.8
Transport	2.92	2.94	2.86	2.82	2.74	2.72	2.69	2.68	2.67	2.65	2.64	-0.2	-0.4	-0.2	-0.1
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.0	23.2	27.3	29.2	30.5	31.6	31.3				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.2	12.2	12.9	13.2	13.8	14.3				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3416273**	**3417499**	**3512449**	**3635152**	**3768975**	**4006180**	**4174632**	**4325409**	**1.0**	**0.3**	**0.6**	**0.9**
Nuclear energy	945027	997733	916685	887134	744027	674641	728730	757233	793580	819198	830918	-0.3	-2.1	-0.2	0.7
Solids	933660	974939	830048	803284	694245	616329	423482	286975	279546	289864	383486	-1.2	-1.8	-4.8	-0.5
Oil (including refinery gas)	181203	141358	86851	46006	26248	24143	21609	21936	20680	21092	21014	-7.1	-11.3	-1.9	-0.1
Gas (including derived gases)	514392	699743	795653	752631	709359	712182	650916	656965	698438	685021	684939	4.5	-1.1	-0.9	0.3
Biomass-waste	46848	83787	145901	190393	220804	230831	301859	347900	395384	411046	386208	12.0	4.2	3.2	1.2
Hydro (pumping excluded)	358408	311883	374576	368453	374203	384124	401665	416802	424714	429587	434269	0.4	0.0	0.7	0.4
Wind	22253	70453	149202	263517	492833	676897	867003	980678	1024811	1112385	1162884	21.0	12.7	5.8	1.5
Solar	118	1459	22363	96144	143662	177766	215788	257904	316342	342089	352437	68.9	20.4	4.2	2.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	24101	42581	52683	64351	69255	2.5	5.9	7.1	5.4
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930079**	**1020452**	**1083464**	**1176138**	**1248640**	**1330980**	**1376611**	**1411747**	**2.6**	**2.0**	**1.4**	**0.9**
Nuclear energy	136924	134494	131323	123150	111162	96796	98875	100424	104980	108188	109688	-0.4	-1.7	-1.2	0.5
Renewable energy	114281	147780	226757	318900	439843	535831	627363	695178	751925	801282	828136	7.1	6.8	3.6	1.4
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122643	127080	132075	134547	136767	138749	1.0	0.7	0.5	0.4
Wind	12893	40510	84512	123698	206749	276105	342752	383896	402069	432537	449562	20.7	9.4	5.2	1.4
Solar	180	1740	29846	76309	110837	134048	153503	174390	208118	221989	229103	66.7	14.0	3.3	2.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	4029	4817	7192	9989	10722	0.0	21.3	9.3	5.0
Thermal power	398853	429386	480034	488029	469448	450838	449899	453037	474075	467141	473922	1.9	-0.2	-0.4	0.3
of which cogeneration units	92439	98998	101203	102095	112523	115228	121759	127854	135206	144381	147777	0.9	1.1	0.8	1.0
of which CCS units	0	0	0	0	904	904	1217	11168	46040	53428	76417	0.0	0.0	3.0	23.0
Solids fired	186470	180630	175756	163212	141533	120625	99240	84100	80329	76657	76662	-0.6	-2.1	-3.5	-1.3
Gas fired	129190	169054	224922	253067	259247	263993	272388	285689	296238	284709	282117	5.7	1.4	0.5	0.2
Oil fired	67499	59434	54039	42242	33119	27379	23315	19619	19190	19793	22407	-2.2	-4.8	-3.4	-0.2
Biomass-waste fired	15128	19615	24590	28716	34646	37931	53343	60129	74321	81430	87824	5.0	3.5	4.4	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1613	3500	3996	4551	4912	2.5	2.2	6.0	5.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.6	35.6	34.1	33.3	33.0	33.2	33.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.7	41.2	42.1	41.7	42.7	42.5	43.1				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.3	17.7	17.8	17.8	17.0	15.8				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	2.5	6.2	7.3	10.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.2	61.5	69.8	74.4	75.1	76.1	74.8				
- nuclear	31.4	30.4	27.5	26.0	21.8	19.2	20.0	20.1	19.8	19.6	19.2				
- renewable energy forms	14.4	14.4	21.0	27.1	36.4	42.3	49.8	54.3	55.3	56.5	55.6				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6756.2**	**7047.8**	**7493.9**	**7963.7**	**8283.6**	**8618.3**	**8861.3**	**9109.6**	**0.9**	**0.9**	**1.2**	**0.7**
Public road transport	519.6	527.2	512.8	531.4	550.2	574.4	601.0	621.5	643.4	659.5	675.8	-0.1	0.7	0.9	0.6
Private cars and motorcycles	4425.4	4694.5	4893.4	5053.0	5195.5	5454.7	5711.6	5879.5	6048.7	6170.1	6292.1	1.0	0.6	1.0	0.5
Rail	447.8	459.7	496.4	536.6	583.4	647.1	720.9	776.4	831.5	871.5	911.6	1.0	1.6	2.1	1.2
Aviation	459.7	530.7	525.6	595.7	677.8	774.9	885.2	959.4	1046.3	1110.3	1178.7	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.4	41.0	42.9	45.0	46.8	48.4	49.9	51.4	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.9**	**2937.3**	**3173.4**	**3426.4**	**3563.5**	**3708.0**	**3804.2**	**3902.3**	**1.1**	**1.7**	**1.6**	**0.7**
Trucks	1522.0	1803.3	1764.4	1921.1	2074.7	2232.5	2397.3	2493.0	2593.4	2659.9	2730.9	1.5	1.6	1.5	0.7
Rail	405.5	416.0	392.5	435.7	486.0	540.3	601.5	631.1	662.2	682.4	700.3	-0.3	2.2	2.2	0.8
Inland navigation	300.1	325.9	336.6	356.1	376.6	400.6	427.5	439.4	452.4	461.9	471.1	1.2	1.1	1.3	0.5
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369510**	**355913**	**350095**	**351819**	**351611**	**355469**	**357288**	**361034**	**0.7**	**-0.3**	**-0.1**	**0.1**
Public road transport	7580	7663	7522	7716	7793	7841	7917	7993	8124	8179	8267	-0.1	0.4	0.2	0.2
Private cars and motorcycles	178015	181818	182270	176044	157092	145688	141628	140278	140656	140994	142096	0.2	-1.5	-1.0	0.0
Trucks	95660	111643	112043	117814	120021	122573	127385	129218	131228	132137	133974	1.6	0.7	0.6	0.3
Rail	8093	7855	7399	7954	8553	9177	9818	9947	9991	9841	9620	-0.9	1.5	1.4	-0.1
Aviation	45492	50512	49820	53837	56062	58101	58010	56970	58131	58713	59598	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6145	6392	6715	7060	7206	7338	7423	7478	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE25DEC_a											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831444**	**803947**	**765326**	**741079**	**792186**	**865854**	**914808**	**969301**	**-1.2**	**-0.5**	**-0.8**	**1.4**
Solids	214627	196059	163855	149857	138706	123526	79364	75176	86364	85004	95055	-2.7	-1.7	-5.4	0.9
Oil	176084	136469	103565	90650	77089	63740	52994	38066	26283	15501	9717	-5.2	-2.9	-3.7	-8.1
Natural gas	209437	190678	158525	149175	139739	117107	98366	86336	77911	72198	62656	-2.7	-1.3	-3.4	-2.2
Nuclear	243841	257516	236563	229106	191457	180335	190315	216393	237802	246410	259453	-0.3	-2.1	-0.1	1.6
Renewable energy sources	103944	123918	178977	212656	256956	280618	320040	376215	437494	495696	542420	5.6	3.7	2.2	2.7
Hydro	30818	26817	32208	31687	32181	33025	34206	35763	36482	36980	37600	0.4	0.0	0.6	0.5
Biomass & Waste	66071	84883	124361	136284	150330	150673	162906	184375	212922	244428	268747	6.5	1.9	0.8	2.5
Wind	1913	6058	12829	22662	42397	59186	76354	87526	103384	113076	122446	21.0	12.7	6.1	2.4
Solar and others	430	806	3691	14049	22796	28247	34224	42054	51533	60737	65708	24.0	20.0	4.1	3.3
Geothermal	4712	5354	5888	7974	9252	9486	12350	26497	33173	40474	47919	2.3	4.6	2.9	7.0
Net Imports	**829314**	**988719**	**956735**	**967825**	**903668**	**875647**	**835281**	**771247**	**697164**	**652326**	**609655**	**1.4**	**-0.6**	**-0.8**	**-1.6**
Solids	98273	125211	110927	115959	93849	84961	66850	50931	42165	47070	54267	1.2	-1.7	-3.3	-1.0
Oil	535238	604030	563977	551776	526129	506067	490765	445719	380361	311606	250227	0.5	-0.7	-0.7	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527783	505240	486722	471795	436711	386824	335671	286898	0.4	-0.7	-0.7	-2.5
- Oil products	17192	18909	22737	23992	20889	19345	18970	9008	-6462	-24065	-36671	2.8	-0.8	-1.0	0.0
Natural gas	193432	257849	276001	286170	263551	262916	252177	243394	236661	248595	253511	3.6	-0.5	-0.4	0.0
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1740	-1818	-1879	-2096	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745803**	**1652199**	**1583545**	**1517682**	**1502789**	**1502564**	**1505976**	**1516655**	**0.2**	**-0.7**	**-0.8**	**0.0**
Solids	321277	317986	280653	265816	232554	208487	146214	126107	128529	132074	149323	-1.3	-1.9	-4.5	0.1
Oil	665142	683909	620735	589177	548720	514369	487727	427419	351879	273200	206253	-0.7	-1.2	-1.2	-4.2
Natural gas	396145	448380	444428	435128	402372	378032	347896	325453	308882	313541	307557	1.2	-1.0	-1.4	-0.6
Nuclear	243841	257516	236563	229106	191457	180335	190315	216393	237802	246410	259453	-0.3	-2.1	-0.1	1.6
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1740	-1818	-1879	-2096	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226705	278698	303830	347021	409159	477290	542631	596166	5.9	4.2	2.2	2.7
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.2	9.6	8.4	8.6	8.8	9.8				
Oil	38.4	37.3	35.1	33.7	33.2	32.5	32.1	28.4	23.4	18.1	13.6				
Natural gas	22.9	24.5	25.1	24.9	24.4	23.9	22.9	21.7	20.6	20.8	20.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.4	12.5	14.4	15.8	16.4	17.1				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.2	22.9	27.2	31.8	36.0	39.3				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415864**	**3392575**	**3433983**	**3521066**	**3877566**	**4497350**	**4933460**	**5378081**	**1.0**	**0.2**	**0.4**	**2.1**
Self consumption and grid losses	396970	407042	377767	368942	349448	346313	354118	384977	469412	537575	628480	-0.5	-0.8	0.1	2.9
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383167**	**347005**	**319581**	**263260**	**276844**	**318740**	**355937**	**387617**	**0.8**	**-1.8**	**-2.7**	**2.0**
Solids	223038	228941	197605	186548	156397	139728	83915	71852	83291	92584	113913	-1.2	-2.3	-6.0	1.5
Oil (including refinery gas)	40042	33244	20532	10903	5853	4753	3682	3106	2605	2131	1453	-6.5	-11.8	-4.5	-4.5
Gas (including derived gases)	102844	133713	149190	131882	122847	107176	93753	98940	105870	115096	114231	3.8	-1.9	-2.7	1.0
Biomass & Waste	14918	26452	45117	47857	55113	61019	72167	79529	91656	101837	106318	11.7	2.0	2.7	2.0
Geothermal heat	4114	4645	4828	5976	6796	6905	9744	23417	29558	36119	41961	1.6	3.5	3.7	7.6
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5760	8170	9741	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971028**	**905006**	**855510**	**834844**	**839867**	**831019**	**800692**	**783325**	**-0.7**	**-1.0**	**-0.8**	**-0.3**
Refineries	740500	763156	670015	646609	612971	581569	556452	505593	441463	375620	318228	-1.0	-0.9	-1.0	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24912	60738	102228	133347	162195	34.1	6.9	-0.4	9.8
District heating	18667	19517	20813	22253	20061	17368	17959	16226	13430	11832	12670	1.1	-0.4	-1.1	-1.7
Derived gases, cokeries etc.	316475	324348	297391	283945	245945	231217	235520	257309	273897	279893	290233	-0.6	-1.9	-0.4	1.0
Energy Branch Consumption	**86990**	**91952**	**88327**	**82420**	**76779**	**70555**	**65335**	**61094**	**59588**	**57117**	**57871**	**0.2**	**-1.4**	**-1.6**	**-0.6**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122348**	**121118**	**118980**	**116711**	**112934**	**111914**	**111803**	**-0.2**	**0.6**	**-0.3**	**-0.3**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170526**	**1129628**	**1091988**	**1064222**	**1027644**	**996806**	**976814**	**963921**	**0.3**	**-0.2**	**-0.6**	**-0.5**
by sector															
Industry	332412	330448	290978	304773	305551	296688	287661	275233	262820	258400	255269	-1.3	0.5	-0.6	-0.6
- energy intensive industries	217920	216886	187894	197085	197311	189748	182711	174499	167879	163910	159223	-1.5	0.5	-0.8	-0.7
- other industrial sectors	114492	113563	103085	107688	108240	106940	104950	100734	94941	94490	96046	-1.0	0.5	-0.3	-0.4
Residential	286291	311793	311545	311966	297301	287029	280591	270390	269207	267629	266350	0.8	-0.5	-0.6	-0.3
Tertiary	166083	179768	187856	181913	169791	164596	157477	154657	154035	152932	153116	1.2	-1.0	-0.8	-0.1
Transport	342901	368665	367191	371873	356986	343675	338492	327364	310744	297853	289186	0.7	-0.3	-0.5	-0.8
by fuel															
Solids	61779	54424	49673	48406	45963	41407	37989	32461	26404	21976	19050	-2.2	-0.8	-1.9	-3.4
Oil	485890	502788	457366	440511	406073	379371	357925	306473	247536	194098	145528	-0.6	-1.2	-1.3	-4.4
Gas	266925	285438	269920	271611	249818	241390	226204	197505	167812	146177	128524	0.1	-0.8	-1.0	-2.8
Electricity	217599	239418	245271	254494	253109	257380	264688	276023	299154	318899	336301	1.2	0.3	0.4	1.2
Heat (from CHP and District Heating)	46015	52355	53515	55297	55505	53991	55135	53738	54700	54578	55243	1.5	0.4	-0.1	0.0
Renewable energy forms	49480	56250	81825	100141	118900	117853	121427	146472	172345	204206	232560	5.2	3.8	0.2	3.3
Other	0	0	0	65	261	597	855	14970	28854	36880	46715	0.0	0.0	12.6	22.1
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194892**	**244883**	**266631**	**307278**	**353668**	**410539**	**463124**	**506893**	**5.4**	**5.1**	**2.3**	**2.5**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4622.9**	**4263.0**	**3966.6**	**3444.7**	**2814.6**	**2108.3**	**1679.8**	**1346.0**	**-0.7**	**-1.3**	**-2.1**	**-4.6**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.3	1890.3	1744.7	1371.1	1130.5	751.5	553.9	394.4		-1.4	-3.2	-6.0
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.6	2372.6	2221.9	2073.5	1684.1	1356.7	1125.9	951.7		-1.2	-1.3	-3.8
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.0**	**3231.8**	**2970.1**	**2538.8**	**2100.8**	**1608.9**	**1255.4**	**960.5**	**-0.5**	**-1.6**	**-2.4**	**-4.7**
Power generation/District heating	1404.5	1483.1	1341.6	1200.1	1025.1	904.7	609.5	443.4	248.2	141.8	61.6	-0.5	-2.7	-5.1	-10.8
Energy Branch	170.1	174.2	159.8	149.7	138.9	123.3	111.9	98.8	83.5	70.9	60.1	-0.6	-1.4	-2.1	-3.1
Industry	693.6	640.7	520.3	538.7	506.5	472.0	423.0	356.9	281.9	239.3	206.4	-2.8	-0.3	-1.8	-3.5
Residential	461.0	491.2	457.9	430.9	390.8	363.8	339.1	285.8	238.1	191.5	143.5	-0.1	-1.6	-1.4	-4.2
Tertiary	255.7	266.4	249.2	220.7	192.5	175.3	151.5	125.7	107.6	88.0	68.6	-0.3	-2.5	-2.4	-3.9
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.1	903.8	790.3	649.5	524.0	420.1	0.5	-0.7	-0.8	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.6**	**276.5**	**231.6**	**222.7**	**100.1**	**61.9**	**34.4**	**-1.0**	**1.5**	**-1.7**	**-9.1**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**75.0**	**69.8**	**60.6**	**49.5**	**37.1**	**29.6**	**23.7**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE25DEC_a			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.0	102.5	91.1	84.1	78.5	73.4	69.1	-1.2	-2.1	-2.4	-1.4
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.88	1.67	1.40	1.07	0.83	0.63	-0.7	-0.9	-1.6	-4.7
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	53.0	49.3	44.6	41.6	38.6				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.9	2107.6	2239.3	2383.8	2509.9	2727.9	2924.0	3104.3	3.7	3.0	1.2	1.3
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.5	14.3	14.0	14.2	14.3	14.1				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.0	82.9	76.0	69.4	63.3	59.6	56.4		-0.9	-1.8	-1.5
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	83.6	74.6	67.5	60.5	55.9	51.5	47.5	-0.5	-1.8	-2.1	-1.7
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	77.6	69.0	60.8	55.3	51.1	47.0	43.8	0.0	-2.5	-2.4	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.9	23.9	21.5	19.8	18.6	-0.6	-1.6	-2.1	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.5	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.14	0.10	0.05	0.03	0.01	-1.6	-2.9	-5.3	-12.4
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.52	1.28	1.07	0.87	-0.8	-0.7	-0.7	-3.3
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.47	1.30	1.07	0.93	0.81	-1.5	-0.8	-1.2	-2.9
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.06	0.88	0.72	0.54	-0.9	-1.1	-0.8	-4.0
Tertiary	1.54	1.48	1.33	1.21	1.13	1.07	0.96	0.81	0.70	0.58	0.45	-1.5	-1.6	-1.6	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.67	2.41	2.09	1.76	1.45	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.1	23.7	28.0	33.3	39.3	44.8	49.2				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	13.6	24.6	39.0	52.8	64.6				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3415864**	**3392575**	**3433983**	**3521066**	**3877566**	**4497350**	**4933460**	**5378081**	**1.0**	**0.2**	**0.4**	**2.1**
Nuclear energy	945027	997733	916685	887192	741418	704452	752816	874405	983767	1035489	1115566	-0.3	-2.1	0.2	2.0
Solids	933660	974939	830048	802058	685246	606329	359147	279629	355482	439716	580505	-1.2	-1.9	-6.3	2.4
Oil (including refinery gas)	181203	141358	86851	46072	26110	21836	17087	16396	13294	10941	7080	-7.1	-11.3	-4.2	-4.3
Gas (including derived gases)	514392	699743	795653	752907	695759	592916	548708	606114	654270	701570	741852	4.5	-1.3	-2.3	1.5
Biomass-waste	46848	83787	145901	190811	221073	245047	302579	343878	398663	436508	452663	12.0	4.2	3.2	2.0
Hydro (pumping excluded)	358408	311883	374576	368453	374203	384015	397739	415852	424213	429997	437204	0.4	0.0	0.6	0.5
Wind	22253	70453	149202	263516	492988	688212	887839	1017740	1202144	1314840	1423788	21.0	12.7	6.1	2.4
Solar	118	1459	22363	96144	143662	174692	232960	281339	384382	459385	497917	68.9	20.4	5.0	3.9
Geothermal and other renewables	5358	5930	6831	8712	12116	16485	22193	42213	51146	65067	78412	2.5	5.9	6.2	6.5
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	29989	39947	43095	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930134**	**1019630**	**1078153**	**1177866**	**1253288**	**1434303**	**1517723**	**1605698**	**2.6**	**2.0**	**1.5**	**1.6**
Nuclear energy	136924	134494	131323	123150	111162	96480	101529	115363	129789	136412	146220	-0.4	-1.7	-0.9	1.8
Renewable energy	114281	147780	226757	318900	439905	536700	641546	721130	857145	952070	1018172	7.1	6.9	3.8	2.3
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122569	125387	131897	134294	136796	139263	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	206812	279169	348044	394609	463825	504441	542322	20.7	9.4	5.3	2.2
Solar	180	1740	29846	76309	110837	131564	163724	188558	252207	301387	324358	66.7	14.0	4.0	3.5
Other renewables (tidal etc.)	0	0	240	586	1655	3397	4391	6066	6818	9446	12229	0.0	21.3	10.2	5.3
Thermal power	398853	429386	480034	488085	468562	444973	434790	416796	447369	429241	441306	1.9	-0.2	-0.7	0.1
of which cogeneration units	92439	98998	101203	102144	112030	112469	119635	124845	134219	141086	145414	0.9	1.0	0.7	1.0
of which CCS units	0	0	0	0	904	904	2914	17342	86936	140736	205417	0.0	0.0	12.4	23.7
Solids fired	186470	180630	175756	163212	141212	120935	103545	87105	95824	99277	105655	-0.6	-2.2	-3.1	0.1
Gas fired	129190	169054	224922	253079	258989	258688	258402	252743	266496	238259	236467	5.7	1.4	0.0	-0.4
Oil fired	67499	59434	54039	42257	32824	26311	22176	17903	15113	11806	10104	-2.2	-4.9	-3.8	-3.9
Biomass-waste fired	15128	19615	24590	28744	34635	38121	49373	55936	66012	75104	83510	5.0	3.5	3.6	2.7
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	917	1294	3109	3924	4795	5570	2.5	2.2	3.7	7.6
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.4	34.9	33.0	34.1	34.3	35.4	36.2				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.6	39.7	40.5	39.6	40.1	40.4	41.6				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.3	17.4	17.1	16.6	15.7	14.9				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.7	1.7	7.3	9.9	15.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.5	64.4	73.7	76.7	77.1	76.5	75.1				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.5	21.4	22.6	22.0	21.2	20.9				
- renewable energy forms	14.4	14.4	21.0	27.2	36.7	43.9	52.4	54.2	55.1	55.3	54.2				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7450.1**	**7866.6**	**8129.5**	**8371.8**	**8563.6**	**8768.3**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.5	603.5	624.3	649.7	666.0	688.2	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.0	5613.5	5719.4	5791.3	5857.5	5930.9	1.0	0.6	0.8	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.3	724.4	783.1	844.4	889.4	936.2	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	773.3	880.2	955.9	1037.7	1100.4	1161.1	1.4	2.6	2.6	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.1	46.9	48.7	50.3	51.8	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3385.1**	**3510.2**	**3635.2**	**3713.0**	**3799.7**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.9	2426.9	2502.0	2545.1	2598.4	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	607.2	639.9	674.4	698.6	719.9	-0.3	2.2	2.2	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.0	443.4	458.8	469.3	481.3	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341091**	**335882**	**324776**	**308209**	**295372**	**286747**	**0.7**	**-0.3**	**-0.5**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7808	7830	7417	7126	6765	6517	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141051	132491	123761	108956	98351	91716	0.2	-1.5	-1.7	-1.8
Trucks	95660	111643	112043	117988	118898	118269	120893	119505	116870	114453	112314	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9891	10058	10158	10059	9897	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	57978	57687	56798	57704	58264	58739	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6143	6387	6752	7090	7237	7394	7479	7564	-0.1	0.8	1.1	0.3

Source: PRIMES

EU28: EE28DEC_a												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831437**	**801762**	**755841**	**725478**	**752677**	**809776**	**844531**	**893883**	**-1.2**	**-0.5**	**-1.0**	**1.0**
Solids	214627	196059	163855	149869	138232	123154	90202	72964	82829	79852	87778	-2.7	-1.7	-4.2	-0.1
Oil	176084	136469	103565	90646	77048	63601	52502	37441	25814	15218	9563	-5.2	-2.9	-3.8	-8.2
Natural gas	209437	190678	158525	149171	139082	113313	91950	80998	72555	64788	56354	-2.7	-1.3	-4.1	-2.4
Nuclear	243841	257516	236563	229105	190830	179824	187307	202952	217736	222201	240338	-0.3	-2.1	-0.2	1.3
Renewable energy sources	103944	123918	178977	212646	256569	275950	303517	358323	410842	462472	499849	5.6	3.7	1.7	2.5
Hydro	30818	26817	32208	31687	32181	33018	34250	35506	36325	36829	37369	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136273	149839	148537	152949	174836	200774	226912	246363	6.5	1.9	0.2	2.4
Wind	1913	6058	12829	22662	42476	57343	72675	82478	95714	106730	114608	21.0	12.7	5.5	2.3
Solar and others	430	806	3691	14050	22800	27677	32338	39917	48264	54969	58808	24.0	20.0	3.6	3.0
Geothermal	4712	5354	5888	7974	9273	9375	11305	25586	29765	37033	42702	2.3	4.6	2.0	6.9
Net Imports	**829314**	**988719**	**956735**	**967839**	**900458**	**866965**	**807173**	**734965**	**658732**	**602199**	**548661**	**1.4**	**-0.6**	**-1.1**	**-1.9**
Solids	98273	125211	110927	115992	93136	88046	69163	49599	39910	41369	42222	1.2	-1.7	-2.9	-2.4
Oil	535238	604030	563977	551766	525490	503628	482210	434054	369310	302311	243972	0.5	-0.7	-0.9	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527775	504790	485072	465782	428610	379144	329168	282412	0.4	-0.7	-0.8	-2.5
- Oil products	17192	18909	22737	23990	20700	18556	16428	5444	-9835	-26856	-38440	2.8	-0.9	-2.3	0.0
Natural gas	193432	257849	276001	286167	261728	253924	231722	221579	213435	216501	214771	3.6	-0.5	-1.2	-0.4
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1741	-1819	-1881	-2097	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745811**	**1646805**	**1565378**	**1473972**	**1426998**	**1408053**	**1385572**	**1380243**	**0.2**	**-0.7**	**-1.1**	**-0.3**
Solids	321277	317986	280653	265860	231368	211199	159365	122563	122739	121221	130000	-1.3	-1.9	-3.7	-1.0
Oil	665142	683909	620735	589163	548041	511791	478681	415129	340359	263623	199845	-0.7	-1.2	-1.3	-4.3
Natural gas	396145	448380	444428	435120	399892	365248	321025	298299	280301	274037	262515	1.2	-1.1	-2.2	-1.0
Nuclear	243841	257516	236563	229105	190830	179824	187307	202952	217736	222201	240338	-0.3	-2.1	-0.2	1.3
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1741	-1819	-1881	-2097	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226691	278276	298824	329085	389798	448738	506371	549642	5.9	4.2	1.7	2.6
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.5	10.8	8.6	8.7	8.7	9.4				
Oil	38.4	37.3	35.1	33.7	33.3	32.7	32.5	29.1	24.2	19.0	14.5				
Natural gas	22.9	24.5	25.1	24.9	24.3	23.3	21.8	20.9	19.9	19.8	19.0				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	12.7	14.2	15.5	16.0	17.4				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.1	22.3	27.3	31.9	36.5	39.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415806**	**3378459**	**3399299**	**3466728**	**3677657**	**4190014**	**4551660**	**4935085**	**1.0**	**0.2**	**0.3**	**1.8**
Self consumption and grid losses	396970	407042	377767	368945	347832	345068	347652	361511	432009	490276	567575	-0.5	-0.8	0.0	2.5
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383216**	**344914**	**318554**	**268464**	**269109**	**303605**	**329854**	**352983**	**0.8**	**-1.9**	**-2.5**	**1.4**
Solids	223038	228941	197605	186589	155340	143922	99837	74431	84828	90376	104545	-1.2	-2.4	-4.3	0.2
Oil (including refinery gas)	40042	33244	20532	10888	5803	4686	3564	2920	2502	1907	1431	-6.5	-11.9	-4.8	-4.5
Gas (including derived gases)	102844	133713	149190	131898	121704	101946	87327	91534	97445	99960	99748	3.8	-2.0	-3.3	0.7
Biomass & Waste	14918	26452	45117	47866	55270	61147	68894	77562	87490	95746	99228	11.7	2.1	2.2	1.8
Geothermal heat	4114	4645	4828	5976	6796	6853	8842	22662	26372	32968	37446	1.6	3.5	2.7	7.5
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4967	8898	10585	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970995**	**903441**	**851671**	**823574**	**813426**	**796188**	**762278**	**747900**	**-0.7**	**-1.0**	**-0.9**	**-0.5**
Refineries	740500	763156	670015	646597	612472	579693	549709	496255	432678	368330	313275	-1.0	-0.9	-1.1	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24801	58617	96526	127165	152884	34.1	6.9	-0.5	9.5
District heating	18667	19517	20813	22232	19700	16928	17643	19353	19464	18876	20172	1.1	-0.5	-1.1	0.7
Derived gases, cokeries etc.	316475	324348	297391	283944	245240	229693	231421	239201	247520	247907	261570	-0.6	-1.9	-0.6	0.6
Energy Branch Consumption	**86990**	**91952**	**88327**	**82418**	**76623**	**70107**	**64646**	**59052**	**56495**	**53300**	**52898**	**0.2**	**-1.4**	**-1.7**	**-1.0**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122382**	**120824**	**118046**	**112393**	**107013**	**102441**	**99350**	**-0.2**	**0.6**	**-0.4**	**-0.9**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170503**	**1125938**	**1074992**	**1019819**	**971214**	**932494**	**900118**	**875831**	**0.3**	**-0.3**	**-1.0**	**-0.8**
by sector															
Industry	332412	330448	290978	304755	304156	290815	278346	256170	238416	225347	217675	-1.3	0.4	-0.9	-1.2
- energy intensive industries	217920	216886	187894	197065	196528	186844	178020	162912	152944	142970	133937	-1.5	0.5	-1.0	-1.4
- other industrial sectors	114492	113563	103085	107690	107628	103972	100326	93258	85471	82377	83738	-1.0	0.4	-0.7	-0.9
Residential	286291	311793	311545	311961	295956	279524	261677	248674	244598	238965	230897	0.8	-0.5	-1.2	-0.6
Tertiary	166083	179768	187856	181913	168844	160950	142207	140414	139763	138463	138593	1.2	-1.1	-1.7	-0.1
Transport	342901	368665	367191	371873	356983	343702	337590	325955	309718	297343	288666	0.7	-0.3	-0.6	-0.8
by fuel															
Solids	61779	54424	49673	48409	45883	40364	35492	27909	21324	16194	12956	-2.2	-0.8	-2.5	-4.9
Oil	485890	502788	457366	440538	405482	377234	349893	298038	240280	188670	142341	-0.6	-1.2	-1.5	-4.4
Gas	266925	285438	269920	271576	248550	234260	206680	177468	147177	124456	103580	0.1	-0.8	-1.8	-3.4
Electricity	217599	239418	245271	254489	252048	254540	260468	262824	281431	296228	312482	1.2	0.3	0.3	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55297	55197	52788	53266	56559	59270	59540	60160	1.5	0.3	-0.4	0.6
Renewable energy forms	49480	56250	81825	100128	118517	115209	113098	134845	157626	183641	205790	5.2	3.8	-0.5	3.0
Other	0	0	0	65	261	597	922	13571	25387	31390	38522	0.0	0.0	13.4	20.5
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194992**	**244149**	**261570**	**290397**	**334459**	**385558**	**431496**	**468980**	**5.4**	**5.0**	**1.7**	**2.4**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.0**	**4250.0**	**3940.0**	**3431.6**	**2718.0**	**2031.0**	**1605.5**	**1250.7**	**-0.7**	**-1.3**	**-2.1**	**-4.9**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.7	1881.1	1740.8	1427.5	1106.0	738.9	542.1	360.3		-1.5	-2.7	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.3	2368.8	2199.2	2004.1	1612.0	1292.2	1063.4	890.4		-1.2	-1.7	-4.0
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.1**	**3218.9**	**2944.3**	**2519.7**	**2006.2**	**1518.8**	**1169.6**	**864.8**	**-0.5**	**-1.6**	**-2.4**	**-5.2**
Power generation/District heating	1404.5	1483.1	1341.6	1200.3	1017.4	908.1	668.7	445.7	256.1	156.1	69.3	-0.5	-2.7	-4.1	-10.7
Energy Branch	170.1	174.2	159.8	149.7	138.8	122.2	111.3	95.4	79.6	66.4	54.8	-0.6	-1.4	-2.2	-3.5
Industry	693.6	640.7	520.3	538.7	504.2	461.7	414.3	328.4	248.9	199.2	160.9	-2.8	-0.3	-1.9	-4.6
Residential	461.0	491.2	457.9	430.9	389.0	351.9	307.1	247.6	200.2	155.0	107.1	-0.1	-1.6	-2.3	-5.1
Tertiary	255.7	266.4	249.2	220.7	191.4	169.2	118.0	103.9	88.4	71.2	54.8	-0.3	-2.6	-4.7	-3.8
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.2	900.3	785.1	645.7	521.7	417.9	0.5	-0.7	-0.8	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.7**	**237.6**	**220.8**	**113.0**	**73.4**	**34.8**	**-1.0**	**1.5**	**-1.4**	**-9.2**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.8**	**69.3**	**60.4**	**47.8**	**35.7**	**28.2**	**22.0**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE28DEC_a			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.6	101.3	88.4	79.9	73.5	67.5	62.9	-1.2	-2.2	-2.6	-1.7
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.71	1.41	1.08	0.84	0.63	-0.7	-0.9	-1.3	-4.9
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	52.7	49.4	44.9	41.6	38.0				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.9	2108.4	2246.9	2416.3	2548.0	2766.4	2974.3	3154.9	3.7	3.0	1.4	1.3
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.5	14.5	14.3	14.4	14.5	14.4				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.6	81.2	73.6	64.6	57.4	52.0	48.1		-1.0	-2.1	-2.1
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	83.2	72.6	62.9	55.6	50.8	46.0	41.2	-0.5	-1.8	-2.8	-2.1
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	77.2	67.4	54.9	50.2	46.4	42.6	39.6	0.0	-2.6	-3.3	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.8	23.7	21.4	19.7	18.6	-0.6	-1.6	-2.1	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.5	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.16	0.10	0.05	0.03	0.01	-1.6	-2.9	-4.2	-12.1
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.51	1.27	1.05	0.85	-0.8	-0.7	-0.7	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.49	1.28	1.04	0.88	0.74	-1.5	-0.8	-1.1	-3.4
Residential	1.61	1.58	1.47	1.38	1.31	1.26	1.17	1.00	0.82	0.65	0.46	-0.9	-1.1	-1.1	-4.5
Tertiary	1.54	1.48	1.33	1.21	1.13	1.05	0.83	0.74	0.63	0.51	0.40	-1.5	-1.6	-3.1	-3.6
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.67	2.41	2.08	1.75	1.45	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.1	23.7	27.7	33.4	39.5	45.3	50.1				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	13.7	24.9	39.4	53.4	65.2				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415806**	**3378459**	**3399299**	**3466728**	**3677657**	**4190014**	**4551660**	**4935085**	**1.0**	**0.2**	**0.3**	**1.8**
Nuclear energy	945027	997733	916685	887191	738989	702340	740054	816776	896746	928842	1031485	-0.3	-2.1	0.0	1.7
Solids	933660	974939	830048	802211	680083	629832	432779	288140	349610	413849	527273	-1.2	-2.0	-4.4	1.0
Oil (including refinery gas)	181203	141358	86851	45943	25921	21502	16650	15385	12995	9758	5890	-7.1	-11.4	-4.3	-5.1
Gas (including derived gases)	514392	699743	795653	752725	688399	562102	508135	550300	591950	622355	631414	4.5	-1.4	-3.0	1.1
Biomass-waste	46848	83787	145901	190910	221182	246702	288607	330875	376774	399427	416538	12.0	4.2	2.7	1.9
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383935	398253	412865	422378	428244	434522	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263517	493905	666774	845061	959050	1112954	1241041	1332651	21.0	12.7	5.5	2.3
Solar	118	1459	22363	96144	143662	170576	218794	264894	358113	413029	443996	68.9	20.4	4.3	3.6
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	18395	39374	44906	55857	67319	2.5	5.9	4.3	6.7
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	23588	39255	43996	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930139**	**1019358**	**1060619**	**1144729**	**1201223**	**1350698**	**1414248**	**1479188**	**2.6**	**2.0**	**1.2**	**1.3**
Nuclear energy	136924	134494	131323	123150	111162	95269	99226	107997	118651	122740	135749	-0.4	-1.7	-1.1	1.6
Renewable energy	114281	147780	226757	318900	440313	522735	614650	686494	805206	887091	941755	7.1	6.9	3.4	2.2
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122535	125565	131188	133642	136131	138195	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207219	268269	330274	371379	429150	474066	506362	20.7	9.4	4.8	2.2
Solar	180	1740	29846	76309	110837	128896	155543	178669	236628	269739	287359	66.7	14.0	3.4	3.1
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3268	5258	5785	7154	9839	0.0	21.3	7.0	5.7
Thermal power	398853	429386	480034	488089	467884	442615	430853	406733	426841	404417	401685	1.9	-0.3	-0.8	-0.3
of which cogeneration units	92439	98998	101203	102206	111262	111094	114309	120483	126026	128250	131587	0.9	1.0	0.3	0.7
of which CCS units	0	0	0	0	904	904	1783	16078	78375	121021	176213	0.0	0.0	7.0	25.8
Solids fired	186470	180630	175756	163212	141039	120703	102985	87183	93454	94747	99301	-0.6	-2.2	-3.1	-0.2
Gas fired	129190	169054	224922	253085	258726	256881	258153	246702	252869	226531	212698	5.7	1.4	0.0	-1.0
Oil fired	67499	59434	54039	42254	32648	26149	22149	17516	14575	11145	9053	-2.2	-4.9	-3.8	-4.4
Biomass-waste fired	15128	19615	24590	28744	34568	37972	46393	52324	62443	67618	75663	5.0	3.5	3.0	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1174	3009	3501	4376	4971	2.5	2.2	2.7	7.5
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.3	35.1	33.3	33.8	34.0	35.1	36.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.5	39.6	40.3	38.7	39.3	39.7	40.7				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.1	16.9	16.8	16.7	15.5	14.6				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.4	6.4	9.5	13.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.7	64.3	72.4	76.8	77.1	76.8	76.2				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.7	21.3	22.2	21.5	20.6	21.1				
- renewable energy forms	14.4	14.4	21.0	27.2	36.9	43.6	51.0	54.6	55.6	56.2	55.1				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7450.5**	**7862.8**	**8125.9**	**8368.6**	**8567.1**	**8778.8**	**0.9**	**0.9**	**1.1**	**0.6**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.5	603.3	624.3	650.1	666.0	687.8	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.1	5606.3	5714.1	5784.8	5856.4	5936.6	1.0	0.6	0.8	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.2	724.1	783.0	844.4	888.8	934.7	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	773.7	884.0	957.6	1040.6	1105.8	1168.1	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.9	48.6	50.2	51.7	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3385.8**	**3510.3**	**3635.2**	**3713.3**	**3801.1**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.7	2426.9	2502.0	2545.1	2599.1	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.0	640.0	674.4	698.8	720.4	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.5	458.8	469.4	481.5	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341130**	**335023**	**323408**	**307230**	**294916**	**286281**	**0.7**	**-0.3**	**-0.6**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7808	7826	7413	7123	6756	6497	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141053	131328	122232	107730	97534	90905	0.2	-1.5	-1.8	-1.8
Trucks	95660	111643	112043	117988	118898	118269	120885	119497	116860	114419	112190	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9900	10061	10161	10062	9908	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58016	57997	56968	57966	58674	59224	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6143	6387	6752	7087	7237	7390	7472	7558	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE30EC_a											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831440**	**799875**	**743685**	**701180**	**705973**	**762343**	**788381**	**831896**	**-1.2**	**-0.5**	**-1.3**	**0.9**
Solids	214627	196059	163855	149881	137862	122299	91633	70653	78043	73804	81348	-2.7	-1.7	-4.0	-0.6
Oil	176084	136469	103565	90646	77001	63361	51913	36860	25431	15030	9475	-5.2	-2.9	-3.9	-8.2
Natural gas	209437	190678	158525	149167	138308	109242	86359	72823	66612	60095	52276	-2.7	-1.4	-4.6	-2.5
Nuclear	243841	257516	236563	229104	190370	178631	178835	186348	197044	199502	220234	-0.3	-2.1	-0.6	1.0
Renewable energy sources	103944	123918	178977	212643	256335	270153	292441	339288	395213	439951	468564	5.6	3.7	1.3	2.4
Hydro	30818	26817	32208	31687	32181	33015	34057	35347	36238	36724	37241	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136270	149552	144438	147330	164985	192847	216951	232725	6.5	1.9	-0.1	2.3
Wind	1913	6058	12829	22663	42529	56256	70034	79190	91665	101234	107079	21.0	12.7	5.1	2.1
Solar and others	430	806	3691	14049	22800	27188	30766	37543	45490	50444	52829	24.0	20.0	3.0	2.7
Geothermal	4712	5354	5888	7974	9272	9255	10254	22224	28973	34597	38691	2.3	4.6	1.0	6.9
Net Imports	**829314**	**988719**	**956735**	**967865**	**896858**	**851897**	**781960**	**703647**	**622500**	**568983**	**516147**	**1.4**	**-0.6**	**-1.4**	**-2.1**
Solids	98273	125211	110927	115986	92085	88383	69208	48698	34135	34684	37988	1.2	-1.8	-2.8	-3.0
Oil	535238	604030	563977	551783	524921	499562	474115	424096	360728	296187	241093	0.5	-0.7	-1.0	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527785	504377	482326	460142	421475	373059	324755	280194	0.4	-0.7	-0.9	-2.4
- Oil products	17192	18909	22737	23998	20544	17236	13972	2621	-12331	-28568	-39101	2.8	-1.0	-3.8	0.0
Natural gas	193432	257849	276001	286182	259779	243145	215430	202788	192843	197665	191804	3.6	-0.6	-1.9	-0.6
Electricity	2029	1412	707	-129	-1603	-1508	-1489	-1740	-1816	-1876	-2084	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745840**	**1641318**	**1538154**	**1424462**	**1348976**	**1324389**	**1296206**	**1285743**	**0.2**	**-0.7**	**-1.4**	**-0.5**
Solids	321277	317986	280653	265867	229947	210682	160840	119352	112178	108488	119336	-1.3	-2.0	-3.5	-1.5
Oil	665142	683909	620735	589181	547424	507485	469996	404589	331395	257310	196877	-0.7	-1.2	-1.5	-4.3
Natural gas	396145	448380	444428	435131	397168	350396	299142	271333	253765	250508	235469	1.2	-1.1	-2.8	-1.2
Nuclear	243841	257516	236563	229104	190370	178631	178835	186348	197044	199502	220234	-0.3	-2.1	-0.6	1.0
Electricity	2029	1412	707	-129	-1603	-1508	-1489	-1740	-1816	-1876	-2084	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226686	278011	292467	317138	369094	431823	482274	515911	5.9	4.2	1.3	2.5
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.7	11.3	8.8	8.5	8.4	9.3				
Oil	38.4	37.3	35.1	33.7	33.4	33.0	33.0	30.0	25.0	19.9	15.3				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.8	21.0	20.1	19.2	19.3	18.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.6	12.6	13.8	14.9	15.4	17.1				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.0	22.3	27.4	32.6	37.2	40.1				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415901**	**3364258**	**3354597**	**3345224**	**3477585**	**3928955**	**4229680**	**4560022**	**1.0**	**0.1**	**-0.1**	**1.6**
Self consumption and grid losses	396970	407042	377767	368960	346100	341018	327452	325368	369662	414848	477805	-0.5	-0.9	-0.6	1.9
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383240**	**342669**	**314342**	**262790**	**250347**	**285890**	**309431**	**324588**	**0.8**	**-2.0**	**-2.6**	**1.1**
Solids	223038	228941	197605	186586	154012	144346	103084	72208	76026	79294	94598	-1.2	-2.5	-3.9	-0.4
Oil (including refinery gas)	40042	33244	20532	10887	5748	4534	3408	2846	2364	1856	1411	-6.5	-12.0	-5.1	-4.3
Gas (including derived gases)	102844	133713	149190	131885	120828	98403	80926	81726	88245	92479	85378	3.8	-2.1	-3.9	0.3
Biomass & Waste	14918	26452	45117	47906	55284	60204	67359	73896	88093	96433	99088	11.7	2.1	2.0	1.9
Geothermal heat	4114	4645	4828	5976	6796	6853	8014	19671	26030	31164	34353	1.6	3.5	1.7	7.5
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5133	8204	9760	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971007**	**902315**	**846802**	**808194**	**784669**	**760011**	**723080**	**711920**	**-0.7**	**-1.0**	**-1.1**	**-0.6**
Refineries	740500	763156	670015	646610	612017	576578	543143	488133	425887	363546	310943	-1.0	-0.9	-1.2	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24665	56942	93286	121756	146384	34.1	6.9	-0.5	9.3
District heating	18667	19517	20813	22233	19528	16633	17491	16697	15087	13577	13157	1.1	-0.6	-1.1	-1.4
Derived gases, cokeries etc.	316475	324348	297391	283943	244740	228234	222894	222898	225752	224200	241436	-0.6	-1.9	-0.9	0.4
Energy Branch Consumption	**86990**	**91952**	**88327**	**82420**	**76470**	**69593**	**63435**	**57201**	**52873**	**49874**	**49702**	**0.2**	**-1.4**	**-1.9**	**-1.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119319**	**122388**	**120219**	**115589**	**108895**	**103746**	**99548**	**98032**	**-0.2**	**0.6**	**-0.6**	**-0.8**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170516**	**1122037**	**1051763**	**982544**	**921756**	**879825**	**844651**	**818430**	**0.3**	**-0.3**	**-1.3**	**-0.9**
by sector															
Industry	332412	330448	290978	304758	303324	288362	272460	249504	231894	219876	215796	-1.3	0.4	-1.1	-1.2
- energy intensive industries	217920	216886	187894	197068	196069	185031	172991	156761	146989	137759	132040	-1.5	0.4	-1.2	-1.3
- other industrial sectors	114492	113563	103085	107691	107255	103331	99469	92743	84905	82117	83757	-1.0	0.4	-0.8	-0.9
Residential	286291	311793	311545	311965	293837	265513	244073	224369	217458	208100	194938	0.8	-0.6	-1.8	-1.1
Tertiary	166083	179768	187856	181919	167895	154151	129807	123577	122353	120513	119851	1.2	-1.1	-2.5	-0.4
Transport	342901	368665	367191	371873	356981	343737	336203	324307	308120	296163	287844	0.7	-0.3	-0.6	-0.8
by fuel															
Solids	61779	54424	49673	48418	45836	39463	33608	26598	20367	15504	12819	-2.2	-0.8	-3.1	-4.7
Oil	485890	502788	457366	440563	404972	373700	343639	290716	234082	184001	140138	-0.6	-1.2	-1.6	-4.4
Gas	266925	285438	269920	271582	246780	223631	192715	162950	132572	111236	92936	0.1	-0.9	-2.4	-3.6
Electricity	217599	239418	245271	254495	250988	251095	251802	250167	267207	280010	293861	1.2	0.2	0.0	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55298	54920	52113	52793	52191	54294	53734	52884	1.5	0.3	-0.4	0.0
Renewable energy forms	49480	56250	81825	100093	118281	111163	107002	126549	148234	171980	191234	5.2	3.8	-1.0	2.9
Other	0	0	0	65	261	597	984	12586	23069	28187	34558	0.0	0.0	14.2	19.5
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194862**	**244210**	**255521**	**279728**	**318093**	**370608**	**410496**	**439323**	**5.4**	**5.0**	**1.4**	**2.3**
TOTAL GHG emissions (Mt of CO_2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.1**	**4235.7**	**3892.8**	**3407.3**	**2708.3**	**1990.8**	**1554.3**	**1219.1**	**-0.7**	**-1.3**	**-2.2**	**-5.0**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.4	1872.2	1731.4	1454.7	1147.7	750.6	532.2	360.2		-1.5	-2.5	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.8	2363.5	2161.4	1952.6	1560.6	1240.2	1022.1	858.9		-1.2	-1.9	-4.0
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.2**	**3204.7**	**2897.3**	**2464.6**	**1990.7**	**1472.4**	**1107.6**	**826.3**	**-0.5**	**-1.6**	**-2.6**	**-5.3**
Power generation/District heating	1404.5	1483.1	1341.6	1200.2	1009.5	901.1	674.8	481.7	269.4	143.8	63.3	-0.5	-2.8	-3.9	-11.2
Energy Branch	170.1	174.2	159.8	149.7	138.5	121.4	109.5	95.3	77.3	64.8	54.2	-0.6	-1.4	-2.3	-3.5
Industry	693.6	640.7	520.3	538.8	502.9	457.8	404.1	330.8	240.3	193.9	164.4	-2.8	-0.3	-2.2	-4.4
Residential	461.0	491.2	457.9	430.9	385.4	326.6	276.3	216.0	170.7	127.9	84.2	-0.1	-1.7	-3.3	-5.8
Tertiary	255.7	266.4	249.2	220.7	190.4	159.0	104.6	88.2	75.2	59.9	45.5	-0.3	-2.7	-5.8	-4.1
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.3	895.3	778.7	639.6	517.4	414.7	0.5	-0.7	-0.9	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.6**	**268.3**	**226.5**	**119.1**	**84.2**	**41.6**	**-1.0**	**1.5**	**-0.2**	**-8.9**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**68.5**	**59.9**	**47.6**	**35.0**	**27.3**	**21.4**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE30EC_a			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.2	99.6	85.5	75.5	69.2	63.2	58.6	-1.2	-2.2	-2.9	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.73	1.48	1.11	0.85	0.64	-0.7	-0.9	-1.2	-4.8
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	52.7	49.9	45.0	41.9	38.3				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.8	2106.6	2268.9	2481.5	2640.5	2871.3	3135.8	3327.8	3.7	3.0	1.7	1.5
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.7	14.9	14.8	15.0	15.3	15.2				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.3	80.5	72.0	63.0	55.8	50.7	47.7		-1.0	-2.2	-2.0
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.6	69.0	58.7	50.2	45.2	40.1	34.7	-0.5	-1.9	-3.4	-2.6
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.7	64.6	50.1	44.2	40.6	37.1	34.2	0.0	-2.6	-4.2	-1.9
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.7	23.5	21.2	19.7	18.5	-0.6	-1.6	-2.2	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.24	0.22	0.17	0.12	0.06	0.03	0.01	-1.6	-3.0	-3.8	-12.3
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.53	1.28	1.06	0.87	-0.8	-0.7	-0.7	-3.3
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.48	1.33	1.04	0.88	0.76	-1.5	-0.8	-1.1	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.23	1.13	0.96	0.78	0.61	0.43	-0.9	-1.1	-1.5	-4.7
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.81	0.71	0.61	0.50	0.38	-1.5	-1.6	-3.4	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.40	2.08	1.75	1.44	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.2	23.6	27.7	33.6	40.5	46.3	50.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.0	25.5	40.3	54.3	66.0				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415901**	**3364258**	**3354597**	**3345224**	**3477585**	**3928955**	**4229680**	**4560022**	**1.0**	**0.1**	**-0.1**	**1.6**
Nuclear energy	945027	997733	916685	887185	737206	697551	703936	745532	805231	828021	942094	-0.3	-2.2	-0.5	1.5
Solids	933660	974939	830048	802248	672875	633340	445974	290407	296392	343369	460318	-1.2	-2.1	-4.0	0.2
Oil (including refinery gas)	181203	141358	86851	46138	25643	21236	15863	15003	12161	9521	6818	-7.1	-11.5	-4.7	-4.1
Gas (including derived gases)	514392	699743	795653	752506	682930	535702	461222	485358	527364	561565	537679	4.5	-1.5	-3.8	0.8
Biomass-waste	46848	83787	145901	190998	221100	243967	279555	316897	383126	404743	419314	12.0	4.2	2.4	2.0
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383900	396014	411008	421373	427027	433031	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263517	494523	654141	814344	920816	1065871	1177141	1245105	21.0	12.7	5.1	2.1
Solar	118	1459	22363	96144	143662	169222	210907	256819	347455	389884	415082	68.9	20.4	3.9	3.4
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	17408	35745	44467	52941	58842	2.5	5.9	3.7	6.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	25514	35468	41738	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930117**	**1019066**	**1051883**	**1118578**	**1159634**	**1289256**	**1335777**	**1381991**	**2.6**	**2.0**	**0.9**	**1.1**
Nuclear energy	136924	134494	131323	123150	111162	94547	95440	99378	106810	109859	124496	-0.4	-1.7	-1.5	1.3
Renewable energy	114281	147780	226757	318900	440528	516836	598131	666532	779590	847363	887761	7.1	6.9	3.1	2.0
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122519	124892	129931	133343	135775	137741	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207434	263223	319570	357961	412770	451631	475383	20.7	9.4	4.4	2.0
Solar	180	1740	29846	76309	110837	128059	150414	173458	227705	253137	266843	66.7	14.0	3.1	2.9
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3256	5182	5772	6819	7794	0.0	21.3	7.0	4.5
Thermal power	398853	429386	480034	488067	467376	440499	425007	393724	402856	378555	369733	1.9	-0.3	-0.9	-0.7
of which cogeneration units	92439	98998	101203	102193	110999	110785	112357	116951	122443	123037	127535	0.9	0.9	0.1	0.6
of which CCS units	0	0	0	0	904	904	929	7041	54353	109237	152359	0.0	0.0	0.3	29.0
Solids fired	186470	180630	175756	163212	140915	120678	101809	84889	86940	86592	90109	-0.6	-2.2	-3.2	-0.6
Gas fired	129190	169054	224922	253060	258508	255100	253809	236957	233930	208106	189793	5.7	1.4	-0.2	-1.4
Oil fired	67499	59434	54039	42258	32481	25979	21937	17295	14324	10933	8658	-2.2	-5.0	-3.8	-4.5
Biomass-waste fired	15128	19615	24590	28745	34570	37832	46389	51971	64207	68787	76613	5.0	3.5	3.0	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1064	2612	3455	4137	4560	2.5	2.2	1.7	7.5
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	35.0	32.9	33.1	33.5	34.7	35.8				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.5	39.7	38.8	38.4	38.7	39.9				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.1	17.0	16.8	17.1	15.9	15.1				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.5	3.5	7.4	11.8				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.9	64.5	72.4	77.3	78.6	78.2	77.8				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.8	21.0	21.4	20.6	19.7	20.9				
- renewable energy forms	14.4	14.4	21.0	27.2	37.0	43.7	51.4	55.8	58.0	58.5	56.9				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7451.1**	**7855.0**	**8124.7**	**8368.9**	**8550.3**	**8780.6**	**0.9**	**0.9**	**1.1**	**0.6**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.4	603.4	623.9	650.1	668.2	688.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.2	5595.7	5706.9	5781.9	5833.5	5930.2	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.1	724.0	782.0	843.7	890.5	934.3	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	774.4	887.0	965.1	1044.6	1108.1	1176.5	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.7	48.5	50.1	51.5	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.0**	**3510.6**	**3635.4**	**3713.0**	**3801.7**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.6	2426.9	2502.1	2544.8	2599.7	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.2	640.2	674.5	698.7	720.5	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.5	458.8	469.4	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341190**	**333676**	**321809**	**305674**	**293781**	**285504**	**0.7**	**-0.3**	**-0.6**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7807	7827	7408	7126	6777	6497	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141057	129744	120077	105833	96151	89639	0.2	-1.5	-1.9	-1.8
Trucks	95660	111643	112043	117988	118898	118270	120880	119493	116856	114368	112069	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9902	10060	10154	10066	9912	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58073	58237	57543	58324	58951	59842	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6387	6751	7086	7228	7382	7469	7546	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE32DEC_a												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831468**	**799964**	**740446**	**686479**	**697777**	**753848**	**786422**	**826944**	**-1.2**	**-0.5**	**-1.5**	**0.9**
Solids	214627	196059	163855	149901	137886	121487	92642	71589	77783	74783	80855	-2.7	-1.7	-3.9	-0.7
Oil	176084	136469	103565	90643	77000	63188	51467	36453	24996	14671	9255	-5.2	-2.9	-3.9	-8.2
Natural gas	209437	190678	158525	149164	138410	108293	82862	72235	66426	60400	52290	-2.7	-1.3	-5.0	-2.3
Nuclear	243841	257516	236563	229106	190341	178241	171298	181853	195667	202321	222536	-0.3	-2.2	-1.0	1.3
Renewable energy sources	103944	123918	178977	212653	256326	269236	288211	335647	388977	434247	462008	5.6	3.7	1.2	2.4
Hydro	30818	26817	32208	31687	32181	33016	34060	35321	36238	36754	37250	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136279	149547	143841	145115	162264	189122	211665	226728	6.5	1.9	-0.3	2.3
Wind	1913	6058	12829	22662	42525	56066	69039	78836	91364	101175	106983	21.0	12.7	5.0	2.2
Solar and others	430	806	3691	14050	22800	27070	30051	37033	43931	50108	52354	24.0	20.0	2.8	2.8
Geothermal	4712	5354	5888	7974	9273	9242	9945	22193	28322	34545	38693	2.3	4.6	0.7	7.0
Net Imports	**829314**	**988719**	**956735**	**967842**	**896951**	**845485**	**767260**	**697431**	**610672**	**560112**	**510299**	**1.4**	**-0.6**	**-1.5**	**-2.0**
Solids	98273	125211	110927	115977	92086	86603	71563	50346	33547	35484	39779	1.2	-1.8	-2.5	-2.9
Oil	535238	604030	563977	551775	524913	497891	468781	418135	352234	285209	231795	0.5	-0.7	-1.1	-3.5
- Crude oil and Feedstocks	518046	585121	541240	527771	504350	481251	456554	417176	366720	316376	272960	0.4	-0.7	-1.0	-2.5
- Oil products	17192	18909	22737	24004	20563	16640	12228	959	-14487	-31167	-41165	2.8	-1.0	-5.1	0.0
Natural gas	193432	257849	276001	286173	259880	240341	203996	201265	190777	200167	194805	3.6	-0.6	-2.4	-0.2
Electricity	2029	1412	707	-129	-1602	-1508	-1486	-1740	-1816	-1878	-2099	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745845**	**1641499**	**1528503**	**1395061**	**1334563**	**1304066**	**1285376**	**1274943**	**0.2**	**-0.7**	**-1.6**	**-0.4**
Solids	321277	317986	280653	265879	229971	208090	164205	121935	111331	110267	120634	-1.3	-2.0	-3.3	-1.5
Oil	665142	683909	620735	589170	547415	505642	464217	398221	322465	245974	187359	-0.7	-1.2	-1.6	-4.4
Natural gas	396145	448380	444428	435120	397373	346644	284212	269222	251512	253315	238485	1.2	-1.1	-3.3	-0.9
Nuclear	243841	257516	236563	229106	190341	178241	171298	181853	195667	202321	222536	-0.3	-2.2	-1.0	1.3
Electricity	2029	1412	707	-129	-1602	-1508	-1486	-1740	-1816	-1878	-2099	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226699	278001	291393	312616	365073	424907	475377	508027	5.9	4.2	1.2	2.5
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.6	11.8	9.1	8.5	8.6	9.5				
Oil	38.4	37.3	35.1	33.7	33.3	33.1	33.3	29.8	24.7	19.1	14.7				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.7	20.4	20.2	19.3	19.7	18.7				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.7	12.3	13.6	15.0	15.7	17.5				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.1	22.4	27.4	32.6	37.0	39.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415816**	**3365366**	**3336026**	**3276046**	**3469911**	**3916439**	**4276554**	**4603950**	**1.0**	**0.1**	**-0.3**	**1.7**
Self consumption and grid losses	396970	407042	377767	368942	346243	339638	322853	325994	372051	422057	486850	-0.5	-0.9	-0.7	2.1
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383270**	**342902**	**311500**	**260315**	**253664**	**283396**	**315940**	**329255**	**0.8**	**-1.9**	**-2.7**	**1.2**
Solids	223038	228941	197605	186612	154047	142724	108644	75790	75764	81507	95989	-1.2	-2.5	-3.4	-0.6
Oil (including refinery gas)	40042	33244	20532	10894	5780	4530	3342	2862	2326	1774	1382	-6.5	-11.9	-5.3	-4.3
Gas (including derived gases)	102844	133713	149190	131897	121019	96899	72885	82284	87917	97108	89307	3.8	-2.1	-4.9	1.0
Biomass & Waste	14918	26452	45117	47890	55259	60493	67659	73056	87612	96763	99208	11.7	2.0	2.0	1.9
Geothermal heat	4114	4645	4828	5976	6796	6853	7785	19671	25422	31164	34436	1.6	3.5	1.4	7.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4354	7624	8933	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971003**	**902264**	**844055**	**794081**	**773655**	**747918**	**711552**	**700279**	**-0.7**	**-1.0**	**-1.3**	**-0.6**
Refineries	740500	763156	670015	646602	612015	575176	538738	483283	419083	354850	303582	-1.0	-0.9	-1.3	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24592	56290	90339	117093	140679	34.1	6.9	-0.6	9.1
District heating	18667	19517	20813	22236	19511	16517	17100	16519	14649	13006	12337	1.1	-0.6	-1.3	-1.6
Derived gases, cokeries etc.	316475	324348	297391	283943	244709	227005	213651	217563	223847	226602	243681	-0.6	-1.9	-1.3	0.7
Energy Branch Consumption	**86990**	**91952**	**88327**	**82417**	**76473**	**69205**	**62612**	**56616**	**52250**	**49421**	**49582**	**0.2**	**-1.4**	**-2.0**	**-1.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122386**	**118832**	**112517**	**107050**	**102422**	**98660**	**98024**	**-0.2**	**0.6**	**-0.8**	**-0.7**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170498**	**1122131**	**1045780**	**961900**	**910592**	**865633**	**829576**	**804488**	**0.3**	**-0.3**	**-1.5**	**-0.9**
by sector															
Industry	332412	330448	290978	304746	303294	284070	264250	244678	227059	218180	215824	-1.3	0.4	-1.4	-1.0
- energy intensive industries	217920	216886	187894	197056	196038	182527	167633	153488	142215	136075	131971	-1.5	0.4	-1.6	-1.2
- other industrial sectors	114492	113563	103085	107690	107256	101543	96618	91190	84844	82105	83853	-1.0	0.4	-1.0	-0.7
Residential	286291	311793	311545	311966	293951	264442	237183	222346	215230	205525	191961	0.8	-0.6	-2.1	-1.1
Tertiary	166083	179768	187856	181912	167904	153537	124963	122181	121073	119121	118281	1.2	-1.1	-2.9	-0.3
Transport	342901	368665	367191	371873	356981	343731	335504	321387	302271	286749	278421	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48401	45820	38896	32222	25970	20044	15289	12806	-2.2	-0.8	-3.5	-4.5
Oil	485890	502788	457366	440528	404993	373025	340679	286063	226544	173713	131120	-0.6	-1.2	-1.7	-4.7
Gas	266925	285438	269920	271568	246738	221648	186717	160769	131160	110035	92259	0.1	-0.9	-2.7	-3.5
Electricity	217599	239418	245271	254490	251071	249644	246274	249412	266659	283267	296658	1.2	0.2	-0.2	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55313	54931	51874	51261	51518	53599	53119	52135	1.5	0.3	-0.7	0.1
Renewable energy forms	49480	56250	81825	100133	118316	110095	103700	124219	144397	165330	184049	5.2	3.8	-1.3	2.9
Other	0	0	0	65	261	597	1048	12642	23231	28823	35460	0.0	0.0	14.9	19.3
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194912**	**244213**	**254336**	**275168**	**313975**	**364278**	**403415**	**430964**	**5.4**	**5.0**	**1.2**	**2.3**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.1**	**4236.3**	**3870.9**	**3380.1**	**2700.2**	**2081.7**	**1524.7**	**1198.9**	**-0.7**	**-1.3**	**-2.2**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.5	1872.8	1714.7	1447.8	1156.1	865.4	535.4	368.1		-1.5	-2.5	-6.6
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.6	2363.4	2156.1	1932.2	1544.1	1216.4	989.3	830.7		-1.2	-2.0	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.2**	**3205.3**	**2875.5**	**2434.4**	**1982.1**	**1478.9**	**1078.0**	**802.9**	**-0.5**	**-1.6**	**-2.7**	**-5.4**
Power generation/District heating	1404.5	1483.1	1341.6	1200.4	1010.2	890.0	676.1	496.0	304.2	150.2	69.2	-0.5	-2.8	-3.9	-10.8
Energy Branch	170.1	174.2	159.8	149.7	138.4	120.7	107.7	94.1	76.1	63.4	53.3	-0.6	-1.4	-2.5	-3.5
Industry	693.6	640.7	520.3	538.6	502.9	450.5	391.8	324.8	238.6	193.1	165.7	-2.8	-0.3	-2.5	-4.2
Residential	461.0	491.2	457.9	430.9	385.4	324.7	266.2	213.4	168.2	125.6	82.2	-0.1	-1.7	-3.6	-5.7
Tertiary	255.7	266.4	249.2	220.7	190.3	158.2	100.6	86.9	74.0	58.9	44.7	-0.3	-2.7	-6.2	-4.0
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.3	892.1	766.9	617.8	486.7	387.7	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.4**	**271.3**	**227.1**	**203.6**	**84.3**	**44.8**	**-1.0**	**1.5**	**-0.1**	**-8.6**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**68.1**	**59.5**	**47.5**	**36.6**	**26.8**	**21.1**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE32DEC_a			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.2	98.9	83.7	74.7	68.1	62.6	58.1	-1.2	-2.2	-3.1	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.75	1.49	1.13	0.84	0.63	-0.7	-0.9	-1.1	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.3	52.8	50.0	44.8	41.6	38.2				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.7	2106.6	2274.1	2526.0	2667.4	2919.6	3187.4	3355.4	3.7	3.0	1.8	1.4
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.7	15.2	14.9	15.2	15.5	15.3				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.3	79.3	69.9	61.7	54.7	50.3	47.7		-1.0	-2.5	-1.9
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.7	68.7	57.1	49.8	44.7	39.6	34.2	-0.5	-1.9	-3.6	-2.5
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.7	64.3	48.2	43.7	40.2	36.6	33.8	0.0	-2.6	-4.5	-1.8
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.6	23.2	20.6	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.17	0.12	0.07	0.03	0.01	-1.6	-3.0	-3.6	-12.0
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.72	1.53	1.27	1.04	0.85	-0.8	-0.7	-0.7	-3.5
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.48	1.33	1.05	0.89	0.77	-1.5	-0.8	-1.1	-3.2
Residential	1.61	1.58	1.47	1.38	1.31	1.23	1.12	0.96	0.78	0.61	0.43	-0.9	-1.1	-1.5	-4.7
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.80	0.71	0.61	0.49	0.38	-1.5	-1.6	-3.4	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.04	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.2	23.6	27.8	33.5	40.5	46.3	50.6				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.2	26.2	41.7	56.1	67.6				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3415816**	**3365366**	**3336026**	**3276046**	**3469911**	**3916439**	**4276554**	**4603950**	**1.0**	**0.1**	**-0.3**	**1.7**
Nuclear energy	945027	997733	916685	887192	737094	695966	671581	726105	798952	840125	951928	-0.3	-2.2	-0.9	1.8
Solids	933660	974939	830048	802441	673122	626542	472340	309132	296674	353066	471389	-1.2	-2.1	-3.5	0.0
Oil (including refinery gas)	181203	141358	86851	46090	25933	20996	15476	14946	11957	9079	6804	-7.1	-11.4	-5.0	-4.0
Gas (including derived gases)	514392	699743	795653	752382	683775	527858	412106	489498	545965	585388	564000	4.5	-1.5	-4.9	1.6
Biomass-waste	46848	83787	145901	190886	220979	244742	280971	313979	382009	408675	423080	12.0	4.2	2.4	2.1
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383908	396051	410707	421369	427378	433145	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263516	494482	651933	802781	916701	1062374	1176449	1243985	21.0	12.7	5.0	2.2
Solar	118	1459	22363	96144	143662	168544	207575	253072	332020	389257	413030	68.9	20.4	3.7	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	17165	35769	43673	52941	59113	2.5	5.9	3.5	6.4
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	21447	34196	37477	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930133**	**1019117**	**1050394**	**1107267**	**1151276**	**1276755**	**1336932**	**1383221**	**2.6**	**2.0**	**0.8**	**1.1**
Nuclear energy	136924	134494	131323	123150	111162	94355	93074	97019	106069	111559	125868	-0.4	-1.7	-1.8	1.5
Renewable energy	114281	147780	226757	318900	440507	515248	593178	662294	769161	846491	885789	7.1	6.9	3.0	2.0
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122525	124926	129886	133333	135857	137763	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207413	262092	316799	356039	411094	450743	474229	20.7	9.4	4.3	2.0
Solar	180	1740	29846	76309	110837	127596	148184	171173	219008	253072	265913	66.7	14.0	2.9	3.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3268	5195	5726	6819	7884	0.0	21.3	7.0	4.5
Thermal power	398853	429386	480034	488084	467448	440791	421015	391964	401526	378882	371565	1.9	-0.3	-1.0	-0.6
of which cogeneration units	92439	98998	101203	102201	110979	109605	109469	114625	121685	123473	127484	0.9	0.9	-0.1	0.8
of which CCS units	0	0	0	0	904	904	904	7017	39838	112916	155344	0.0	0.0	0.0	29.3
Solids fired	186470	180630	175756	163212	140919	120425	101448	85067	86716	86825	91099	-0.6	-2.2	-3.2	-0.5
Gas fired	129190	169054	224922	253082	258579	255752	250579	235342	233215	208211	190620	5.7	1.4	-0.3	-1.4
Oil fired	67499	59434	54039	42252	32474	25963	21926	17249	14258	10845	8525	-2.2	-5.0	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34574	37740	46029	51694	63962	68864	76749	5.0	3.5	2.9	2.6
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1034	2612	3375	4137	4571	2.5	2.2	1.4	7.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	34.8	32.6	33.3	33.8	35.0	36.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.4	39.3	39.0	39.1	38.8	40.3				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.2	16.9	16.6	17.0	15.9	15.0				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.6	3.5	7.4	12.3				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.9	64.8	72.5	76.6	78.1	77.7	77.2				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.9	20.5	20.9	20.5	19.8	20.8				
- renewable energy forms	14.4	14.4	21.0	27.2	37.0	43.9	52.0	55.6	57.5	57.9	56.3				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7451.1**	**7847.0**	**8107.3**	**8321.8**	**8497.6**	**8736.7**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.4	603.7	624.8	654.3	672.4	691.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.2	5586.5	5687.5	5727.4	5774.6	5882.4	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.1	724.5	783.0	847.4	893.7	936.1	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	774.4	887.4	965.2	1044.0	1106.6	1175.4	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.8	48.7	50.3	51.6	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.0**	**3510.8**	**3635.2**	**3713.2**	**3802.0**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.4	2426.7	2501.4	2544.6	2599.7	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.3	640.5	674.9	699.1	720.7	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.3	443.6	458.9	469.5	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341190**	**332999**	**318900**	**299836**	**284378**	**276091**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7771	7807	7830	7409	7150	6799	6513	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141057	129020	117139	99984	86786	80259	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118898	118270	120869	119477	116806	114305	112009	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9908	10070	10174	10083	9922	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58073	58282	57569	58330	58926	59834	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6387	6751	7090	7236	7393	7480	7553	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE35DEC_a												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831443**	**798097**	**721554**	**649102**	**655124**	**708686**	**738516**	**772731**	**-1.2**	**-0.5**	**-2.0**	**0.9**
Solids	214627	196059	163855	149894	138022	120411	95355	73147	68307	66481	74661	-2.7	-1.7	-3.6	-1.2
Oil	176084	136469	103565	90642	76989	62929	51072	36190	24841	14597	9226	-5.2	-2.9	-4.0	-8.2
Natural gas	209437	190678	158525	149166	137906	104415	74720	66446	60892	56113	48137	-2.7	-1.4	-5.9	-2.2
Nuclear	243841	257516	236563	229104	189952	171908	157524	166417	177634	180590	197663	-0.3	-2.2	-1.9	1.1
Renewable energy sources	103944	123918	178977	212638	255227	261891	270431	312924	377010	420735	443046	5.6	3.6	0.6	2.5
Hydro	30818	26817	32208	31687	32180	32948	33863	35274	36210	36682	37175	0.4	0.0	0.5	0.5
Biomass & Waste	66071	84883	124361	136264	148525	138975	135192	152282	183737	206664	219019	6.5	1.8	-0.9	2.4
Wind	1913	6058	12829	22662	42457	54230	64111	73226	88366	97331	102001	21.0	12.7	4.2	2.3
Solar and others	430	806	3691	14051	22799	26599	27969	34472	41317	46941	48311	24.0	20.0	2.1	2.8
Geothermal	4712	5354	5888	7974	9267	9139	9295	17669	27380	33117	36540	2.3	4.6	0.0	7.1
Net Imports	**829314**	**988719**	**956735**	**967878**	**896579**	**832192**	**746859**	**678342**	**588415**	**532890**	**485823**	**1.4**	**-0.6**	**-1.8**	**-2.1**
Solids	98273	125211	110927	115995	91872	88795	77135	54512	33614	28266	33117	1.2	-1.9	-1.7	-4.1
Oil	535238	604030	563977	551794	524754	493926	462831	413413	348476	282617	230928	0.5	-0.7	-1.2	-3.4
- Crude oil and Feedstocks	518046	585121	541240	527781	504232	478665	452504	413957	364112	314538	272306	0.4	-0.7	-1.1	-2.5
- Oil products	17192	18909	22737	24013	20523	15260	10326	-544	-15636	-31921	-41378	2.8	-1.0	-6.6	0.0
Natural gas	193432	257849	276001	286177	260000	229334	184913	183587	172925	183431	179054	3.6	-0.6	-3.4	-0.2
Electricity	2029	1412	707	-129	-1602	-1508	-1488	-1740	-1819	-1880	-2097	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745856**	**1639260**	**1496318**	**1337283**	**1272821**	**1236646**	**1210247**	**1196253**	**0.2**	**-0.8**	**-2.0**	**-0.6**
Solids	321277	317986	280653	265889	229894	209206	172490	127659	101921	94747	107778	-1.3	-2.0	-2.8	-2.3
Oil	665142	683909	620735	589188	547246	501416	457872	393237	318552	243308	186463	-0.7	-1.3	-1.8	-4.4
Natural gas	396145	448380	444428	435126	396988	331758	256986	245755	228128	232291	218580	1.2	-1.1	-4.3	-0.8
Nuclear	243841	257516	236563	229104	189952	171908	157524	166417	177634	180590	197663	-0.3	-2.2	-1.9	1.1
Electricity	2029	1412	707	-129	-1602	-1508	-1488	-1740	-1819	-1880	-2097	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226679	276783	283537	293899	341494	412229	461192	487866	5.9	4.1	0.6	2.6
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	14.0	12.9	10.0	8.2	7.8	9.0				
Oil	38.4	37.3	35.1	33.7	33.4	33.5	34.2	30.9	25.8	20.1	15.6				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.2	19.2	19.3	18.4	19.2	18.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	11.8	13.1	14.4	14.9	16.5				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	18.9	22.0	26.8	33.3	38.1	40.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415616**	**3361174**	**3248860**	**3081596**	**3266216**	**3685356**	**3999283**	**4266953**	**1.0**	**0.1**	**-0.9**	**1.6**
Self consumption and grid losses	396970	407042	377767	368917	345669	330896	293605	293130	321803	358103	402709	-0.5	-0.9	-1.6	1.6
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383290**	**342379**	**306462**	**251160**	**240293**	**263396**	**292881**	**305139**	**0.8**	**-2.0**	**-3.1**	**1.0**
Solids	223038	228941	197605	186639	153980	145683	118800	82691	67484	67081	83372	-1.2	-2.5	-2.6	-1.8
Oil (including refinery gas)	40042	33244	20532	10891	5772	4526	3246	2877	2261	1759	1324	-6.5	-11.9	-5.6	-4.4
Gas (including derived gases)	102844	133713	149190	131871	121328	90859	60242	71658	76118	87162	78514	3.8	-2.0	-6.8	1.3
Biomass & Waste	14918	26452	45117	47914	54502	58541	61455	67591	87430	98490	99061	11.7	1.9	1.2	2.4
Geothermal heat	4114	4645	4828	5976	6796	6853	7416	15477	24875	30256	32981	1.6	3.5	0.9	7.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5227	8133	9887	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970990**	**901576**	**834079**	**774053**	**751647**	**722264**	**680808**	**668964**	**-0.7**	**-1.0**	**-1.5**	**-0.7**
Refineries	740500	763156	670015	646614	611888	572137	534023	479539	416152	352855	302891	-1.0	-0.9	-1.4	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25358	24591	55183	89206	114770	138649	34.1	6.9	-0.6	9.0
District heating	18667	19517	20813	22214	19374	16880	16836	15392	11457	9032	8466	1.1	-0.7	-1.4	-3.4
Derived gases, cokeries etc.	316475	324348	297391	283940	244285	219705	198604	201533	205449	204150	218957	-0.6	-1.9	-2.0	0.5
Energy Branch Consumption	**86990**	**91952**	**88327**	**82413**	**76461**	**68614**	**61707**	**55594**	**50071**	**46854**	**46409**	**0.2**	**-1.4**	**-2.1**	**-1.4**
Non-Energy Uses	**117117**	**120718**	**114884**	**119320**	**122392**	**117523**	**110687**	**105453**	**101389**	**98061**	**98032**	**-0.2**	**0.6**	**-1.0**	**-0.6**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170499**	**1120502**	**1022200**	**920075**	**870767**	**825095**	**786402**	**758883**	**0.3**	**-0.3**	**-2.0**	**-1.0**
by sector															
Industry	332412	330448	290978	304745	302877	280054	258754	240404	224866	216668	215641	-1.3	0.4	-1.6	-0.9
- energy intensive industries	217920	216886	187894	197049	195802	180295	164999	151021	140128	134921	132017	-1.5	0.4	-1.7	-1.1
- other industrial sectors	114492	113563	103085	107696	107075	99759	93755	89383	84738	81747	83624	-1.0	0.4	-1.3	-0.6
Residential	286291	311793	311545	311967	293092	251791	215196	200746	191367	179003	162158	0.8	-0.6	-3.0	-1.4
Tertiary	166083	179768	187856	181914	167514	146543	110285	107949	106466	103915	102487	1.2	-1.1	-4.1	-0.4
Transport	342901	368665	367191	371873	357021	343813	335840	321668	302395	286817	278598	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48392	45791	37307	30784	24756	19349	15032	12838	-2.2	-0.8	-3.9	-4.3
Oil	485890	502788	457366	440511	404794	370041	336053	282475	223560	171624	130236	-0.6	-1.2	-1.8	-4.6
Gas	266925	285438	269920	271648	246107	212814	172720	148895	120968	100246	84352	0.1	-0.9	-3.5	-3.5
Electricity	217599	239418	245271	254475	250763	243009	232195	235980	252502	267515	277267	1.2	0.2	-0.8	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55309	54749	52233	49602	48996	49000	48086	47269	1.5	0.2	-1.0	-0.2
Renewable energy forms	49480	56250	81825	100099	118037	106198	97670	117922	138284	157500	174420	5.2	3.7	-1.9	2.9
Other	0	0	0	65	261	597	1050	11743	21433	26399	32502	0.0	0.0	14.9	18.7
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194885**	**243413**	**247548**	**258410**	**295279**	**352999**	**390762**	**412300**	**5.4**	**5.0**	**0.6**	**2.4**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.2**	**4234.8**	**3831.5**	**3346.3**	**2731.5**	**2034.1**	**1473.0**	**1167.3**	**-0.7**	**-1.3**	**-2.3**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.5	1873.1	1708.6	1462.8	1226.1	851.2	513.1	358.2		-1.5	-2.4	-6.8
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.7	2361.7	2123.0	1883.6	1505.4	1182.8	959.9	809.1		-1.2	-2.2	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.3**	**3203.6**	**2836.0**	**2391.9**	**1987.8**	**1421.7**	**1025.6**	**770.7**	**-0.5**	**-1.6**	**-2.9**	**-5.5**
Power generation/District heating	1404.5	1483.1	1341.6	1200.5	1010.1	887.4	682.7	544.4	283.7	129.8	58.1	-0.5	-2.8	-3.8	-11.6
Energy Branch	170.1	174.2	159.8	149.6	138.6	119.8	106.6	92.7	75.0	62.0	53.0	-0.6	-1.4	-2.6	-3.4
Industry	693.6	640.7	520.3	538.6	503.0	445.3	390.3	322.6	235.8	191.3	167.5	-2.8	-0.3	-2.5	-4.1
Residential	461.0	491.2	457.9	430.9	384.1	301.2	230.4	184.0	143.8	103.9	65.0	-0.1	-1.7	-5.0	-6.1
Tertiary	255.7	266.4	249.2	220.7	189.8	150.8	88.9	76.4	65.3	51.8	39.0	-0.3	-2.7	-7.3	-4.0
Transport	1001.0	1082.7	1050.9	1049.9	978.1	931.6	893.1	767.6	618.1	486.8	388.0	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**275.5**	**280.0**	**252.6**	**213.1**	**85.0**	**45.4**	**-1.0**	**1.5**	**0.2**	**-8.7**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**67.4**	**58.9**	**48.1**	**35.8**	**25.9**	**20.5**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE35DEC_a			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.1	96.9	80.2	71.2	64.6	59.0	54.5	-1.2	-2.2	-3.5	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.90	1.79	1.56	1.15	0.85	0.64	-0.7	-0.9	-0.9	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.6	53.5	50.9	45.4	41.9	38.6				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.9	2105.7	2303.6	2662.2	2800.0	3076.7	3383.6	3593.4	3.7	3.0	2.4	1.5
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.9	16.0	15.7	16.1	16.5	16.4				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.2	78.2	68.4	60.7	54.1	50.0	47.6		-1.0	-2.7	-1.8
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.4	65.4	51.8	44.9	39.8	34.5	28.9	-0.5	-1.9	-4.5	-2.9
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.6	61.4	42.6	38.6	35.3	32.0	29.3	0.0	-2.6	-5.7	-1.9
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.6	23.2	20.6	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.18	0.14	0.07	0.03	0.01	-1.6	-2.9	-3.0	-12.7
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.79	1.74	1.55	1.29	1.06	0.87	-0.8	-0.7	-0.5	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.51	1.34	1.05	0.88	0.78	-1.5	-0.7	-1.0	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.20	1.07	0.92	0.75	0.58	0.40	-0.9	-1.1	-2.0	-4.8
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.81	0.71	0.61	0.50	0.38	-1.5	-1.6	-3.3	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.04	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.1	23.6	27.4	33.1	41.4	47.7	51.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.2	26.2	42.3	57.0	68.6				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415616**	**3361174**	**3248860**	**3081596**	**3266216**	**3685356**	**3999283**	**4266953**	**1.0**	**0.1**	**-0.9**	**1.6**
Nuclear energy	945027	997733	916685	887184	735586	669229	614947	659774	720713	744717	842447	-0.3	-2.2	-1.8	1.6
Solids	933660	974939	830048	802585	672393	640613	512510	347072	254027	279264	383058	-1.2	-2.1	-2.7	-1.4
Oil (including refinery gas)	181203	141358	86851	46106	25934	20837	15014	14592	11325	9041	6365	-7.1	-11.4	-5.3	-4.2
Gas (including derived gases)	514392	699743	795653	751990	686270	486846	332572	422612	470687	517385	495099	4.5	-1.5	-7.0	2.0
Biomass-waste	46848	83787	145901	190927	217341	235321	251362	287318	385914	420958	423826	12.0	4.1	1.5	2.6
Hydro (pumping excluded)	358408	311883	374576	368453	374186	383119	393758	410167	421052	426538	432263	0.4	0.0	0.5	0.5
Wind	22253	70453	149202	263516	493685	630586	745477	851466	1027510	1131758	1186061	21.0	12.7	4.2	2.3
Solar	118	1459	22363	96144	143662	166774	199365	242347	324463	380512	399815	68.9	20.4	3.3	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	16590	30867	42970	51601	56662	2.5	5.9	3.2	6.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	26696	37510	41357	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930099**	**1018489**	**1034966**	**1069732**	**1102173**	**1232199**	**1284806**	**1313671**	**2.6**	**2.0**	**0.5**	**1.0**
Nuclear energy	136924	134494	131323	123150	111162	92030	88076	89123	95965	99041	111503	-0.4	-1.7	-2.3	1.2
Renewable energy	114281	147780	226757	318900	440177	507020	569290	632812	751015	824198	856398	7.1	6.9	2.6	2.1
Hydro (pumping excluded)	101207	105529	112159	118306	120598	122324	124437	129518	133244	135613	137475	1.0	0.7	0.3	0.5
Wind	12893	40510	84512	123698	207087	255211	297577	333051	397636	434546	453476	20.7	9.4	3.7	2.1
Solar	180	1740	29846	76309	110837	126450	144021	165061	214442	247367	257956	66.7	14.0	2.7	3.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3256	5182	5692	6672	7490	0.0	21.3	7.0	4.3
Thermal power	398853	429386	480034	488050	467150	435917	412366	380238	385220	361567	345770	1.9	-0.3	-1.2	-0.9
of which cogeneration units	92439	98998	101203	102482	110690	107069	106056	106727	116105	120128	122405	0.9	0.9	-0.4	0.7
of which CCS units	0	0	0	0	904	904	904	2079	31330	100998	136082	0.0	0.0	0.0	28.5
Solids fired	186470	180630	175756	163212	140957	120336	101121	83728	81636	80081	80781	-0.6	-2.2	-3.3	-1.1
Gas fired	129190	169054	224922	253051	258083	251352	242831	225181	219910	195644	173275	5.7	1.4	-0.6	-1.7
Oil fired	67499	59434	54039	42249	32633	25945	21971	17654	14598	10928	8598	-2.2	-4.9	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34575	37374	45454	51620	65773	70898	78739	5.0	3.5	2.8	2.8
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	989	2055	3302	4016	4378	2.5	2.2	0.9	7.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	34.4	31.7	32.7	33.0	34.2	35.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.1	38.4	39.0	38.5	38.2	39.1				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	15.9	16.3	16.4	17.1	16.2	15.2				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	2.3	6.2	10.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.8	64.7	72.1	76.0	79.9	79.7	79.1				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.6	20.0	20.2	19.7	18.8	19.9				
- renewable energy forms	14.4	14.4	21.0	27.2	36.9	44.1	52.1	55.8	60.2	60.9	59.1				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7050.0**	**7452.1**	**7851.0**	**8111.2**	**8322.6**	**8497.1**	**8737.4**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.3	603.2	624.5	654.3	672.3	690.5	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.6	5410.5	5587.2	5688.6	5727.3	5773.8	5881.4	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.1	647.9	723.7	782.3	847.2	893.4	935.2	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.4	775.4	892.0	969.1	1045.2	1107.3	1178.7	1.4	2.6	2.8	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	44.9	46.7	48.6	50.3	51.5	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.4**	**3511.3**	**3635.6**	**3713.0**	**3801.5**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.4	2426.6	2501.4	2545.0	2599.8	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.7	641.0	675.2	698.7	720.2	-0.3	2.2	2.3	0.8
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.3	443.6	459.0	469.4	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354504**	**341294**	**333375**	**319214**	**299991**	**284477**	**276292**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7770	7806	7825	7403	7147	6800	6514	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156774	141065	129021	117140	99985	86784	80261	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118898	118271	120872	119462	116791	114294	111986	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9231	9910	10073	10178	10078	9918	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56124	58173	58663	57906	58498	59044	60067	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6386	6749	7083	7229	7391	7476	7548	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE40DEC_a												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831467**	**798182**	**721654**	**594126**	**601760**	**645922**	**686502**	**725722**	**-1.2**	**-0.5**	**-2.9**	**1.0**
Solids	214627	196059	163855	149909	138357	122588	88013	75580	67117	60562	71523	-2.7	-1.7	-4.4	-1.0
Oil	176084	136469	103565	90639	76992	62871	50594	35891	24685	14526	9193	-5.2	-2.9	-4.1	-8.2
Natural gas	209437	190678	158525	149168	137818	104402	65593	59388	56195	53182	45391	-2.7	-1.4	-7.2	-1.8
Nuclear	243841	257516	236563	229104	190026	172868	137809	145170	151578	160614	178766	-0.3	-2.2	-3.2	1.3
Renewable energy sources	103944	123918	178977	212647	254989	258925	252117	285731	346347	397618	420849	5.6	3.6	-0.1	2.6
Hydro	30818	26817	32208	31687	32180	32956	33532	34287	35802	36254	36918	0.4	0.0	0.4	0.5
Biomass & Waste	66071	84883	124361	136274	148474	138011	124759	141967	166669	198037	212409	6.5	1.8	-1.7	2.7
Wind	1913	6058	12829	22662	42272	52303	60668	65752	81456	90026	94075	21.0	12.7	3.7	2.2
Solar and others	430	806	3691	14050	22796	26526	24785	30544	37164	41902	42969	24.0	20.0	0.8	2.8
Geothermal	4712	5354	5888	7974	9267	9129	8374	13182	25256	31400	34479	2.3	4.6	-1.0	7.3
Net Imports	**829314**	**988719**	**956735**	**967871**	**897192**	**834294**	**707942**	**653319**	**571662**	**512780**	**465308**	**1.4**	**-0.6**	**-2.3**	**-2.1**
Solids	98273	125211	110927	116028	92380	91837	65754	54356	39287	28264	32001	1.2	-1.8	-3.3	-3.5
Oil	535238	604030	563977	551788	524779	492943	455032	407527	344764	280202	229748	0.5	-0.7	-1.4	-3.4
- Crude oil and Feedstocks	518046	585121	541240	527775	504240	477965	447164	409846	361424	312739	271449	0.4	-0.7	-1.2	-2.5
- Oil products	17192	18909	22737	24013	20538	14978	7868	-2320	-16660	-32538	-41702	2.8	-1.0	-9.1	0.0
Natural gas	193432	257849	276001	286142	260089	229511	166466	166071	156056	166898	161971	3.6	-0.6	-4.4	-0.1
Electricity	2029	1412	707	-129	-1602	-1507	-1490	-1736	-1819	-1887	-2089	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745873**	**1639958**	**1498520**	**1243389**	**1194435**	**1157129**	**1138123**	**1128729**	**0.2**	**-0.7**	**-2.7**	**-0.5**
Solids	321277	317986	280653	265938	230738	214425	153767	129936	106403	88826	103524	-1.3	-1.9	-4.0	-2.0
Oil	665142	683909	620735	589179	547273	500376	449594	387052	314684	240821	185250	-0.7	-1.3	-1.9	-4.3
Natural gas	396145	448380	444428	435092	396989	331922	229412	221181	206561	212827	198752	1.2	-1.1	-5.3	-0.7
Nuclear	243841	257516	236563	229104	190026	172868	137809	145170	151578	160614	178766	-0.3	-2.2	-3.2	1.3
Electricity	2029	1412	707	-129	-1602	-1507	-1490	-1736	-1819	-1887	-2089	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226690	276534	280435	274298	312833	379722	436921	464526	5.9	4.1	-0.1	2.7
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	14.3	12.4	10.9	9.2	7.8	9.2				
Oil	38.4	37.3	35.1	33.7	33.4	33.4	36.2	32.4	27.2	21.2	16.4				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.2	18.5	18.5	17.9	18.7	17.6				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	11.1	12.2	13.1	14.1	15.8				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	18.7	22.1	26.2	32.8	38.4	41.2				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415599**	**3363144**	**3255927**	**2804308**	**3004366**	**3423242**	**3703855**	**3968984**	**1.0**	**0.1**	**-1.8**	**1.8**
Self consumption and grid losses	396970	407042	377767	368936	346142	334042	261356	268879	295275	321605	369255	-0.5	-0.9	-2.8	1.7
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383320**	**343115**	**312621**	**223213**	**227200**	**247274**	**275839**	**290789**	**0.8**	**-1.9**	**-4.2**	**1.3**
Solids	223038	228941	197605	186660	154839	151933	103497	86710	71848	61126	79650	-1.2	-2.4	-3.9	-1.3
Oil (including refinery gas)	40042	33244	20532	10887	5786	4352	3158	2918	2269	1707	1313	-6.5	-11.9	-5.9	-4.3
Gas (including derived gases)	102844	133713	149190	131886	121199	91115	52958	62634	67127	79340	69361	3.8	-2.1	-7.9	1.4
Biomass & Waste	14918	26452	45117	47910	54494	58369	56735	63527	77803	97239	99097	11.7	1.9	0.4	2.8
Geothermal heat	4114	4645	4828	5976	6796	6851	6864	11411	23228	29110	31632	1.6	3.5	0.1	7.9
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4999	7317	9736	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970986**	**901663**	**832719**	**742152**	**719594**	**686953**	**651670**	**641675**	**-0.7**	**-1.0**	**-1.9**	**-0.7**
Refineries	740500	763156	670015	646606	611902	571290	527852	474892	413249	350939	301978	-1.0	-0.9	-1.5	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25359	24595	53757	86249	110546	134920	34.1	6.9	-0.6	8.9
District heating	18667	19517	20813	22216	19390	16564	12685	11810	7176	5305	4734	1.1	-0.7	-4.2	-4.8
Derived gases, cokeries etc.	316475	324348	297391	283942	244341	219506	177020	179134	180279	184880	200043	-0.6	-1.9	-3.2	0.6
Energy Branch Consumption	**86990**	**91952**	**88327**	**82408**	**76506**	**68665**	**59458**	**54181**	**48840**	**44715**	**44598**	**0.2**	**-1.4**	**-2.5**	**-1.4**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122391**	**116695**	**108596**	**103913**	**100940**	**97869**	**98038**	**-0.2**	**0.6**	**-1.2**	**-0.5**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170494**	**1120654**	**1020866**	**858690**	**816464**	**776267**	**738226**	**711900**	**0.3**	**-0.3**	**-2.6**	**-0.9**
by sector															
Industry	332412	330448	290978	304739	302929	278925	255989	238419	224364	216224	215251	-1.3	0.4	-1.7	-0.9
- energy intensive industries	217920	216886	187894	197042	195821	179152	161968	148782	139680	134616	131840	-1.5	0.4	-1.9	-1.0
- other industrial sectors	114492	113563	103085	107697	107107	99773	94021	89636	84684	81608	83411	-1.0	0.4	-1.3	-0.6
Residential	286291	311793	311545	311967	293086	251356	180244	169433	161469	149291	133559	0.8	-0.6	-4.7	-1.5
Tertiary	166083	179768	187856	181915	167577	146523	86398	86442	87331	85438	84513	1.2	-1.1	-6.4	-0.1
Transport	342901	368665	367191	371873	357063	344062	336059	322170	303104	287273	278578	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48413	45741	36612	28972	23511	19266	14984	12769	-2.2	-0.8	-4.5	-4.0
Oil	485890	502788	457366	440495	404845	369931	330059	278025	220184	169503	129150	-0.6	-1.2	-2.0	-4.6
Gas	266925	285438	269920	271612	246200	212909	153899	134429	110162	90003	74938	0.1	-0.9	-4.6	-3.5
Electricity	217599	239418	245271	254471	250887	243332	211399	217179	235509	249796	258410	1.2	0.2	-1.7	1.0
Heat (from CHP and District Heating)	46015	52355	53515	55316	54725	52089	42745	42851	43173	42133	41944	1.5	0.2	-2.4	-0.1
Renewable energy forms	49480	56250	81825	100121	117994	105396	90561	109905	128800	148145	165222	5.2	3.7	-2.6	3.1
Other	0	0	0	65	261	597	1055	10564	19173	23662	29468	0.0	0.0	15.0	18.1
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194970**	**242986**	**244446**	**239514**	**270796**	**323447**	**366990**	**389609**	**5.4**	**5.0**	**-0.1**	**2.5**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.3**	**4238.7**	**3853.8**	**3185.7**	**2711.2**	**2133.0**	**1451.4**	**1123.8**	**-0.7**	**-1.3**	**-2.8**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.0	1876.7	1731.6	1367.8	1256.2	986.8	522.7	339.2		-1.5	-3.1	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.3	2362.0	2122.2	1817.9	1455.0	1146.2	928.7	784.6		-1.2	-2.6	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.4**	**3207.3**	**2857.0**	**2230.9**	**1938.4**	**1516.5**	**1002.0**	**727.4**	**-0.5**	**-1.6**	**-3.6**	**-5.4**
Power generation/District heating	1404.5	1483.1	1341.6	1200.6	1013.0	908.7	593.9	543.4	407.5	136.4	41.3	-0.5	-2.8	-5.2	-12.5
Energy Branch	170.1	174.2	159.8	149.7	138.5	118.7	103.9	91.5	75.6	61.8	52.3	-0.6	-1.4	-2.8	-3.4
Industry	693.6	640.7	520.3	538.6	503.7	447.5	385.1	325.8	246.9	193.8	165.6	-2.8	-0.3	-2.6	-4.1
Residential	461.0	491.2	457.9	430.9	384.1	300.2	182.2	146.4	112.7	79.0	47.5	-0.1	-1.7	-7.2	-6.5
Tertiary	255.7	266.4	249.2	220.7	189.7	149.5	71.9	62.0	53.9	43.2	32.8	-0.3	-2.7	-9.2	-3.9
Transport	1001.0	1082.7	1050.9	1049.9	978.3	932.3	893.9	769.2	619.9	487.8	387.9	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.9**	**276.8**	**280.4**	**281.7**	**217.2**	**87.0**	**45.2**	**-1.0**	**1.5**	**0.2**	**-8.7**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.6**	**67.8**	**56.0**	**47.7**	**37.5**	**25.5**	**19.8**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE40DEC_a			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.1	97.0	74.6	66.9	60.4	55.5	51.4	-1.2	-2.2	-4.2	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.91	1.79	1.62	1.31	0.88	0.64	-0.7	-0.9	-0.9	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.6	54.4	52.1	47.0	42.8	39.1				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1890.9	2106.5	2306.4	3032.7	3129.4	3395.2	3745.7	4006.3	3.7	3.0	3.7	1.4
as % of GDP	10.2	11.4	12.8	14.3	14.8	14.9	18.2	17.5	17.7	18.3	18.3				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.2	77.9	67.7	60.2	54.0	49.9	47.6		-1.0	-2.8	-1.7
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.4	65.3	43.4	37.9	33.5	28.7	23.8	-0.5	-1.9	-6.2	-3.0
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.6	61.4	33.4	30.9	29.0	26.3	24.2	0.0	-2.6	-8.0	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.7	23.3	20.7	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.23	0.17	0.15	0.10	0.03	0.01	-1.6	-2.9	-3.4	-13.7
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.79	1.79	1.60	1.33	1.09	0.89	-0.8	-0.7	-0.3	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.60	1.50	1.37	1.10	0.90	0.77	-1.5	-0.7	-1.0	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.19	1.01	0.86	0.70	0.53	0.36	-0.9	-1.1	-2.6	-5.1
Tertiary	1.54	1.48	1.33	1.21	1.13	1.02	0.83	0.72	0.62	0.51	0.39	-1.5	-1.6	-3.0	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.05	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.1	23.3	27.4	32.6	40.5	48.0	52.4				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.4	26.3	42.3	57.5	68.9				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3415599**	**3363144**	**3255927**	**2804308**	**3004366**	**3423242**	**3703855**	**3968984**	**1.0**	**0.1**	**-1.8**	**1.8**
Nuclear energy	945027	997733	916685	887185	735874	673556	536430	570593	608066	658356	759401	-0.3	-2.2	-3.1	1.8
Solids	933660	974939	830048	802733	676404	666387	433376	368393	312489	244337	355684	-1.2	-2.0	-4.4	-1.0
Oil (including refinery gas)	181203	141358	86851	45969	26009	19984	14419	14214	11321	8686	5273	-7.1	-11.4	-5.7	-4.9
Gas (including derived gases)	514392	699743	795653	752003	685820	487963	290207	364085	405726	463517	434346	4.5	-1.5	-8.2	2.0
Biomass-waste	46848	83787	145901	190884	217533	234409	232058	271052	349523	422133	424394	12.0	4.1	0.6	3.1
Hydro (pumping excluded)	358408	311883	374576	368453	374186	383210	389910	398682	416298	421554	429275	0.4	0.0	0.4	0.5
Wind	22253	70453	149202	263516	491540	608172	705437	764556	947168	1046811	1093895	21.0	12.7	3.7	2.2
Solar	118	1459	22363	96144	143662	166878	186689	227932	307285	356600	373788	68.9	20.4	2.7	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15368	15783	24859	39611	48636	52932	2.5	5.9	2.7	6.2
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	25755	33225	39996	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930117**	**1017665**	**1025340**	**1040514**	**1041376**	**1159956**	**1208177**	**1231823**	**2.6**	**2.0**	**0.2**	**0.8**
Nuclear energy	136924	134494	131323	123150	111162	91595	85077	81388	81611	87645	100457	-0.4	-1.7	-2.6	0.8
Renewable energy	114281	147780	226757	318900	439349	498334	548216	592728	708714	776055	806035	7.1	6.8	2.2	1.9
Hydro (pumping excluded)	101207	105529	112159	118306	120598	122346	124018	126767	131195	133426	136486	1.0	0.7	0.3	0.5
Wind	12893	40510	84512	123698	206259	246614	283136	303191	367918	402833	418949	20.7	9.3	3.2	2.0
Solar	180	1740	29846	76309	110837	126407	137873	158087	204541	233861	244110	66.7	14.0	2.2	2.9
Other renewables (tidal etc.)	0	0	240	586	1655	2967	3188	4683	5061	5936	6491	0.0	21.3	6.8	3.6
Thermal power	398853	429386	480034	488068	467155	435411	407222	367261	369631	344477	325331	1.9	-0.3	-1.4	-1.1
of which cogeneration units	92439	98998	101203	102224	110690	106163	101682	99932	110710	115158	115917	0.9	0.9	-0.8	0.7
of which CCS units	0	0	0	0	904	904	904	904	11046	84221	127005	0.0	0.0	0.0	28.0
Solids fired	186470	180630	175756	163212	141085	120710	101239	83482	80448	76328	77196	-0.6	-2.2	-3.3	-1.3
Gas fired	129190	169054	224922	253066	257793	250302	240038	216231	209465	183114	157776	5.7	1.4	-0.7	-2.1
Oil fired	67499	59434	54039	42252	32647	25926	21875	17342	14391	10933	8611	-2.2	-4.9	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34727	37564	43154	48690	62243	70237	77547	5.0	3.5	2.2	3.0
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	915	1515	3084	3864	4199	2.5	2.2	0.1	7.9
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.2	34.8	29.7	31.8	32.6	33.7	35.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.5	39.0	37.7	39.0	39.4	37.6	38.4				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.6	15.5	16.2	16.2	17.4	16.6	15.3				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	1.3	4.6	10.2				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.7	63.9	73.7	75.1	78.5	80.5	79.8				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.7	19.1	19.0	17.9	17.9	19.3				
- renewable energy forms	14.4	14.4	21.0	27.2	36.8	43.2	54.6	56.2	60.6	62.5	60.4				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7050.3**	**7454.4**	**7853.0**	**8116.4**	**8331.3**	**8502.4**	**8734.5**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.8	575.0	603.0	623.9	653.4	671.9	691.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.7	5411.0	5587.4	5689.2	5730.0	5775.2	5879.3	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.1	647.4	722.9	781.4	845.4	892.1	935.7	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.8	778.0	894.9	975.3	1054.1	1113.0	1176.9	1.4	2.6	2.8	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	42.9	44.8	46.6	48.5	50.1	51.6	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.4**	**3385.7**	**3511.9**	**3635.6**	**3712.7**	**3801.2**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.2	2346.6	2426.5	2501.7	2545.0	2600.0	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	607.9	641.6	674.9	698.2	719.7	-0.3	2.2	2.3	0.8
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.8	459.0	469.4	481.5	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354546**	**341541**	**333642**	**319752**	**300729**	**284965**	**276309**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7770	7803	7826	7395	7136	6791	6513	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156777	141081	129027	117154	100042	86814	80247	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118899	118275	120887	119476	116805	114271	111965	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9230	9895	10075	10170	10074	9915	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56163	58408	58933	58431	59201	59549	60118	0.9	1.2	0.5	0.1
Inland navigation	5973	6575	5892	6143	6386	6745	7074	7220	7375	7467	7550	-0.1	0.8	1.0	0.3

Source: PRIMES

Cost reporting method: c

EU28: REF2012tplusF											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831587**	**806999**	**774028**	**750386**	**756269**	**758942**	**756325**	**741591**	**-1.2**	**-0.4**	**-0.7**	**-0.1**
Solids	214627	196059	163855	149946	139419	127372	88814	78810	74257	72656	68963	-2.7	-1.6	-4.4	-1.3
Oil	176084	136469	103565	90795	77412	65152	55157	43065	33789	22982	16197	-5.2	-2.9	-3.3	-5.9
Natural gas	209437	190678	158525	149165	140761	124871	110507	103426	97087	84365	71349	-2.7	-1.2	-2.4	-2.2
Nuclear	243841	257516	236563	229091	192194	179601	200958	215101	218499	220909	216248	-0.3	-2.1	0.4	0.4
Renewable energy sources	103944	123918	178977	212589	257212	277033	294950	315867	335310	355412	368835	5.6	3.7	1.4	1.1
Hydro	30818	26817	32208	31687	32181	32955	34082	35124	35706	36025	36580	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136218	150600	151413	152531	154423	160741	163611	162741	6.5	1.9	0.1	0.3
Wind	1913	6058	12829	22663	42406	54639	66346	73718	78176	85525	93351	21.0	12.7	4.6	1.7
Solar and others	430	806	3691	14047	22777	28573	32011	37261	41669	45099	45953	24.0	20.0	3.5	1.8
Geothermal	4712	5354	5888	7974	9248	9453	9979	15341	19017	25152	30210	2.3	4.6	0.8	5.7
Net Imports	**829314**	**988719**	**956735**	**967965**	**909430**	**914865**	**920857**	**911994**	**917314**	**940317**	**961688**	**1.4**	**-0.5**	**0.1**	**0.2**
Solids	98273	125211	110927	116119	95051	87995	85092	61658	54216	54638	54894	1.2	-1.5	-1.1	-2.2
Oil	535238	604030	563977	551754	527894	519346	516402	517466	518318	527807	532886	0.5	-0.7	-0.2	0.2
- Crude oil and Feedstocks	518046	585121	541240	527813	506534	496537	490142	488282	485469	489278	488275	0.4	-0.7	-0.3	0.0
- Oil products	17192	18909	22737	23941	21361	22809	26260	29184	32849	38529	44612	2.8	-0.6	2.1	2.7
Natural gas	193432	257849	276001	286188	266292	285786	295737	308333	317942	330144	345370	3.6	-0.4	1.1	0.8
Electricity	2029	1412	707	-129	-1602	-1507	-1489	-1740	-1819	-1880	-2096	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1746078**	**1660906**	**1631144**	**1611172**	**1605665**	**1611671**	**1628926**	**1632192**	**0.2**	**-0.6**	**-0.3**	**0.1**
Solids	321277	317986	280653	266064	234470	215366	173905	140468	128472	127295	123857	-1.3	-1.8	-2.9	-1.7
Oil	665142	683909	620735	589293	550703	528750	514194	502296	493414	490670	487100	-0.7	-1.2	-0.7	-0.3
Natural gas	396145	448380	444428	435135	406133	408655	403538	407397	409137	406913	407615	1.2	-0.9	-0.1	0.1
Nuclear	243841	257516	236563	229091	192194	179601	200958	215101	218499	220909	216248	-0.3	-2.1	0.4	0.4
Electricity	2029	1412	707	-129	-1602	-1507	-1489	-1740	-1819	-1880	-2096	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226624	279007	300279	320066	342143	363967	385020	399468	5.9	4.2	1.4	1.1
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.2	10.8	8.7	8.0	7.8	7.6				
Oil	38.4	37.3	35.1	33.7	33.2	32.4	31.9	31.3	30.6	30.1	29.8				
Natural gas	22.9	24.5	25.1	24.9	24.5	25.1	25.0	25.4	25.4	25.0	25.0				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.0	12.5	13.4	13.6	13.6	13.2				
Renewable energy forms	6.0	6.8	10.4	13.0	16.8	18.4	19.9	21.3	22.6	23.6	24.5				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3416143**	**3417103**	**3526993**	**3667044**	**3810604**	**3999241**	**4210248**	**4347499**	**1.0**	**0.3**	**0.7**	**0.9**
Self consumption and grid losses	396970	407042	377767	369020	352626	359642	367834	384934	414973	448155	474233	-0.5	-0.7	0.4	1.3
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383279**	**350653**	**338227**	**299628**	**283107**	**287705**	**299279**	**300677**	**0.8**	**-1.7**	**-1.6**	**0.0**
Solids	223038	228941	197605	186789	158213	143833	105916	76434	68124	69913	68236	-1.2	-2.2	-3.9	-2.2
Oil (including refinery gas)	40042	33244	20532	10888	5907	5284	4524	4024	4157	4106	3999	-6.5	-11.7	-2.6	-0.6
Gas (including derived gases)	102844	133713	149190	131860	124637	126186	124553	127862	129233	128779	124793	3.8	-1.8	0.0	0.0
Biomass & Waste	14918	26452	45117	47765	55099	56071	57403	62394	70305	74626	76713	11.7	2.0	0.4	1.5
Geothermal heat	4114	4645	4828	5976	6796	6853	7232	12393	15886	21855	26937	1.6	3.5	0.6	6.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971213**	**907635**	**869885**	**873784**	**869927**	**857971**	**852563**	**841625**	**-0.7**	**-1.0**	**-0.4**	**-0.2**
Refineries	740500	763156	670015	646759	614530	592841	577534	564620	552898	546497	538635	-1.0	-0.9	-0.6	-0.3
Biofuels and hydrogen production	705	3101	13296	18232	26203	26359	26690	26750	26670	27551	28879	34.1	7.0	0.2	0.4
District heating	18667	19517	20813	22289	20164	19238	19339	18308	17120	16930	17867	1.1	-0.3	-0.4	-0.4
Derived gases, cokeries etc.	316475	324348	297391	283934	246737	231448	250222	260249	261282	261585	256244	-0.6	-1.8	0.1	0.1
Energy Branch Consumption	**86990**	**91952**	**88327**	**82447**	**77111**	**73795**	**70810**	**68774**	**68154**	**68439**	**68633**	**0.2**	**-1.3**	**-0.8**	**-0.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119317**	**122300**	**121539**	**121545**	**121156**	**119756**	**119349**	**119926**	**-0.2**	**0.6**	**-0.1**	**-0.1**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170679**	**1135707**	**1129540**	**1125739**	**1126378**	**1134045**	**1145322**	**1151911**	**0.3**	**-0.2**	**-0.1**	**0.1**
by sector															
Industry	332412	330448	290978	304790	306458	305818	306946	304679	304286	307156	309068	-1.3	0.5	0.0	0.0
- energy intensive industries	217920	216886	187894	197097	197798	195317	194779	192244	190028	190299	188589	-1.5	0.5	-0.2	-0.2
- other industrial sectors	114492	113563	103085	107693	108660	110501	112167	112436	114258	116857	120479	-1.0	0.5	0.3	0.4
Residential	286291	311793	311545	311971	298542	299594	296933	298540	301009	303725	303245	0.8	-0.4	-0.1	0.1
Tertiary	166083	179768	187856	181930	172265	171368	167259	168215	169544	172346	172611	1.2	-0.9	-0.3	0.2
Transport	342901	368665	367191	371987	358443	352759	354602	354943	359206	362096	366986	0.7	-0.2	-0.1	0.2
by fuel															
Solids	61779	54424	49673	48396	46049	43058	41182	39790	37899	36225	34454	-2.2	-0.8	-1.1	-0.9
Oil	485890	502788	457366	440656	407882	391518	379332	370260	365014	363481	361555	-0.6	-1.1	-0.7	-0.2
Gas	266925	285438	269920	271580	251689	251363	248334	247896	247261	245785	249377	0.1	-0.7	-0.1	0.0
Electricity	217599	239418	245271	254509	254919	264128	275763	286183	299289	314052	323069	1.2	0.4	0.8	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55316	55781	56041	55856	56417	57242	58019	58386	1.5	0.4	0.0	0.2
Renewable energy forms	49480	56250	81825	100154	119123	123004	124620	124896	125946	125902	122809	5.2	3.8	0.5	-0.1
Other	0	0	0	67	264	428	652	935	1394	1858	2261	0.0	0.0	9.5	6.4
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194876**	**245063**	**264319**	**282449**	**299844**	**316529**	**330560**	**342242**	**5.4**	**5.1**	**1.4**	**1.0**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4624.2**	**4285.8**	**4111.8**	**3785.7**	**3540.4**	**3385.4**	**3208.5**	**3125.4**	**-0.7**	**-1.2**	**-1.2**	**-1.0**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.3	1903.9	1829.4	1603.2	1395.2	1265.6	1097.0	1017.9		-1.3	-1.7	-2.2
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.8	2382.0	2282.4	2182.5	2145.2	2119.8	2111.5	2107.5		-1.1	-0.9	-0.2
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3591.2**	**3254.6**	**3114.0**	**2872.9**	**2644.0**	**2503.9**	**2425.0**	**2357.1**	**-0.5**	**-1.5**	**-1.2**	**-1.0**
Power generation/District heating	1404.5	1483.1	1341.6	1201.0	1037.0	969.8	790.8	618.5	518.0	459.9	400.7	-0.5	-2.5	-2.7	-3.3
Energy Branch	170.1	174.2	159.8	149.8	139.4	130.8	124.3	116.3	110.5	106.1	103.4	-0.6	-1.4	-1.1	-0.9
Industry	693.6	640.7	520.3	538.9	508.4	492.9	483.8	457.0	433.4	425.6	424.0	-2.8	-0.2	-0.5	-0.7
Residential	461.0	491.2	457.9	430.8	392.4	379.8	359.2	350.0	339.2	332.2	323.2	-0.1	-1.5	-0.9	-0.5
Tertiary	255.7	266.4	249.2	220.6	195.4	181.5	159.5	151.7	144.9	140.5	137.5	-0.3	-2.4	-2.0	-0.7
Transport	1001.0	1082.7	1050.9	1050.1	982.0	959.3	955.3	950.4	958.0	960.7	968.4	0.5	-0.7	-0.3	0.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**277.8**	**238.5**	**225.6**	**210.1**	**105.5**	**84.2**	**-1.0**	**1.5**	**-1.4**	**-5.1**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**670.8**	**671.4**	**678.0**	**684.1**	**-1.5**	**-0.9**	**-1.2**	**0.1**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.4**	**75.4**	**72.3**	**66.6**	**62.3**	**59.6**	**56.4**	**55.0**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: REF2012tplusF			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.6	105.6	96.7	89.9	84.2	79.4	74.4	-1.2	-2.1	-1.9	-1.3
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.91	1.78	1.65	1.55	1.49	1.44	-0.7	-0.9	-0.9	-1.0
Import Dependency %	46.7	52.5	52.7	53.8	53.0	54.2	55.1	54.7	54.7	55.4	56.5				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.3	1716.1	1775.1	1847.1	1895.1	1961.5	2038.9	2100.2	3.4	1.9	0.7	0.6
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	11.1	10.6	10.2	9.9	9.6				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.3	85.4	81.1	76.9	73.3	70.8	68.3		-0.9	-1.2	-0.9
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	84.0	77.8	71.4	66.8	62.5	58.5	54.1	-0.5	-1.7	-1.6	-1.4
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	78.7	71.8	64.6	60.2	56.2	53.0	49.3	0.0	-2.4	-2.0	-1.3
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.1	29.0	26.8	25.5	24.8	24.3	24.0	-0.6	-1.6	-1.8	-0.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.8	44.2	41.9	40.4	39.4	38.4	37.7	37.1	0.3	-0.9	-0.9	-0.4
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.23	0.18	0.13	0.11	0.09	0.08	-1.6	-2.8	-3.2	-4.1
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.74	1.69	1.65	1.62	1.61	-0.8	-0.7	-0.5	-0.4
Industry	2.09	1.94	1.79	1.77	1.66	1.61	1.58	1.50	1.42	1.39	1.37	-1.5	-0.7	-0.5	-0.7
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.17	1.13	1.09	1.07	-0.9	-1.1	-0.8	-0.6
Tertiary	1.54	1.48	1.33	1.21	1.13	1.06	0.95	0.90	0.85	0.81	0.80	-1.5	-1.6	-1.7	-0.9
Transport	2.92	2.94	2.86	2.82	2.74	2.72	2.69	2.68	2.67	2.65	2.64	-0.2	-0.4	-0.2	-0.1
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.0	22.7	24.4	25.8	27.0	27.9	28.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.2	12.0	12.5	12.9	13.4	14.1				
Gross Electricity generation by source (in GWh$_e$	**3007267**	**3287285**	**3328110**	**3416143**	**3417103**	**3526993**	**3667044**	**3810604**	**3999241**	**4210248**	**4347499**	**1.0**	**0.3**	**0.7**	**0.9**
Nuclear energy	945027	997733	916685	887133	744275	700745	798536	868963	899072	923584	925368	-0.3	-2.1	0.7	0.7
Solids	933660	974939	830048	802985	695187	634705	475408	338823	316001	348162	364411	-1.2	-1.8	-3.7	-1.3
Oil (including refinery gas)	181203	141358	86851	46047	26351	24719	20367	20887	21379	22072	21396	-7.1	-11.2	-2.5	0.2
Gas (including derived gases)	514392	699743	795653	752612	707159	724245	738503	771635	789791	800906	787806	4.5	-1.2	0.4	0.3
Biomass-waste	46848	83787	145901	190537	221059	232213	244380	272146	315813	329348	341583	12.0	4.2	1.0	1.7
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383199	396304	408416	415190	418892	425350	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263519	493091	635340	771467	857183	909025	994478	1085475	21.0	12.7	4.6	1.7
Solar	118	1459	22363	96144	143662	176869	206134	250245	305813	332001	347866	68.9	20.4	3.7	2.7
Geothermal and other renewables	5358	5930	6831	8712	12116	14959	15945	22307	27156	40804	48243	2.5	5.9	2.8	5.7
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930091**	**1020608**	**1068184**	**1139437**	**1200565**	**1276176**	**1332501**	**1384829**	**2.6**	**2.0**	**1.1**	**1.0**
Nuclear energy	136924	134494	131323	123150	111162	96620	107067	115262	119221	122229	122236	-0.4	-1.7	-0.4	0.7
Renewable energy	114281	147780	226757	318900	439930	518253	583930	638972	695773	745304	788875	7.1	6.9	2.9	1.5
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122425	124880	128891	130589	132262	134472	1.0	0.7	0.3	0.4
Wind	12893	40510	84512	123698	206837	259330	306665	336105	356156	386066	416514	20.7	9.4	4.0	1.5
Solar	180	1740	29846	76309	110837	133698	149351	170783	205486	220708	230983	66.7	14.0	3.0	2.2
Other renewables (tidal etc.)	0	0	240	586	1655	2800	3033	3193	3542	6268	6906	0.0	21.3	6.2	4.2
Thermal power	398853	429386	480034	488042	469516	453312	448440	446331	461183	464968	473718	1.9	-0.2	-0.5	0.3
of which cogeneration units	92439	98998	101203	102082	112459	114394	114917	120643	127184	136115	138177	0.9	1.1	0.2	0.9
of which CCS units	0	0	0	0	904	904	1614	7554	18146	34422	38409	0.0	0.0	6.0	17.2
Solids fired	186470	180630	175756	163212	141533	121308	103796	90400	87684	86635	81361	-0.6	-2.1	-3.1	-1.2
Gas fired	129190	169054	224922	253067	259228	266067	280845	291675	296751	298216	302087	5.7	1.4	0.8	0.4
Oil fired	67499	59434	54039	42254	33187	27457	23519	19708	20759	19695	21359	-2.2	-4.8	-3.4	-0.5
Biomass-waste fired	15128	19615	24590	28716	34666	37570	39320	42903	53878	57521	65334	5.0	3.5	1.3	2.6
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	960	1645	2109	2901	3576	2.5	2.2	0.6	6.8
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.6	36.2	35.4	35.0	34.5	34.7	34.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.7	41.3	42.7	43.1	43.7	43.9	44.2				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.5	16.1	16.4	16.8	16.7	16.1				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.7	3.4	5.0	6.9				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.2	60.8	66.3	70.3	71.8	72.2	73.0				
- nuclear	31.4	30.4	27.5	26.0	21.8	19.9	21.8	22.8	22.5	21.9	21.3				
- renewable energy forms	14.4	14.4	21.0	27.1	36.4	40.9	44.6	47.5	49.3	50.2	51.7				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6756.2**	**7047.8**	**7494.3**	**7964.8**	**8291.0**	**8630.6**	**8887.9**	**9151.0**	**0.9**	**0.9**	**1.2**	**0.7**
Public road transport	519.6	527.2	512.8	531.4	550.2	574.3	600.9	620.7	642.2	656.8	671.8	-0.1	0.7	0.9	0.6
Private cars and motorcycles	4425.4	4694.5	4893.4	5053.0	5195.5	5454.8	5711.8	5881.1	6051.7	6176.6	6302.7	1.0	0.6	1.0	0.5
Rail	447.8	459.7	496.4	536.6	583.4	647.0	720.7	775.2	829.4	867.0	904.4	1.0	1.6	2.1	1.1
Aviation	459.7	530.7	525.6	595.7	677.8	775.3	886.4	967.5	1059.2	1138.1	1221.5	1.4	2.6	2.7	1.6
Inland navigation	41.7	39.5	38.1	39.4	41.0	42.9	45.0	46.6	48.1	49.4	50.6	-0.9	0.7	0.9	0.6
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.9**	**2937.3**	**3173.4**	**3426.8**	**3564.2**	**3709.0**	**3806.2**	**3904.6**	**1.1**	**1.7**	**1.6**	**0.7**
Trucks	1522.0	1803.3	1764.4	1921.1	2074.7	2232.5	2397.2	2492.9	2593.3	2659.8	2731.0	1.5	1.6	1.5	0.7
Rail	405.5	416.0	392.5	435.7	486.0	540.3	601.9	631.8	663.1	684.1	702.1	-0.3	2.2	2.2	0.8
Inland navigation	300.1	325.9	336.6	356.1	376.6	400.6	427.6	439.5	452.6	462.3	471.5	1.2	1.1	1.3	0.5
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369510**	**355913**	**350138**	**351907**	**352189**	**356402**	**359261**	**364112**	**0.7**	**-0.3**	**-0.1**	**0.2**
Public road transport	7580	7663	7522	7716	7793	7841	7915	7986	8113	8157	8235	-0.1	0.4	0.2	0.2
Private cars and motorcycles	178015	181818	182270	176044	157092	145691	141615	140285	140674	141079	142285	0.2	-1.5	-1.0	0.0
Trucks	95660	111643	112043	117814	120021	122576	127381	129214	131227	132138	133971	1.6	0.7	0.6	0.3
Rail	8093	7855	7399	7954	8553	9177	9823	9955	10003	9856	9635	-0.9	1.5	1.4	-0.1
Aviation	45492	50512	49820	53837	56062	58139	58115	57554	59065	60644	62563	0.9	1.2	0.4	0.4
Inland navigation	5973	6575	5892	6145	6392	6715	7059	7195	7320	7386	7423	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EEREF2012tp												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831603**	**807039**	**768617**	**759481**	**762551**	**773611**	**772270**	**756520**	**-1.2**	**-0.4**	**-0.6**	**0.0**
Solids	214627	196059	163855	149978	139407	124742	85254	68644	68188	65787	70844	-2.7	-1.6	-4.8	-0.9
Oil	176084	136469	103565	90791	77413	65119	55076	43039	33760	22939	16155	-5.2	-2.9	-3.3	-5.9
Natural gas	209437	190678	158525	149149	140909	124742	107197	99034	94013	82152	69868	-2.7	-1.2	-2.7	-2.1
Nuclear	243841	257516	236563	229092	192130	172826	184787	189566	194621	197371	194952	-0.3	-2.1	-0.4	0.3
Renewable energy sources	103944	123918	178977	212593	257179	281188	327166	362268	383030	404022	404702	5.6	3.7	2.4	1.1
Hydro	30818	26817	32208	31687	32181	33035	34543	35845	36525	36945	37347	0.4	0.0	0.7	0.4
Biomass & Waste	66071	84883	124361	136223	150582	151760	170091	174442	181727	186996	179818	6.5	1.9	1.2	0.3
Wind	1913	6058	12829	22662	42384	58213	74562	84338	88134	95665	100008	21.0	12.7	5.8	1.5
Solar and others	430	806	3691	14047	22785	28727	33075	38333	43412	46834	47258	24.0	20.0	3.8	1.8
Geothermal	4712	5354	5888	7974	9247	9453	14895	29310	33231	37582	40271	2.3	4.6	4.9	5.1
Net Imports	**829314**	**988719**	**956735**	**967983**	**909455**	**911750**	**890923**	**885671**	**892039**	**906624**	**937124**	**1.4**	**-0.5**	**-0.2**	**0.3**
Solids	98273	125211	110927	116118	94901	86721	75633	56766	46073	42460	48371	1.2	-1.5	-2.2	-2.2
Oil	535238	604030	563977	551740	527919	519052	515366	517145	518000	526469	531046	0.5	-0.7	-0.2	0.1
- Crude oil and Feedstocks	518046	585121	541240	527800	506550	496323	489514	488315	485583	488871	487639	0.4	-0.7	-0.3	0.0
- Oil products	17192	18909	22737	23940	21370	22729	25852	28830	32417	37597	43407	2.8	-0.6	1.9	2.6
Natural gas	193432	257849	276001	286216	266445	284172	273437	283704	297630	305955	326010	3.6	-0.4	0.3	0.9
Electricity	2029	1412	707	-129	-1602	-1507	-1492	-1742	-1819	-1880	-2103	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1746112**	**1660971**	**1622617**	**1590334**	**1585625**	**1601066**	**1611178**	**1622558**	**0.2**	**-0.6**	**-0.4**	**0.1**
Solids	321277	317986	280653	266096	234308	211463	160887	125410	114262	108248	119215	-1.3	-1.8	-3.7	-1.5
Oil	665142	683909	620735	589276	550730	528423	513078	501948	493067	489287	485218	-0.7	-1.2	-0.7	-0.3
Natural gas	396145	448380	444428	435148	406434	406912	377929	378376	385751	380511	386774	1.2	-0.9	-0.7	0.1
Nuclear	243841	257516	236563	229092	192130	172826	184787	189566	194621	197371	194952	-0.3	-2.1	-0.4	0.3
Electricity	2029	1412	707	-129	-1602	-1507	-1492	-1742	-1819	-1880	-2103	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226630	278971	304500	355144	392066	415184	437641	438502	5.9	4.2	2.4	1.1
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.0	10.1	7.9	7.1	6.7	7.3				
Oil	38.4	37.3	35.1	33.7	33.2	32.6	32.3	31.7	30.8	30.4	29.9				
Natural gas	22.9	24.5	25.1	24.9	24.5	25.1	23.8	23.9	24.1	23.6	23.8				
Nuclear	14.1	14.0	13.4	13.1	11.6	10.7	11.6	12.0	12.2	12.3	12.0				
Renewable energy forms	6.0	6.8	10.4	13.0	16.8	18.8	22.3	24.7	25.9	27.2	27.0				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3416273**	**3417499**	**3512449**	**3635152**	**3768975**	**4006180**	**4174632**	**4325409**	**1.0**	**0.3**	**0.6**	**0.9**
Self consumption and grid losses	396970	407042	377767	369057	352584	355557	360733	379366	423931	450668	490285	-0.5	-0.7	0.2	1.5
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383287**	**350708**	**332646**	**288803**	**277186**	**288098**	**292659**	**303342**	**0.8**	**-1.7**	**-1.9**	**0.2**
Solids	223038	228941	197605	186820	158055	139972	94843	63404	54962	53043	66290	-1.2	-2.2	-5.0	-1.8
Oil (including refinery gas)	40042	33244	20532	10882	5905	5166	4432	4145	3946	3881	3933	-6.5	-11.7	-2.8	-0.6
Gas (including derived gases)	102844	133713	149190	131875	124913	124644	107638	104907	112247	110239	109159	3.8	-1.8	-1.5	0.1
Biomass & Waste	14918	26452	45117	47734	55038	56010	69740	78362	86837	91211	86960	11.7	2.0	2.4	1.1
Geothermal heat	4114	4645	4828	5976	6796	6853	12149	26368	30105	34285	37000	1.6	3.5	6.0	5.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971267**	**907652**	**863046**	**853513**	**842500**	**833304**	**827128**	**817913**	**-0.7**	**-1.0**	**-0.6**	**-0.2**
Refineries	740500	763156	670015	646746	614553	592625	576768	564502	552799	545771	537607	-1.0	-0.9	-0.6	-0.4
Biofuels and hydrogen production	705	3101	13296	18232	26203	26358	26693	26752	26670	27518	28765	34.1	7.0	0.2	0.4
District heating	18667	19517	20813	22356	20225	19400	20165	19713	19207	18301	19022	1.1	-0.3	0.0	-0.3
Derived gases, cokeries etc.	316475	324348	297391	283933	246672	224664	229887	231533	234629	235539	232520	-0.6	-1.9	-0.7	0.1
Energy Branch Consumption	**86990**	**91952**	**88327**	**82441**	**77114**	**73358**	**69035**	**67496**	**68305**	**68067**	**69841**	**0.2**	**-1.3**	**-1.1**	**0.1**
Non-Energy Uses	**117117**	**120718**	**114884**	**119319**	**122303**	**121539**	**121555**	**121161**	**119760**	**119345**	**119914**	**-0.2**	**0.6**	**-0.1**	**-0.1**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170647**	**1135779**	**1128931**	**1122601**	**1123096**	**1133454**	**1140807**	**1146350**	**0.3**	**-0.2**	**-0.1**	**0.1**
by sector															
Industry	332412	330448	290978	304797	306480	305658	304669	303472	306200	306833	309171	-1.3	0.5	-0.1	0.1
- energy intensive industries	217920	216886	187894	197107	197778	195190	193640	191295	192262	189981	188173	-1.5	0.5	-0.2	-0.1
- other industrial sectors	114492	113563	103085	107689	108701	110468	111029	112177	113938	116852	120998	-1.0	0.5	0.2	0.4
Residential	286291	311793	311545	311942	298600	299525	296866	298046	300500	302878	302160	0.8	-0.4	-0.1	0.1
Tertiary	166083	179768	187856	181920	172256	171034	166580	167238	168512	171020	171155	1.2	-0.9	-0.3	0.1
Transport	342901	368665	367191	371988	358443	352714	354487	354340	358241	360076	363863	0.7	-0.2	-0.1	0.1
by fuel															
Solids	61779	54424	49673	48387	46039	43054	40853	39199	37796	35424	33225	-2.2	-0.8	-1.2	-1.0
Oil	485890	502788	457366	440593	407865	391561	379259	370256	364917	362479	359464	-0.6	-1.1	-0.7	-0.3
Gas	266925	285438	269920	271625	251721	251100	239185	241483	241473	238544	244010	0.1	-0.7	-0.5	0.1
Electricity	217599	239418	245271	254518	254958	263298	273814	283397	299364	311037	319921	1.2	0.4	0.7	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55313	55800	56261	57373	57090	57454	57545	56575	1.5	0.4	0.3	-0.1
Renewable energy forms	49480	56250	81825	100144	119133	123229	131465	130736	131057	133922	130898	5.2	3.8	1.0	0.0
Other	0	0	0	67	264	428	652	935	1394	1856	2257	0.0	0.0	9.5	6.4
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194777**	**245087**	**269100**	**315349**	**338256**	**357293**	**373697**	**372667**	**5.4**	**5.1**	**2.6**	**0.8**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4624.3**	**4285.9**	**4088.6**	**3657.4**	**3380.7**	**3093.8**	**2980.3**	**2920.6**	**-0.7**	**-1.2**	**-1.6**	**-1.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.6	1903.8	1806.5	1491.9	1244.5	981.4	885.9	826.5		-1.3	-2.4	-2.9
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.7	2382.1	2282.0	2165.6	2136.2	2112.4	2094.4	2094.2		-1.1	-0.9	-0.2
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3591.3**	**3254.7**	**3091.1**	**2748.3**	**2487.2**	**2316.4**	**2227.3**	**2173.0**	**-0.5**	**-1.5**	**-1.7**	**-1.2**
Power generation/District heating	1404.5	1483.1	1341.6	1201.3	1037.1	948.5	700.2	488.8	348.8	291.3	246.1	-0.5	-2.5	-3.9	-5.1
Energy Branch	170.1	174.2	159.8	149.8	139.5	130.2	118.8	113.4	108.9	104.9	102.7	-0.6	-1.4	-1.6	-0.7
Industry	693.6	640.7	520.3	538.8	508.3	491.3	454.5	432.6	417.1	400.8	401.0	-2.8	-0.2	-1.1	-0.6
Residential	461.0	491.2	457.9	430.8	392.4	379.8	359.1	349.9	339.1	332.2	323.2	-0.1	-1.5	-0.9	-0.5
Tertiary	255.7	266.4	249.2	220.6	195.5	182.1	160.7	153.8	147.1	143.1	140.3	-0.3	-2.4	-1.9	-0.7
Transport	1001.0	1082.7	1050.9	1050.1	982.0	959.2	955.0	948.7	955.3	955.1	959.7	0.5	-0.7	-0.3	0.0
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**277.5**	**234.8**	**222.7**	**106.0**	**75.0**	**63.6**	**-1.0**	**1.5**	**-1.5**	**-6.3**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**670.8**	**671.4**	**678.0**	**684.1**	**-1.5**	**-0.9**	**-1.2**	**0.1**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.4**	**75.4**	**71.9**	**64.3**	**59.5**	**54.4**	**52.4**	**51.4**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EEREF2012tp			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.6	105.0	95.4	88.7	83.6	78.5	73.9	-1.2	-2.1	-2.0	-1.3
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.90	1.73	1.57	1.45	1.38	1.34	-0.7	-0.9	-1.2	-1.3
Import Dependency %	46.7	52.5	52.7	53.8	53.0	54.3	54.0	53.7	53.6	54.0	55.3				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.2	1715.7	1777.9	1850.0	1900.7	1978.7	2042.6	2097.7	3.4	1.9	0.8	0.6
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	11.1	10.6	10.3	10.0	9.6				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.3	85.4	80.5	76.6	73.7	70.7	68.3		-0.9	-1.2	-0.8
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	84.0	77.8	71.4	66.7	62.4	58.3	53.9	-0.5	-1.7	-1.6	-1.4
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	78.7	71.7	64.3	59.8	55.9	52.6	48.9	0.0	-2.4	-2.0	-1.4
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.1	29.0	26.8	25.5	24.7	24.2	23.7	-0.6	-1.6	-1.8	-0.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.8	44.2	41.9	40.4	39.4	38.4	37.7	37.1	0.3	-0.9	-0.9	-0.4
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.16	0.11	0.07	0.06	0.05	-1.6	-2.8	-4.4	-5.8
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.72	1.68	1.64	1.61	1.59	-0.8	-0.7	-0.6	-0.4
Industry	2.09	1.94	1.79	1.77	1.66	1.61	1.49	1.43	1.36	1.31	1.30	-1.5	-0.8	-1.1	-0.7
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.17	1.13	1.10	1.07	-0.9	-1.1	-0.8	-0.6
Tertiary	1.54	1.48	1.33	1.21	1.13	1.06	0.96	0.92	0.87	0.84	0.82	-1.5	-1.5	-1.6	-0.8
Transport	2.92	2.94	2.86	2.82	2.74	2.72	2.69	2.68	2.67	2.65	2.64	-0.2	-0.4	-0.2	-0.1
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.0	23.2	27.3	29.2	30.5	31.6	31.3				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.2	12.2	12.9	13.2	13.8	14.3				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3416273**	**3417499**	**3512449**	**3635152**	**3768975**	**4006180**	**4174632**	**4325409**	**1.0**	**0.3**	**0.6**	**0.9**
Nuclear energy	945027	997733	916685	887134	744027	674641	728730	757233	793580	819198	830918	-0.3	-2.1	-0.2	0.7
Solids	933660	974939	830048	803284	694245	616329	423482	286975	279546	289864	383486	-1.2	-1.8	-4.8	-0.5
Oil (including refinery gas)	181203	141358	86851	46006	26248	24143	21609	21936	20680	21092	21014	-7.1	-11.3	-1.9	-0.1
Gas (including derived gases)	514392	699743	795653	752631	709359	712182	650916	656965	698438	685021	684939	4.5	-1.1	-0.9	0.3
Biomass-waste	46848	83787	145901	190393	220804	230831	301859	347900	395384	411046	386208	12.0	4.2	3.2	1.2
Hydro (pumping excluded)	358408	311883	374576	368453	374203	384124	401665	416802	424714	429587	434269	0.4	0.0	0.7	0.4
Wind	22253	70453	149202	263517	492833	676897	867003	980678	1024811	1112385	1162884	21.0	12.7	5.8	1.5
Solar	118	1459	22363	96144	143662	177766	215788	257904	316342	342089	352437	68.9	20.4	4.2	2.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	24101	42581	52683	64351	69255	2.5	5.9	7.1	5.4
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930079**	**1020452**	**1083464**	**1176138**	**1248640**	**1330980**	**1376611**	**1411747**	**2.6**	**2.0**	**1.4**	**0.9**
Nuclear energy	136924	134494	131323	123150	111162	96796	98875	100424	104980	108188	109688	-0.4	-1.7	-1.2	0.5
Renewable energy	114281	147780	226757	318900	439843	535831	627363	695178	751925	801282	828136	7.1	6.8	3.6	1.4
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122643	127080	132075	134547	136767	138749	1.0	0.7	0.5	0.4
Wind	12893	40510	84512	123698	206749	276105	342752	383896	402069	432537	449562	20.7	9.4	5.2	1.4
Solar	180	1740	29846	76309	110837	134048	153503	174390	208118	221989	229103	66.7	14.0	3.3	2.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	4029	4817	7192	9989	10722	0.0	21.3	9.3	5.0
Thermal power	398853	429386	480034	488029	469448	450838	449899	453037	474075	467141	473922	1.9	-0.2	-0.4	0.3
of which cogeneration units	92439	98998	101203	102095	112523	115228	121759	127854	135206	144381	147777	0.9	1.1	0.8	1.0
of which CCS units	0	0	0	0	904	904	1217	11168	46040	53428	76417	0.0	0.0	3.0	23.0
Solids fired	186470	180630	175756	163212	141533	120625	99240	84100	80329	76657	76662	-0.6	-2.1	-3.5	-1.3
Gas fired	129190	169054	224922	253067	259247	263993	272388	285689	296238	284709	282117	5.7	1.4	0.5	0.2
Oil fired	67499	59434	54039	42242	33119	27379	23315	19619	19190	19793	22407	-2.2	-4.8	-3.4	-0.2
Biomass-waste fired	15128	19615	24590	28716	34646	37931	53343	60129	74321	81430	87824	5.0	3.5	4.4	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1613	3500	3996	4551	4912	2.5	2.2	6.0	5.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.6	35.6	34.1	33.3	33.0	33.2	33.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.7	41.2	42.1	41.7	42.7	42.5	43.1				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.3	17.7	17.8	17.8	17.0	15.8				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	2.5	6.2	7.3	10.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.2	61.5	69.8	74.4	75.1	76.1	74.8				
- nuclear	31.4	30.4	27.5	26.0	21.8	19.2	20.0	20.1	19.8	19.6	19.2				
- renewable energy forms	14.4	14.4	21.0	27.1	36.4	42.3	49.8	54.3	55.3	56.5	55.6				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6756.2**	**7047.8**	**7493.9**	**7963.7**	**8283.6**	**8618.3**	**8861.3**	**9109.6**	**0.9**	**0.9**	**1.2**	**0.7**
Public road transport	519.6	527.2	512.8	531.4	550.2	574.4	601.0	621.5	643.4	659.5	675.8	-0.1	0.7	0.9	0.6
Private cars and motorcycles	4425.4	4694.5	4893.4	5053.0	5195.5	5454.7	5711.6	5879.5	6048.7	6170.1	6292.1	1.0	0.6	1.0	0.5
Rail	447.8	459.7	496.4	536.6	583.4	647.1	720.9	776.4	831.5	871.5	911.6	1.0	1.6	2.1	1.2
Aviation	459.7	530.7	525.6	595.7	677.8	774.9	885.2	959.4	1046.3	1110.3	1178.7	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.4	41.0	42.9	45.0	46.8	48.4	49.9	51.4	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.9**	**2937.3**	**3173.4**	**3426.4**	**3563.5**	**3708.0**	**3804.2**	**3902.3**	**1.1**	**1.7**	**1.6**	**0.7**
Trucks	1522.0	1803.3	1764.4	1921.1	2074.7	2232.5	2397.3	2493.0	2593.4	2659.9	2730.9	1.5	1.6	1.5	0.7
Rail	405.5	416.0	392.5	435.7	486.0	540.3	601.5	631.1	662.2	682.4	700.3	-0.3	2.2	2.2	0.8
Inland navigation	300.1	325.9	336.6	356.1	376.6	400.6	427.5	439.4	452.4	461.9	471.1	1.2	1.1	1.3	0.5
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369510**	**355913**	**350095**	**351819**	**351611**	**355469**	**357288**	**361034**	**0.7**	**-0.3**	**-0.1**	**0.1**
Public road transport	7580	7663	7522	7716	7793	7841	7917	7993	8124	8179	8267	-0.1	0.4	0.2	0.2
Private cars and motorcycles	178015	181818	182270	176044	157092	145688	141628	140278	140656	140994	142096	0.2	-1.5	-1.0	0.0
Trucks	95660	111643	112043	117814	120021	122573	127385	129218	131228	132137	133974	1.6	0.7	0.6	0.3
Rail	8093	7855	7399	7954	8553	9177	9818	9947	9991	9841	9620	-0.9	1.5	1.4	-0.1
Aviation	45492	50512	49820	53837	56062	58101	58010	56970	58131	58713	59598	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6145	6392	6715	7060	7206	7338	7423	7478	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE25DEC_c												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831444**	**803947**	**765326**	**741079**	**792186**	**865854**	**914808**	**969301**	**-1.2**	**-0.5**	**-0.8**	**1.4**
Solids	214627	196059	163855	149857	138706	123526	79364	75176	86364	85004	95055	-2.7	-1.7	-5.4	0.9
Oil	176084	136469	103565	90650	77089	63740	52994	38066	26283	15501	9717	-5.2	-2.9	-3.7	-8.1
Natural gas	209437	190678	158525	149175	139739	117107	98366	86336	77911	72198	62656	-2.7	-1.3	-3.4	-2.2
Nuclear	243841	257516	236563	229106	191457	180335	190315	216393	237802	246410	259453	-0.3	-2.1	-0.1	1.6
Renewable energy sources	103944	123918	178977	212656	256956	280618	320040	376215	437494	495696	542420	5.6	3.7	2.2	2.7
Hydro	30818	26817	32208	31687	32181	33025	34206	35763	36482	36980	37600	0.4	0.0	0.6	0.5
Biomass & Waste	66071	84883	124361	136284	150330	150673	162906	184375	212922	244428	268747	6.5	1.9	0.8	2.5
Wind	1913	6058	12829	22662	42397	59186	76354	87526	103384	113076	122446	21.0	12.7	6.1	2.4
Solar and others	430	806	3691	14049	22796	28247	34224	42054	51533	60737	65708	24.0	20.0	4.1	3.3
Geothermal	4712	5354	5888	7974	9252	9486	12350	26497	33173	40474	47919	2.3	4.6	2.9	7.0
Net Imports	**829314**	**988719**	**956735**	**967825**	**903668**	**875647**	**835281**	**771247**	**697164**	**652326**	**609655**	**1.4**	**-0.6**	**-0.8**	**-1.6**
Solids	98273	125211	110927	115959	93849	84961	66850	50931	42165	47070	54267	1.2	-1.7	-3.3	-1.0
Oil	535238	604030	563977	551776	526129	506067	490765	445719	380361	311606	250227	0.5	-0.7	-0.7	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527783	505240	486722	471795	436711	386824	335671	286898	0.4	-0.7	-0.7	-2.5
- Oil products	17192	18909	22737	23992	20889	19345	18970	9008	-6462	-24065	-36671	2.8	-0.8	-1.0	0.0
Natural gas	193432	257849	276001	286170	263551	262916	252177	243394	236661	248595	253511	3.6	-0.5	-0.4	0.0
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1740	-1818	-1879	-2096	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745803**	**1652199**	**1583545**	**1517682**	**1502789**	**1502564**	**1505976**	**1516655**	**0.2**	**-0.7**	**-0.8**	**0.0**
Solids	321277	317986	280653	265816	232554	208487	146214	126107	128529	132074	149323	-1.3	-1.9	-4.5	0.1
Oil	665142	683909	620735	589177	548720	514369	487727	427419	351879	273200	206253	-0.7	-1.2	-1.2	-4.2
Natural gas	396145	448380	444428	435128	402372	378032	347896	325453	308882	313541	307557	1.2	-1.0	-1.4	-0.6
Nuclear	243841	257516	236563	229106	191457	180335	190315	216393	237802	246410	259453	-0.3	-2.1	-0.1	1.6
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1740	-1818	-1879	-2096	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226705	278698	303830	347021	409159	477290	542631	596166	5.9	4.2	2.2	2.7
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.2	9.6	8.4	8.6	8.8	9.8				
Oil	38.4	37.3	35.1	33.7	33.2	32.5	32.1	28.4	23.4	18.1	13.6				
Natural gas	22.9	24.5	25.1	24.9	24.4	23.9	22.9	21.7	20.6	20.8	20.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.4	12.5	14.4	15.8	16.4	17.1				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.2	22.9	27.2	31.8	36.0	39.3				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415864**	**3392575**	**3433983**	**3521066**	**3877566**	**4497350**	**4933460**	**5378081**	**1.0**	**0.2**	**0.4**	**2.1**
Self consumption and grid losses	396970	407042	377767	368942	349448	346313	354118	384977	469412	537575	628480	-0.5	-0.8	0.1	2.9
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383167**	**347005**	**319581**	**263260**	**276844**	**318740**	**355937**	**387617**	**0.8**	**-1.8**	**-2.7**	**2.0**
Solids	223038	228941	197605	186548	156397	139728	83915	71852	83291	92584	113913	-1.2	-2.3	-6.0	1.5
Oil (including refinery gas)	40042	33244	20532	10903	5853	4753	3682	3106	2605	2131	1453	-6.5	-11.8	-4.5	-4.5
Gas (including derived gases)	102844	133713	149190	131882	122847	107176	93753	98940	105870	115096	114231	3.8	-1.9	-2.7	1.0
Biomass & Waste	14918	26452	45117	47857	55113	61019	72167	79529	91656	101837	106318	11.7	2.0	2.7	2.0
Geothermal heat	4114	4645	4828	5976	6796	6905	9744	23417	29558	36119	41961	1.6	3.5	3.7	7.6
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5760	8170	9741	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971028**	**905006**	**855510**	**834844**	**839867**	**831019**	**800692**	**783325**	**-0.7**	**-1.0**	**-0.8**	**-0.3**
Refineries	740500	763156	670015	646609	612971	581569	556452	505593	441463	375620	318228	-1.0	-0.9	-1.0	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24912	60738	102228	133347	162195	34.1	6.9	-0.4	9.8
District heating	18667	19517	20813	22253	20061	17368	17959	16226	13430	11832	12670	1.1	-0.4	-1.1	-1.7
Derived gases, cokeries etc.	316475	324348	297391	283945	245945	231217	235520	257309	273897	279893	290233	-0.6	-1.9	-0.4	1.0
Energy Branch Consumption	**86990**	**91952**	**88327**	**82420**	**76779**	**70555**	**65335**	**61094**	**59588**	**57117**	**57871**	**0.2**	**-1.4**	**-1.6**	**-0.6**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122348**	**121118**	**118980**	**116711**	**112934**	**111914**	**111803**	**-0.2**	**0.6**	**-0.3**	**-0.3**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170526**	**1129628**	**1091988**	**1064222**	**1027644**	**996806**	**976814**	**963921**	**0.3**	**-0.2**	**-0.6**	**-0.5**
by sector															
Industry	332412	330448	290978	304773	305551	296688	287661	275233	262820	258400	255269	-1.3	0.5	-0.6	-0.6
- energy intensive industries	217920	216886	187894	197085	197311	189748	182711	174499	167879	163910	159223	-1.5	0.5	-0.8	-0.7
- other industrial sectors	114492	113563	103085	107688	108240	106940	104950	100734	94941	94490	96046	-1.0	0.5	-0.3	-0.4
Residential	286291	311793	311545	311966	297301	287029	280591	270390	269207	267629	266350	0.8	-0.5	-0.6	-0.3
Tertiary	166083	179768	187856	181913	169791	164596	157477	154657	154035	152932	153116	1.2	-1.0	-0.8	-0.1
Transport	342901	368665	367191	371873	356986	343675	338492	327364	310744	297853	289186	0.7	-0.3	-0.5	-0.8
by fuel															
Solids	61779	54424	49673	48406	45963	41407	37989	32461	26404	21976	19050	-2.2	-0.8	-1.9	-3.4
Oil	485890	502788	457366	440511	406073	379371	357925	306473	247536	194098	145528	-0.6	-1.2	-1.3	-4.4
Gas	266925	285438	269920	271611	249818	241390	226204	197505	167812	146177	128524	0.1	-0.8	-1.0	-2.8
Electricity	217599	239418	245271	254494	253109	257380	264688	276023	299154	318899	336301	1.2	0.3	0.4	1.2
Heat (from CHP and District Heating)	46015	52355	53515	55297	55505	53991	55135	53738	54700	54578	55243	1.5	0.4	-0.1	0.0
Renewable energy forms	49480	56250	81825	100141	118900	117853	121427	146472	172345	204206	232560	5.2	3.8	0.2	3.3
Other	0	0	0	65	261	597	855	14970	28854	36880	46715	0.0	0.0	12.6	22.1
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194892**	**244883**	**266631**	**307278**	**353668**	**410539**	**463124**	**506893**	**5.4**	**5.1**	**2.3**	**2.5**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4622.9**	**4263.0**	**3966.6**	**3444.7**	**2814.6**	**2108.3**	**1679.8**	**1346.0**	**-0.7**	**-1.3**	**-2.1**	**-4.6**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.3	1890.3	1744.7	1371.1	1130.5	751.5	553.9	394.4		-1.4	-3.2	-6.0
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.6	2372.6	2221.9	2073.5	1684.1	1356.7	1125.9	951.7		-1.2	-1.3	-3.8
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.0**	**3231.8**	**2970.1**	**2538.8**	**2100.8**	**1608.9**	**1255.4**	**960.5**	**-0.5**	**-1.6**	**-2.4**	**-4.7**
Power generation/District heating	1404.5	1483.1	1341.6	1200.1	1025.1	904.7	609.5	443.4	248.2	141.8	61.6	-0.5	-2.7	-5.1	-10.8
Energy Branch	170.1	174.2	159.8	149.7	138.9	123.3	111.9	98.8	83.5	70.9	60.1	-0.6	-1.4	-2.1	-3.1
Industry	693.6	640.7	520.3	538.7	506.5	472.0	423.0	356.9	281.9	239.3	206.4	-2.8	-0.3	-1.8	-3.5
Residential	461.0	491.2	457.9	430.9	390.8	363.8	339.1	285.8	238.1	191.5	143.5	-0.1	-1.6	-1.4	-4.2
Tertiary	255.7	266.4	249.2	220.7	192.5	175.3	151.5	125.7	107.6	88.0	68.6	-0.3	-2.5	-2.4	-3.9
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.1	903.8	790.3	649.5	524.0	420.1	0.5	-0.7	-0.8	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.6**	**276.5**	**231.6**	**222.7**	**100.1**	**61.9**	**34.4**	**-1.0**	**1.5**	**-1.7**	**-9.1**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**75.0**	**69.8**	**60.6**	**49.5**	**37.1**	**29.6**	**23.7**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE25DEC_c			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.0	102.5	91.1	84.1	78.5	73.4	69.1	-1.2	-2.1	-2.4	-1.4
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.88	1.67	1.40	1.07	0.83	0.63	-0.7	-0.9	-1.6	-4.7
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	53.0	49.3	44.6	41.6	38.6				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.2	1710.7	1769.4	1863.4	1944.7	2100.4	2229.7	2353.1	3.4	1.9	0.9	1.2
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	11.2	10.9	11.0	10.9	10.7				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.0	82.9	76.0	69.4	63.3	59.6	56.4		-0.9	-1.8	-1.5
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	83.6	74.6	67.5	60.5	55.9	51.5	47.5	-0.5	-1.8	-2.1	-1.7
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	77.6	69.0	60.8	55.3	51.1	47.0	43.8	0.0	-2.5	-2.4	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.9	23.9	21.5	19.8	18.6	-0.6	-1.6	-2.1	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.5	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.14	0.10	0.05	0.03	0.01	-1.6	-2.9	-5.3	-12.4
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.52	1.28	1.07	0.87	-0.8	-0.7	-0.7	-3.3
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.47	1.30	1.07	0.93	0.81	-1.5	-0.8	-1.2	-2.9
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.06	0.88	0.72	0.54	-0.9	-1.1	-0.8	-4.0
Tertiary	1.54	1.48	1.33	1.21	1.13	1.07	0.96	0.81	0.70	0.58	0.45	-1.5	-1.6	-1.6	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.67	2.41	2.09	1.76	1.45	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.1	23.7	28.0	33.3	39.3	44.8	49.2				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	13.6	24.6	39.0	52.8	64.6				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3415864**	**3392575**	**3433983**	**3521066**	**3877566**	**4497350**	**4933460**	**5378081**	**1.0**	**0.2**	**0.4**	**2.1**
Nuclear energy	945027	997733	916685	887192	741418	704452	752816	874405	983767	1035489	1115566	-0.3	-2.1	0.2	2.0
Solids	933660	974939	830048	802058	685246	606329	359147	279629	355482	439716	580505	-1.2	-1.9	-6.3	2.4
Oil (including refinery gas)	181203	141358	86851	46072	26110	21836	17087	16396	13294	10941	7080	-7.1	-11.3	-4.2	-4.3
Gas (including derived gases)	514392	699743	795653	752907	695759	592916	548708	606114	654270	701570	741852	4.5	-1.3	-2.3	1.5
Biomass-waste	46848	83787	145901	190811	221073	245047	302579	343878	398663	436508	452663	12.0	4.2	3.2	2.0
Hydro (pumping excluded)	358408	311883	374576	368453	374203	384015	397739	415852	424213	429997	437204	0.4	0.0	0.6	0.5
Wind	22253	70453	149202	263516	492988	688212	887839	1017740	1202144	1314840	1423788	21.0	12.7	6.1	2.4
Solar	118	1459	22363	96144	143662	174692	232960	281339	384382	459385	497917	68.9	20.4	5.0	3.9
Geothermal and other renewables	5358	5930	6831	8712	12116	16485	22193	42213	51146	65067	78412	2.5	5.9	6.2	6.5
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	29989	39947	43095	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930134**	**1019630**	**1078153**	**1177866**	**1253288**	**1434303**	**1517723**	**1605698**	**2.6**	**2.0**	**1.5**	**1.6**
Nuclear energy	136924	134494	131323	123150	111162	96480	101529	115363	129789	136412	146220	-0.4	-1.7	-0.9	1.8
Renewable energy	114281	147780	226757	318900	439905	536700	641546	721130	857145	952070	1018172	7.1	6.9	3.8	2.3
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122569	125387	131897	134294	136796	139263	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	206812	279169	348044	394609	463825	504441	542322	20.7	9.4	5.3	2.2
Solar	180	1740	29846	76309	110837	131564	163724	188558	252207	301387	324358	66.7	14.0	4.0	3.5
Other renewables (tidal etc.)	0	0	240	586	1655	3397	4391	6066	6818	9446	12229	0.0	21.3	10.2	5.3
Thermal power	398853	429386	480034	488085	468562	444973	434790	416796	447369	429241	441306	1.9	-0.2	-0.7	0.1
of which cogeneration units	92439	98998	101203	102144	112030	112469	119635	124845	134219	141086	145414	0.9	1.0	0.7	1.0
of which CCS units	0	0	0	0	904	904	2914	17342	86936	140736	205417	0.0	0.0	12.4	23.7
Solids fired	186470	180630	175756	163212	141212	120935	103545	87105	95824	99277	105655	-0.6	-2.2	-3.1	0.1
Gas fired	129190	169054	224922	253079	258989	258688	258402	252743	266496	238259	236467	5.7	1.4	0.0	-0.4
Oil fired	67499	59434	54039	42257	32824	26311	22176	17903	15113	11806	10104	-2.2	-4.9	-3.8	-3.9
Biomass-waste fired	15128	19615	24590	28744	34635	38121	49373	55936	66012	75104	83510	5.0	3.5	3.6	2.7
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	917	1294	3109	3924	4795	5570	2.5	2.2	3.7	7.6
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.4	34.9	33.0	34.1	34.3	35.4	36.2				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.6	39.7	40.5	39.6	40.1	40.4	41.6				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.3	17.4	17.1	16.6	15.7	14.9				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.7	1.7	7.3	9.9	15.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.5	64.4	73.7	76.7	77.1	76.5	75.1				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.5	21.4	22.6	22.0	21.2	20.9				
- renewable energy forms	14.4	14.4	21.0	27.2	36.7	43.9	52.4	54.2	55.1	55.3	54.2				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7450.1**	**7866.6**	**8129.5**	**8371.8**	**8563.6**	**8768.3**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.5	603.5	624.3	649.7	666.0	688.2	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.0	5613.5	5719.4	5791.3	5857.5	5930.9	1.0	0.6	0.8	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.3	724.4	783.1	844.4	889.4	936.2	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	773.3	880.2	955.9	1037.7	1100.4	1161.1	1.4	2.6	2.6	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.1	46.9	48.7	50.3	51.8	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3385.1**	**3510.2**	**3635.2**	**3713.0**	**3799.7**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.9	2426.9	2502.0	2545.1	2598.4	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	607.2	639.9	674.4	698.6	719.9	-0.3	2.2	2.2	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.0	443.4	458.8	469.3	481.3	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341091**	**335882**	**324776**	**308209**	**295372**	**286747**	**0.7**	**-0.3**	**-0.5**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7808	7830	7417	7126	6765	6517	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141051	132491	123761	108956	98351	91716	0.2	-1.5	-1.7	-1.8
Trucks	95660	111643	112043	117988	118898	118269	120893	119505	116870	114453	112314	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9891	10058	10158	10059	9897	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	57978	57687	56798	57704	58264	58739	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6143	6387	6752	7090	7237	7394	7479	7564	-0.1	0.8	1.1	0.3

Source: PRIMES

EU28: EE28DEC_c												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831437**	**801762**	**755841**	**725478**	**752677**	**809776**	**844531**	**893883**	**-1.2**	**-0.5**	**-1.0**	**1.0**
Solids	214627	196059	163855	149869	138232	123154	90202	72964	82829	79852	87778	-2.7	-1.7	-4.2	-0.1
Oil	176084	136469	103565	90646	77048	63601	52502	37441	25814	15218	9563	-5.2	-2.9	-3.8	-8.2
Natural gas	209437	190678	158525	149171	139082	113313	91950	80998	72555	64788	56354	-2.7	-1.3	-4.1	-2.4
Nuclear	243841	257516	236563	229105	190830	179824	187307	202952	217736	222201	240338	-0.3	-2.1	-0.2	1.3
Renewable energy sources	103944	123918	178977	212646	256569	275950	303517	358323	410842	462472	499849	5.6	3.7	1.7	2.5
Hydro	30818	26817	32208	31687	32181	33018	34250	35506	36325	36829	37369	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136273	149839	148537	152949	174836	200774	226912	246363	6.5	1.9	0.2	2.4
Wind	1913	6058	12829	22662	42476	57343	72675	82478	95714	106730	114608	21.0	12.7	5.5	2.3
Solar and others	430	806	3691	14050	22800	27677	32338	39917	48264	54969	58808	24.0	20.0	3.6	3.0
Geothermal	4712	5354	5888	7974	9273	9375	11305	25586	29765	37033	42702	2.3	4.6	2.0	6.9
Net Imports	**829314**	**988719**	**956735**	**967839**	**900458**	**866965**	**807173**	**734965**	**658732**	**602199**	**548661**	**1.4**	**-0.6**	**-1.1**	**-1.9**
Solids	98273	125211	110927	115992	93136	88046	69163	49599	39910	41369	42222	1.2	-1.7	-2.9	-2.4
Oil	535238	604030	563977	551766	525490	503628	482210	434054	369310	302311	243972	0.5	-0.7	-0.9	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527775	504790	485072	465782	428610	379144	329168	282412	0.4	-0.7	-0.8	-2.5
- Oil products	17192	18909	22737	23990	20700	18556	16428	5444	-9835	-26856	-38440	2.8	-0.9	-2.3	0.0
Natural gas	193432	257849	276001	286167	261728	253924	231722	221579	213435	216501	214771	3.6	-0.5	-1.2	-0.4
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1741	-1819	-1881	-2097	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745811**	**1646805**	**1565378**	**1473972**	**1426998**	**1408053**	**1385572**	**1380243**	**0.2**	**-0.7**	**-1.1**	**-0.3**
Solids	321277	317986	280653	265860	231368	211199	159365	122563	122739	121221	130000	-1.3	-1.9	-3.7	-1.0
Oil	665142	683909	620735	589163	548041	511791	478681	415129	340359	263623	199845	-0.7	-1.2	-1.3	-4.3
Natural gas	396145	448380	444428	435120	399892	365248	321025	298299	280301	274037	262515	1.2	-1.1	-2.2	-1.0
Nuclear	243841	257516	236563	229105	190830	179824	187307	202952	217736	222201	240338	-0.3	-2.1	-0.2	1.3
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1741	-1819	-1881	-2097	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226691	278276	298824	329085	389798	448738	506371	549642	5.9	4.2	1.7	2.6
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.5	10.8	8.6	8.7	8.7	9.4				
Oil	38.4	37.3	35.1	33.7	33.3	32.7	32.5	29.1	24.2	19.0	14.5				
Natural gas	22.9	24.5	25.1	24.9	24.3	23.3	21.8	20.9	19.9	19.8	19.0				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	12.7	14.2	15.5	16.0	17.4				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.1	22.3	27.3	31.9	36.5	39.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415806**	**3378459**	**3399299**	**3466728**	**3677657**	**4190014**	**4551660**	**4935085**	**1.0**	**0.2**	**0.3**	**1.8**
Self consumption and grid losses	396970	407042	377767	368945	347832	345068	347652	361511	432009	490276	567575	-0.5	-0.8	0.0	2.5
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383216**	**344914**	**318554**	**268464**	**269109**	**303605**	**329854**	**352983**	**0.8**	**-1.9**	**-2.5**	**1.4**
Solids	223038	228941	197605	186589	155340	143922	99837	74431	84828	90376	104545	-1.2	-2.4	-4.3	0.2
Oil (including refinery gas)	40042	33244	20532	10888	5803	4686	3564	2920	2502	1907	1431	-6.5	-11.9	-4.8	-4.5
Gas (including derived gases)	102844	133713	149190	131898	121704	101946	87327	91534	97445	99960	99748	3.8	-2.0	-3.3	0.7
Biomass & Waste	14918	26452	45117	47866	55270	61147	68894	77562	87490	95746	99228	11.7	2.1	2.2	1.8
Geothermal heat	4114	4645	4828	5976	6796	6853	8842	22662	26372	32968	37446	1.6	3.5	2.7	7.5
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4967	8898	10585	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970995**	**903441**	**851671**	**823574**	**813426**	**796188**	**762278**	**747900**	**-0.7**	**-1.0**	**-0.9**	**-0.5**
Refineries	740500	763156	670015	646597	612472	579693	549709	496255	432678	368330	313275	-1.0	-0.9	-1.1	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24801	58617	96526	127165	152884	34.1	6.9	-0.5	9.5
District heating	18667	19517	20813	22232	19700	16928	17643	19353	19464	18876	20172	1.1	-0.5	-1.1	0.7
Derived gases, cokeries etc.	316475	324348	297391	283944	245240	229693	231421	239201	247520	247907	261570	-0.6	-1.9	-0.6	0.6
Energy Branch Consumption	**86990**	**91952**	**88327**	**82418**	**76623**	**70107**	**64646**	**59052**	**56495**	**53300**	**52898**	**0.2**	**-1.4**	**-1.7**	**-1.0**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122382**	**120824**	**118046**	**112393**	**107013**	**102441**	**99350**	**-0.2**	**0.6**	**-0.4**	**-0.9**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170503**	**1125938**	**1074992**	**1019819**	**971214**	**932494**	**900118**	**875831**	**0.3**	**-0.3**	**-1.0**	**-0.8**
by sector															
Industry	332412	330448	290978	304755	304156	290815	278346	256170	238416	225347	217675	-1.3	0.4	-0.9	-1.2
- energy intensive industries	217920	216886	187894	197065	196528	186844	178020	162912	152944	142970	133937	-1.5	0.5	-1.0	-1.4
- other industrial sectors	114492	113563	103085	107690	107628	103972	100326	93258	85471	82377	83738	-1.0	0.4	-0.7	-0.9
Residential	286291	311793	311545	311961	295956	279524	261677	248674	244598	238965	230897	0.8	-0.5	-1.2	-0.6
Tertiary	166083	179768	187856	181913	168844	160950	142207	140414	139763	138463	138593	1.2	-1.1	-1.7	-0.1
Transport	342901	368665	367191	371873	356983	343702	337590	325955	309718	297343	288666	0.7	-0.3	-0.6	-0.8
by fuel															
Solids	61779	54424	49673	48409	45883	40364	35492	27909	21324	16194	12956	-2.2	-0.8	-2.5	-4.9
Oil	485890	502788	457366	440538	405482	377234	349893	298038	240280	188670	142341	-0.6	-1.2	-1.5	-4.4
Gas	266925	285438	269920	271576	248550	234260	206680	177468	147177	124456	103580	0.1	-0.8	-1.8	-3.4
Electricity	217599	239418	245271	254489	252048	254540	260468	262824	281431	296228	312482	1.2	0.3	0.3	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55297	55197	52788	53266	56559	59270	59540	60160	1.5	0.3	-0.4	0.6
Renewable energy forms	49480	56250	81825	100128	118517	115209	113098	134845	157626	183641	205790	5.2	3.8	-0.5	3.0
Other	0	0	0	65	261	597	922	13571	25387	31390	38522	0.0	0.0	13.4	20.5
RES in Gross Final Energy Consumption (A)	**88147**	**104692**	**149354**	**194992**	**244149**	**261570**	**290397**	**334459**	**385558**	**431496**	**468980**	**5.4**	**5.0**	**1.7**	**2.4**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.0**	**4250.0**	**3940.0**	**3431.6**	**2718.0**	**2031.0**	**1605.5**	**1250.7**	**-0.7**	**-1.3**	**-2.1**	**-4.9**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.7	1881.1	1740.8	1427.5	1106.0	738.9	542.1	360.3		-1.5	-2.7	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.3	2368.8	2199.2	2004.1	1612.0	1292.2	1063.4	890.4		-1.2	-1.7	-4.0
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.1**	**3218.9**	**2944.3**	**2519.7**	**2006.2**	**1518.8**	**1169.6**	**864.8**	**-0.5**	**-1.6**	**-2.4**	**-5.2**
Power generation/District heating	1404.5	1483.1	1341.6	1200.3	1017.4	908.1	668.7	445.7	256.1	156.1	69.3	-0.5	-2.7	-4.1	-10.7
Energy Branch	170.1	174.2	159.8	149.7	138.8	122.2	111.3	95.4	79.6	66.4	54.8	-0.6	-1.4	-2.2	-3.5
Industry	693.6	640.7	520.3	538.7	504.2	461.7	414.3	328.4	248.9	199.2	160.9	-2.8	-0.3	-1.9	-4.6
Residential	461.0	491.2	457.9	430.9	389.0	351.9	307.1	247.6	200.2	155.0	107.1	-0.1	-1.6	-2.3	-5.1
Tertiary	255.7	266.4	249.2	220.7	191.4	169.2	118.0	103.9	88.4	71.2	54.8	-0.3	-2.6	-4.7	-3.8
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.2	900.3	785.1	645.7	521.7	417.9	0.5	-0.7	-0.8	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.7**	**237.6**	**220.8**	**113.0**	**73.4**	**34.8**	**-1.0**	**1.5**	**-1.4**	**-9.2**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.8**	**69.3**	**60.4**	**47.8**	**35.7**	**28.2**	**22.0**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE28DEC_c			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.6	101.3	88.4	79.9	73.5	67.5	62.9	-1.2	-2.2	-2.6	-1.7
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.71	1.41	1.08	0.84	0.63	-0.7	-0.9	-1.3	-4.9
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	52.7	49.4	44.9	41.6	38.0				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.2	1709.7	1767.4	1864.0	1942.9	2094.0	2223.3	2340.1	3.4	1.9	0.9	1.1
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.4	11.2	10.9	10.9	10.8	10.7				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.6	81.2	73.6	64.6	57.4	52.0	48.1		-1.0	-2.1	-2.1
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	83.2	72.6	62.9	55.6	50.8	46.0	41.2	-0.5	-1.8	-2.8	-2.1
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	77.2	67.4	54.9	50.2	46.4	42.6	39.6	0.0	-2.6	-3.3	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.8	23.7	21.4	19.7	18.6	-0.6	-1.6	-2.1	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.5	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.16	0.10	0.05	0.03	0.01	-1.6	-2.9	-4.2	-12.1
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.51	1.27	1.05	0.85	-0.8	-0.7	-0.7	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.49	1.28	1.04	0.88	0.74	-1.5	-0.8	-1.1	-3.4
Residential	1.61	1.58	1.47	1.38	1.31	1.26	1.17	1.00	0.82	0.65	0.46	-0.9	-1.1	-1.1	-4.5
Tertiary	1.54	1.48	1.33	1.21	1.13	1.05	0.83	0.74	0.63	0.51	0.40	-1.5	-1.6	-3.1	-3.6
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.67	2.41	2.08	1.75	1.45	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.1	23.7	27.7	33.4	39.5	45.3	50.1				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	13.7	24.9	39.4	53.4	65.2				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3415806**	**3378459**	**3399299**	**3466728**	**3677657**	**4190014**	**4551660**	**4935085**	**1.0**	**0.2**	**0.3**	**1.8**
Nuclear energy	945027	997733	916685	887191	738989	702340	740054	816776	896746	928842	1031485	-0.3	-2.1	0.0	1.7
Solids	933660	974939	830048	802211	680083	629832	432779	288140	349610	413849	527273	-1.2	-2.0	-4.4	1.0
Oil (including refinery gas)	181203	141358	86851	45943	25921	21502	16650	15385	12995	9758	5890	-7.1	-11.4	-4.3	-5.1
Gas (including derived gases)	514392	699743	795653	752725	688399	562102	508135	550300	591950	622355	631414	4.5	-1.4	-3.0	1.1
Biomass-waste	46848	83787	145901	190910	221182	246702	288607	330875	376774	399427	416538	12.0	4.2	2.7	1.9
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383935	398253	412865	422378	428244	434522	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263517	493905	666774	845061	959050	1112954	1241041	1332651	21.0	12.7	5.5	2.3
Solar	118	1459	22363	96144	143662	170576	218794	264894	358113	413029	443996	68.9	20.4	4.3	3.6
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	18395	39374	44906	55857	67319	2.5	5.9	4.3	6.7
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	23588	39255	43996	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930139**	**1019358**	**1060619**	**1144729**	**1201223**	**1350698**	**1414248**	**1479188**	**2.6**	**2.0**	**1.2**	**1.3**
Nuclear energy	136924	134494	131323	123150	111162	95269	99226	107997	118651	122740	135749	-0.4	-1.7	-1.1	1.6
Renewable energy	114281	147780	226757	318900	440313	522735	614650	686494	805206	887091	941755	7.1	6.9	3.4	2.2
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122535	125565	131188	133642	136131	138195	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207219	268269	330274	371379	429150	474066	506362	20.7	9.4	4.8	2.2
Solar	180	1740	29846	76309	110837	128896	155543	178669	236628	269739	287359	66.7	14.0	3.4	3.1
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3268	5258	5785	7154	9839	0.0	21.3	7.0	5.7
Thermal power	398853	429386	480034	488089	467884	442615	430853	406733	426841	404417	401685	1.9	-0.3	-0.8	-0.3
of which cogeneration units	92439	98998	101203	102206	111262	111094	114309	120483	126026	128250	131587	0.9	1.0	0.3	0.7
of which CCS units	0	0	0	0	904	904	1783	16078	78375	121021	176213	0.0	0.0	7.0	25.8
Solids fired	186470	180630	175756	163212	141039	120703	102985	87183	93454	94747	99301	-0.6	-2.2	-3.1	-0.2
Gas fired	129190	169054	224922	253085	258726	256881	258153	246702	252869	226531	212698	5.7	1.4	0.0	-1.0
Oil fired	67499	59434	54039	42254	32648	26149	22149	17516	14575	11145	9053	-2.2	-4.9	-3.8	-4.4
Biomass-waste fired	15128	19615	24590	28744	34568	37972	46393	52324	62443	67618	75663	5.0	3.5	3.0	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1174	3009	3501	4376	4971	2.5	2.2	2.7	7.5
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.3	35.1	33.3	33.8	34.0	35.1	36.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.5	39.6	40.3	38.7	39.3	39.7	40.7				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.1	16.9	16.8	16.7	15.5	14.6				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.4	6.4	9.5	13.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.7	64.3	72.4	76.8	77.1	76.8	76.2				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.7	21.3	22.2	21.5	20.6	21.1				
- renewable energy forms	14.4	14.4	21.0	27.2	36.9	43.6	51.0	54.6	55.6	56.2	55.1				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7450.5**	**7862.8**	**8125.9**	**8368.6**	**8567.1**	**8778.8**	**0.9**	**0.9**	**1.1**	**0.6**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.5	603.3	624.3	650.1	666.0	687.8	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.1	5606.3	5714.1	5784.8	5856.4	5936.6	1.0	0.6	0.8	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.2	724.1	783.0	844.4	888.8	934.7	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	773.7	884.0	957.6	1040.6	1105.8	1168.1	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.9	48.6	50.2	51.7	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3385.8**	**3510.3**	**3635.2**	**3713.3**	**3801.1**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.7	2426.9	2502.0	2545.1	2599.1	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.0	640.0	674.4	698.8	720.4	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.5	458.8	469.4	481.5	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341130**	**335023**	**323408**	**307230**	**294916**	**286281**	**0.7**	**-0.3**	**-0.6**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7808	7826	7413	7123	6756	6497	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141053	131328	122232	107730	97534	90905	0.2	-1.5	-1.8	-1.8
Trucks	95660	111643	112043	117988	118898	118269	120885	119497	116860	114419	112190	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9900	10061	10161	10062	9908	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58016	57997	56968	57966	58674	59224	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6143	6387	6752	7087	7237	7390	7472	7558	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE30EC_c											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831440**	**799875**	**743685**	**701180**	**705973**	**762343**	**788381**	**831896**	**-1.2**	**-0.5**	**-1.3**	**0.9**
Solids	214627	196059	163855	149881	137862	122299	91633	70653	78043	73804	81348	-2.7	-1.7	-4.0	-0.6
Oil	176084	136469	103565	90646	77001	63361	51913	36860	25431	15030	9475	-5.2	-2.9	-3.9	-8.2
Natural gas	209437	190678	158525	149167	138308	109242	86359	72823	66612	60095	52276	-2.7	-1.4	-4.6	-2.5
Nuclear	243841	257516	236563	229104	190370	178631	178835	186348	197044	199502	220234	-0.3	-2.1	-0.6	1.0
Renewable energy sources	103944	123918	178977	212643	256335	270153	292441	339288	395213	439951	468564	5.6	3.7	1.3	2.4
Hydro	30818	26817	32208	31687	32181	33015	34057	35347	36238	36724	37241	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136270	149552	144438	147330	164985	192847	216951	232725	6.5	1.9	-0.1	2.3
Wind	1913	6058	12829	22663	42529	56256	70034	79190	91665	101234	107079	21.0	12.7	5.1	2.1
Solar and others	430	806	3691	14049	22800	27188	30766	37543	45490	50444	52829	24.0	20.0	3.0	2.7
Geothermal	4712	5354	5888	7974	9272	9255	10254	22224	28973	34597	38691	2.3	4.6	1.0	6.9
Net Imports	**829314**	**988719**	**956735**	**967865**	**896858**	**851897**	**781960**	**703647**	**622500**	**568983**	**516147**	**1.4**	**-0.6**	**-1.4**	**-2.1**
Solids	98273	125211	110927	115986	92085	88383	69208	48698	34135	34684	37988	1.2	-1.8	-2.8	-3.0
Oil	535238	604030	563977	551783	524921	499562	474115	424096	360728	296187	241093	0.5	-0.7	-1.0	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527785	504377	482326	460142	421475	373059	324755	280194	0.4	-0.7	-0.9	-2.4
- Oil products	17192	18909	22737	23998	20544	17236	13972	2621	-12331	-28568	-39101	2.8	-1.0	-3.8	0.0
Natural gas	193432	257849	276001	286182	259779	243145	215430	202788	192843	197665	191804	3.6	-0.6	-1.9	-0.6
Electricity	2029	1412	707	-129	-1603	-1508	-1489	-1740	-1816	-1876	-2084	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745840**	**1641318**	**1538154**	**1424462**	**1348976**	**1324389**	**1296206**	**1285743**	**0.2**	**-0.7**	**-1.4**	**-0.5**
Solids	321277	317986	280653	265867	229947	210682	160840	119352	112178	108488	119336	-1.3	-2.0	-3.5	-1.5
Oil	665142	683909	620735	589181	547424	507485	469996	404589	331395	257310	196877	-0.7	-1.2	-1.5	-4.3
Natural gas	396145	448380	444428	435131	397168	350396	299142	271333	253765	250508	235469	1.2	-1.1	-2.8	-1.2
Nuclear	243841	257516	236563	229104	190370	178631	178835	186348	197044	199502	220234	-0.3	-2.1	-0.6	1.0
Electricity	2029	1412	707	-129	-1603	-1508	-1489	-1740	-1816	-1876	-2084	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226686	278011	292467	317138	369094	431823	482274	515911	5.9	4.2	1.3	2.5
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.7	11.3	8.8	8.5	8.4	9.3				
Oil	38.4	37.3	35.1	33.7	33.4	33.0	33.0	30.0	25.0	19.9	15.3				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.8	21.0	20.1	19.2	19.3	18.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.6	12.6	13.8	14.9	15.4	17.1				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.0	22.3	27.4	32.6	37.2	40.1				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415901**	**3364258**	**3354597**	**3345224**	**3477585**	**3928955**	**4229680**	**4560022**	**1.0**	**0.1**	**-0.1**	**1.6**
Self consumption and grid losses	396970	407042	377767	368960	346100	341018	327452	325368	369662	414848	477805	-0.5	-0.9	-0.6	1.9
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383240**	**342669**	**314342**	**262790**	**250347**	**285890**	**309431**	**324588**	**0.8**	**-2.0**	**-2.6**	**1.1**
Solids	223038	228941	197605	186586	154012	144346	103084	72208	76026	79294	94598	-1.2	-2.5	-3.9	-0.4
Oil (including refinery gas)	40042	33244	20532	10887	5748	4534	3408	2846	2364	1856	1411	-6.5	-12.0	-5.1	-4.3
Gas (including derived gases)	102844	133713	149190	131885	120828	98403	80926	81726	88245	92479	85378	3.8	-2.1	-3.9	0.3
Biomass & Waste	14918	26452	45117	47906	55284	60204	67359	73896	88093	96433	99088	11.7	2.1	2.0	1.9
Geothermal heat	4114	4645	4828	5976	6796	6853	8014	19671	26030	31164	34353	1.6	3.5	1.7	7.5
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5133	8204	9760	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971007**	**902315**	**846802**	**808194**	**784669**	**760011**	**723080**	**711920**	**-0.7**	**-1.0**	**-1.1**	**-0.6**
Refineries	740500	763156	670015	646610	612017	576578	543143	488133	425887	363546	310943	-1.0	-0.9	-1.2	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24665	56942	93286	121756	146384	34.1	6.9	-0.5	9.3
District heating	18667	19517	20813	22233	19528	16633	17491	16697	15087	13577	13157	1.1	-0.6	-1.1	-1.4
Derived gases, cokeries etc.	316475	324348	297391	283943	244740	228234	222894	222898	225752	224200	241436	-0.6	-1.9	-0.9	0.4
Energy Branch Consumption	**86990**	**91952**	**88327**	**82420**	**76470**	**69593**	**63435**	**57201**	**52873**	**49874**	**49702**	**0.2**	**-1.4**	**-1.9**	**-1.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119319**	**122388**	**120219**	**115589**	**108895**	**103746**	**99548**	**98032**	**-0.2**	**0.6**	**-0.6**	**-0.8**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170516**	**1122037**	**1051763**	**982544**	**921756**	**879825**	**844651**	**818430**	**0.3**	**-0.3**	**-1.3**	**-0.9**
by sector															
Industry	332412	330448	290978	304758	303324	288362	272460	249504	231894	219876	215796	-1.3	0.4	-1.1	-1.2
- energy intensive industries	217920	216886	187894	197068	196069	185031	172991	156761	146989	137759	132040	-1.5	0.4	-1.2	-1.3
- other industrial sectors	114492	113563	103085	107691	107255	103331	99469	92743	84905	82117	83757	-1.0	0.4	-0.8	-0.9
Residential	286291	311793	311545	311965	293837	265513	244073	224369	217458	208100	194938	0.8	-0.6	-1.8	-1.1
Tertiary	166083	179768	187856	181919	167895	154151	129807	123577	122353	120513	119851	1.2	-1.1	-2.5	-0.4
Transport	342901	368665	367191	371873	356981	343737	336203	324307	308120	296163	287844	0.7	-0.3	-0.6	-0.8
by fuel															
Solids	61779	54424	49673	48418	45836	39463	33608	26598	20367	15504	12819	-2.2	-0.8	-3.1	-4.7
Oil	485890	502788	457366	440563	404972	373700	343639	290716	234082	184001	140138	-0.6	-1.2	-1.6	-4.4
Gas	266925	285438	269920	271582	246780	223631	192715	162950	132572	111236	92936	0.1	-0.9	-2.4	-3.6
Electricity	217599	239418	245271	254495	250988	251095	251802	250167	267207	280010	293861	1.2	0.2	0.0	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55298	54920	52113	52793	52191	54294	53734	52884	1.5	0.3	-0.4	0.0
Renewable energy forms	49480	56250	81825	100093	118281	111163	107002	126549	148234	171980	191234	5.2	3.8	-1.0	2.9
Other	0	0	0	65	261	597	984	12586	23069	28187	34558	0.0	0.0	14.2	19.5
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194862**	**244210**	**255521**	**279728**	**318093**	**370608**	**410496**	**439323**	**5.4**	**5.0**	**1.4**	**2.3**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.1**	**4235.7**	**3892.8**	**3407.3**	**2708.3**	**1990.8**	**1554.3**	**1219.1**	**-0.7**	**-1.3**	**-2.2**	**-5.0**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.4	1872.2	1731.4	1454.7	1147.7	750.6	532.2	360.2		-1.5	-2.5	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.8	2363.5	2161.4	1952.6	1560.6	1240.2	1022.1	858.9		-1.2	-1.9	-4.0
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.2**	**3204.7**	**2897.3**	**2464.6**	**1990.7**	**1472.4**	**1107.6**	**826.3**	**-0.5**	**-1.6**	**-2.6**	**-5.3**
Power generation/District heating	1404.5	1483.1	1341.6	1200.2	1009.5	901.1	674.8	481.7	269.4	143.8	63.3	-0.5	-2.8	-3.9	-11.2
Energy Branch	170.1	174.2	159.8	149.7	138.5	121.4	109.5	95.3	77.3	64.8	54.2	-0.6	-1.4	-2.3	-3.5
Industry	693.6	640.7	520.3	538.8	502.9	457.8	404.1	330.8	240.3	193.9	164.4	-2.8	-0.3	-2.2	-4.4
Residential	461.0	491.2	457.9	430.9	385.4	326.6	276.3	216.0	170.7	127.9	84.2	-0.1	-1.7	-3.3	-5.8
Tertiary	255.7	266.4	249.2	220.7	190.4	159.0	104.6	88.2	75.2	59.9	45.5	-0.3	-2.7	-5.8	-4.1
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.3	895.3	778.7	639.6	517.4	414.7	0.5	-0.7	-0.9	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.6**	**268.3**	**226.5**	**119.1**	**84.2**	**41.6**	**-1.0**	**1.5**	**-0.2**	**-8.9**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**68.5**	**59.9**	**47.6**	**35.0**	**27.3**	**21.4**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)															EU28: EE30EC_c
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.2	99.6	85.5	75.5	69.2	63.2	58.6	-1.2	-2.2	-2.9	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.73	1.48	1.11	0.85	0.64	-0.7	-0.9	-1.2	-4.8
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	52.7	49.9	45.0	41.9	38.3				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.1	1706.9	1771.5	1888.5	1974.9	2129.8	2295.3	2413.1	3.4	1.9	1.0	1.2
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	11.3	11.1	11.1	11.2	11.0				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.3	80.5	72.0	63.0	55.8	50.7	47.7		-1.0	-2.2	-2.0
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.6	69.0	58.7	50.2	45.2	40.1	34.7	-0.5	-1.9	-3.4	-2.6
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.7	64.6	50.1	44.2	40.6	37.1	34.2	0.0	-2.6	-4.2	-1.9
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.7	23.5	21.2	19.7	18.5	-0.6	-1.6	-2.2	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.24	0.22	0.17	0.12	0.06	0.03	0.01	-1.6	-3.0	-3.8	-12.3
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.53	1.28	1.06	0.87	-0.8	-0.7	-0.7	-3.3
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.48	1.33	1.04	0.88	0.76	-1.5	-0.8	-1.1	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.23	1.13	0.96	0.78	0.61	0.43	-0.9	-1.1	-1.5	-4.7
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.81	0.71	0.61	0.50	0.38	-1.5	-1.6	-3.4	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.40	2.08	1.75	1.44	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.2	23.6	27.7	33.6	40.5	46.3	50.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.0	25.5	40.3	54.3	66.0				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415901**	**3364258**	**3354597**	**3345224**	**3477585**	**3928955**	**4229680**	**4560022**	**1.0**	**0.1**	**-0.1**	**1.6**
Nuclear energy	945027	997733	916685	887185	737206	697551	703936	745532	805231	828021	942094	-0.3	-2.2	-0.5	1.5
Solids	933660	974939	830048	802248	672875	633340	445974	290407	296392	343369	460318	-1.2	-2.1	-4.0	0.2
Oil (including refinery gas)	181203	141358	86851	46138	25643	21236	15863	15003	12161	9521	6818	-7.1	-11.5	-4.7	-4.1
Gas (including derived gases)	514392	699743	795653	752506	682930	535702	461222	485358	527364	561565	537679	4.5	-1.5	-3.8	0.8
Biomass-waste	46848	83787	145901	190998	221100	243967	279555	316897	383126	404743	419314	12.0	4.2	2.4	2.0
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383900	396014	411008	421373	427027	433031	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263517	494523	654141	814344	920816	1065871	1177141	1245105	21.0	12.7	5.1	2.1
Solar	118	1459	22363	96144	143662	169222	210907	256819	347455	389884	415082	68.9	20.4	3.9	3.4
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	17408	35745	44467	52941	58842	2.5	5.9	3.7	6.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	25514	35468	41738	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930117**	**1019066**	**1051883**	**1118578**	**1159634**	**1289256**	**1335777**	**1381991**	**2.6**	**2.0**	**0.9**	**1.1**
Nuclear energy	136924	134494	131323	123150	111162	94547	95440	99378	106810	109859	124496	-0.4	-1.7	-1.5	1.3
Renewable energy	114281	147780	226757	318900	440528	516836	598131	666532	779590	847363	887761	7.1	6.9	3.1	2.0
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122519	124892	129931	133343	135775	137741	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207434	263223	319570	357961	412770	451631	475383	20.7	9.4	4.4	2.0
Solar	180	1740	29846	76309	110837	128059	150414	173458	227705	253137	266843	66.7	14.0	3.1	2.9
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3256	5182	5772	6819	7794	0.0	21.3	7.0	4.5
Thermal power	398853	429386	480034	488067	467376	440499	425007	393724	402856	378555	369733	1.9	-0.3	-0.9	-0.7
of which cogeneration units	92439	98998	101203	102193	110999	110785	112357	116951	122443	123037	127535	0.9	0.9	0.1	0.6
of which CCS units	0	0	0	0	904	904	929	7041	54353	109237	152359	0.0	0.0	0.3	29.0
Solids fired	186470	180630	175756	163212	140915	120678	101809	84889	86940	86592	90109	-0.6	-2.2	-3.2	-0.6
Gas fired	129190	169054	224922	253060	258508	255100	253809	236957	233930	208106	189793	5.7	1.4	-0.2	-1.4
Oil fired	67499	59434	54039	42258	32481	25979	21937	17295	14324	10933	8658	-2.2	-5.0	-3.8	-4.5
Biomass-waste fired	15128	19615	24590	28745	34570	37832	46389	51971	64207	68787	76613	5.0	3.5	3.0	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1064	2612	3455	4137	4560	2.5	2.2	1.7	7.5
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	35.0	32.9	33.1	33.5	34.7	35.8				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.5	39.7	38.8	38.4	38.7	39.9				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.1	17.0	16.8	17.1	15.9	15.1				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.5	3.5	7.4	11.8				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.9	64.5	72.4	77.3	78.6	78.2	77.8				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.8	21.0	21.4	20.6	19.7	20.9				
- renewable energy forms	14.4	14.4	21.0	27.2	37.0	43.7	51.4	55.8	58.0	58.5	56.9				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7451.1**	**7855.0**	**8124.7**	**8368.9**	**8550.3**	**8780.6**	**0.9**	**0.9**	**1.1**	**0.6**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.4	603.4	623.9	650.1	668.2	688.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.2	5595.7	5706.9	5781.9	5833.5	5930.2	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.1	724.0	782.0	843.7	890.5	934.3	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	774.4	887.0	965.1	1044.6	1108.1	1176.5	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.7	48.5	50.1	51.5	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.0**	**3510.6**	**3635.4**	**3713.0**	**3801.7**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.6	2426.9	2502.1	2544.8	2599.7	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.2	640.2	674.5	698.7	720.5	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.5	458.8	469.4	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341190**	**333676**	**321809**	**305674**	**293781**	**285504**	**0.7**	**-0.3**	**-0.6**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7807	7827	7408	7126	6777	6497	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141057	129744	120077	105833	96151	89639	0.2	-1.5	-1.9	-1.8
Trucks	95660	111643	112043	117988	118898	118270	120880	119493	116856	114368	112069	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9902	10060	10154	10066	9912	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58073	58237	57543	58324	58951	59842	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6387	6751	7086	7228	7382	7469	7546	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE32DEC_c												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831468**	**799964**	**740446**	**686479**	**697777**	**753848**	**786422**	**826944**	**-1.2**	**-0.5**	**-1.5**	**0.9**
Solids	214627	196059	163855	149901	137886	121487	92642	71589	77783	74783	80855	-2.7	-1.7	-3.9	-0.7
Oil	176084	136469	103565	90643	77000	63188	51467	36453	24996	14671	9255	-5.2	-2.9	-3.9	-8.2
Natural gas	209437	190678	158525	149164	138410	108293	82862	72235	66426	60400	52290	-2.7	-1.3	-5.0	-2.3
Nuclear	243841	257516	236563	229106	190341	178241	171298	181853	195667	202321	222536	-0.3	-2.2	-1.0	1.3
Renewable energy sources	103944	123918	178977	212653	256326	269236	288211	335647	388977	434247	462008	5.6	3.7	1.2	2.4
Hydro	30818	26817	32208	31687	32181	33016	34060	35321	36238	36754	37250	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136279	149547	143841	145115	162264	189122	211665	226728	6.5	1.9	-0.3	2.3
Wind	1913	6058	12829	22662	42525	56066	69039	78836	91364	101175	106983	21.0	12.7	5.0	2.2
Solar and others	430	806	3691	14050	22800	27070	30051	37033	43931	50108	52354	24.0	20.0	2.8	2.8
Geothermal	4712	5354	5888	7974	9273	9242	9945	22193	28322	34545	38693	2.3	4.6	0.7	7.0
Net Imports	**829314**	**988719**	**956735**	**967842**	**896951**	**845485**	**767260**	**697431**	**610672**	**560112**	**510299**	**1.4**	**-0.6**	**-1.5**	**-2.0**
Solids	98273	125211	110927	115977	92086	86603	71563	50346	33547	35484	39779	1.2	-1.8	-2.5	-2.9
Oil	535238	604030	563977	551775	524913	497891	468781	418135	352234	285209	231795	0.5	-0.7	-1.1	-3.5
- Crude oil and Feedstocks	518046	585121	541240	527771	504350	481251	456554	417176	366720	316376	272960	0.4	-0.7	-1.0	-2.5
- Oil products	17192	18909	22737	24004	20563	16640	12228	959	-14487	-31167	-41165	2.8	-1.0	-5.1	0.0
Natural gas	193432	257849	276001	286173	259880	240341	203996	201265	190777	200167	194805	3.6	-0.6	-2.4	-0.2
Electricity	2029	1412	707	-129	-1602	-1508	-1486	-1740	-1816	-1878	-2099	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745845**	**1641499**	**1528503**	**1395061**	**1334563**	**1304066**	**1285376**	**1274943**	**0.2**	**-0.7**	**-1.6**	**-0.4**
Solids	321277	317986	280653	265879	229971	208090	164205	121935	111331	110267	120634	-1.3	-2.0	-3.3	-1.5
Oil	665142	683909	620735	589170	547415	505642	464217	398221	322465	245974	187359	-0.7	-1.2	-1.6	-4.4
Natural gas	396145	448380	444428	435120	397373	346644	284212	269222	251512	253315	238485	1.2	-1.1	-3.3	-0.9
Nuclear	243841	257516	236563	229106	190341	178241	171298	181853	195667	202321	222536	-0.3	-2.2	-1.0	1.3
Electricity	2029	1412	707	-129	-1602	-1508	-1486	-1740	-1816	-1878	-2099	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226699	278001	291393	312616	365073	424907	475377	508027	5.9	4.2	1.2	2.5
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.6	11.8	9.1	8.5	8.6	9.5				
Oil	38.4	37.3	35.1	33.7	33.3	33.1	33.3	29.8	24.7	19.1	14.7				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.7	20.4	20.2	19.3	19.7	18.7				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.7	12.3	13.6	15.0	15.7	17.5				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.1	22.4	27.4	32.6	37.0	39.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415816**	**3365366**	**3336026**	**3276046**	**3469911**	**3916439**	**4276554**	**4603950**	**1.0**	**0.1**	**-0.3**	**1.7**
Self consumption and grid losses	396970	407042	377767	368942	346243	339638	322853	325994	372051	422057	486850	-0.5	-0.9	-0.7	2.1
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383270**	**342902**	**311500**	**260315**	**253664**	**283396**	**315940**	**329255**	**0.8**	**-1.9**	**-2.7**	**1.2**
Solids	223038	228941	197605	186612	154047	142724	108644	75790	75764	81507	95989	-1.2	-2.5	-3.4	-0.6
Oil (including refinery gas)	40042	33244	20532	10894	5780	4530	3342	2862	2326	1774	1382	-6.5	-11.9	-5.3	-4.3
Gas (including derived gases)	102844	133713	149190	131897	121019	96899	72885	82284	87917	97108	89307	3.8	-2.1	-4.9	1.0
Biomass & Waste	14918	26452	45117	47890	55259	60493	67659	73056	87612	96763	99208	11.7	2.0	2.0	1.9
Geothermal heat	4114	4645	4828	5976	6796	6853	7785	19671	25422	31164	34436	1.6	3.5	1.4	7.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4354	7624	8933	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971003**	**902264**	**844055**	**794081**	**773655**	**747918**	**711552**	**700279**	**-0.7**	**-1.0**	**-1.3**	**-0.6**
Refineries	740500	763156	670015	646602	612015	575176	538738	483283	419083	354850	303582	-1.0	-0.9	-1.3	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24592	56290	90339	117093	140679	34.1	6.9	-0.6	9.1
District heating	18667	19517	20813	22236	19511	16517	17100	16519	14649	13006	12337	1.1	-0.6	-1.3	-1.6
Derived gases, cokeries etc.	316475	324348	297391	283943	244709	227005	213651	217563	223847	226602	243681	-0.6	-1.9	-1.3	0.7
Energy Branch Consumption	**86990**	**91952**	**88327**	**82417**	**76473**	**69205**	**62612**	**56616**	**52250**	**49421**	**49582**	**0.2**	**-1.4**	**-2.0**	**-1.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122386**	**118832**	**112517**	**107050**	**102422**	**98660**	**98024**	**-0.2**	**0.6**	**-0.8**	**-0.7**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170498**	**1122131**	**1045780**	**961900**	**910592**	**865633**	**829576**	**804488**	**0.3**	**-0.3**	**-1.5**	**-0.9**
by sector															
Industry	332412	330448	290978	304746	303294	284070	264250	244678	227059	218180	215824	-1.3	0.4	-1.4	-1.0
- energy intensive industries	217920	216886	187894	197056	196038	182527	167633	153488	142215	136075	131971	-1.5	0.4	-1.6	-1.2
- other industrial sectors	114492	113563	103085	107690	107256	101543	96618	91190	84844	82105	83853	-1.0	0.4	-1.0	-0.7
Residential	286291	311793	311545	311966	293951	264442	237183	222346	215230	205525	191961	0.8	-0.6	-2.1	-1.1
Tertiary	166083	179768	187856	181912	167904	153537	124963	122181	121073	119121	118281	1.2	-1.1	-2.9	-0.3
Transport	342901	368665	367191	371873	356981	343731	335504	321387	302271	286749	278421	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48401	45820	38896	32222	25970	20044	15289	12806	-2.2	-0.8	-3.5	-4.5
Oil	485890	502788	457366	440528	404993	373025	340679	286063	226544	173713	131120	-0.6	-1.2	-1.7	-4.7
Gas	266925	285438	269920	271568	246738	221648	186717	160769	131160	110035	92259	0.1	-0.9	-2.7	-3.5
Electricity	217599	239418	245271	254490	251071	249644	246274	249412	266659	283267	296658	1.2	0.2	-0.2	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55313	54931	51874	51261	51518	53599	53119	52135	1.5	0.3	-0.7	0.1
Renewable energy forms	49480	56250	81825	100133	118316	110095	103700	124219	144397	165330	184049	5.2	3.8	-1.3	2.9
Other	0	0	0	65	261	597	1048	12642	23231	28823	35460	0.0	0.0	14.9	19.3
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194912**	**244213**	**254336**	**275168**	**313975**	**364278**	**403415**	**430964**	**5.4**	**5.0**	**1.2**	**2.3**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.1**	**4236.3**	**3870.9**	**3380.1**	**2700.2**	**2081.7**	**1524.7**	**1198.9**	**-0.7**	**-1.3**	**-2.2**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.5	1872.8	1714.7	1447.8	1156.1	865.4	535.4	368.1		-1.5	-2.5	-6.6
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.6	2363.4	2156.1	1932.2	1544.1	1216.4	989.3	830.7		-1.2	-2.0	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.2**	**3205.3**	**2875.5**	**2434.4**	**1982.1**	**1478.9**	**1078.0**	**802.9**	**-0.5**	**-1.6**	**-2.7**	**-5.4**
Power generation/District heating	1404.5	1483.1	1341.6	1200.4	1010.2	890.0	676.1	496.0	304.2	150.2	69.2	-0.5	-2.8	-3.9	-10.8
Energy Branch	170.1	174.2	159.8	149.7	138.4	120.7	107.7	94.1	76.1	63.4	53.3	-0.6	-1.4	-2.5	-3.5
Industry	693.6	640.7	520.3	538.6	502.9	450.5	391.8	324.8	238.6	193.1	165.7	-2.8	-0.3	-2.5	-4.2
Residential	461.0	491.2	457.9	430.9	385.4	324.7	266.2	213.4	168.2	125.6	82.2	-0.1	-1.7	-3.6	-5.7
Tertiary	255.7	266.4	249.2	220.7	190.3	158.2	100.6	86.9	74.0	58.9	44.7	-0.3	-2.7	-6.2	-4.0
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.3	892.1	766.9	617.8	486.7	387.7	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.4**	**271.3**	**227.1**	**203.6**	**84.3**	**44.8**	**-1.0**	**1.5**	**-0.1**	**-8.6**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**68.1**	**59.5**	**47.5**	**36.6**	**26.8**	**21.1**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE32DEC_c			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.2	98.9	83.7	74.7	68.1	62.6	58.1	-1.2	-2.2	-3.1	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.75	1.49	1.13	0.84	0.63	-0.7	-0.9	-1.1	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.3	52.8	50.0	44.8	41.6	38.2				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.0	1707.0	1772.9	1908.2	1987.8	2156.5	2327.0	2428.3	3.4	1.9	1.1	1.2
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	11.4	11.1	11.3	11.3	11.1				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.3	79.3	69.9	61.7	54.7	50.3	47.7		-1.0	-2.5	-1.9
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.7	68.7	57.1	49.8	44.7	39.6	34.2	-0.5	-1.9	-3.6	-2.5
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.7	64.3	48.2	43.7	40.2	36.6	33.8	0.0	-2.6	-4.5	-1.8
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.6	23.2	20.6	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.17	0.12	0.07	0.03	0.01	-1.6	-3.0	-3.6	-12.0
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.72	1.53	1.27	1.04	0.85	-0.8	-0.7	-0.7	-3.5
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.48	1.33	1.05	0.89	0.77	-1.5	-0.8	-1.1	-3.2
Residential	1.61	1.58	1.47	1.38	1.31	1.23	1.12	0.96	0.78	0.61	0.43	-0.9	-1.1	-1.5	-4.7
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.80	0.71	0.61	0.49	0.38	-1.5	-1.6	-3.4	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.04	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.2	23.6	27.8	33.5	40.5	46.3	50.6				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.2	26.2	41.7	56.1	67.6				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415816**	**3365366**	**3336026**	**3276046**	**3469911**	**3916439**	**4276554**	**4603950**	**1.0**	**0.1**	**-0.3**	**1.7**
Nuclear energy	945027	997733	916685	887192	737094	695966	671581	726105	798952	840125	951928	-0.3	-2.2	-0.9	1.8
Solids	933660	974939	830048	802441	673122	626542	472340	309132	296674	353066	471389	-1.2	-2.1	-3.5	0.0
Oil (including refinery gas)	181203	141358	86851	46090	25933	20996	15476	14946	11957	9079	6804	-7.1	-11.4	-5.0	-4.0
Gas (including derived gases)	514392	699743	795653	752382	683775	527858	412106	489498	545965	585388	564000	4.5	-1.5	-4.9	1.6
Biomass-waste	46848	83787	145901	190886	220979	244742	280971	313979	382009	408675	423080	12.0	4.2	2.4	2.1
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383908	396051	410707	421369	427378	433145	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263516	494482	651933	802781	916701	1062374	1176449	1243985	21.0	12.7	5.0	2.2
Solar	118	1459	22363	96144	143662	168544	207575	253072	332020	389257	413030	68.9	20.4	3.7	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	17165	35769	43673	52941	59113	2.5	5.9	3.5	6.4
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	21447	34196	37477	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930133**	**1019117**	**1050394**	**1107267**	**1151276**	**1276755**	**1336932**	**1383221**	**2.6**	**2.0**	**0.8**	**1.1**
Nuclear energy	136924	134494	131323	123150	111162	94355	93074	97019	106069	111559	125868	-0.4	-1.7	-1.8	1.5
Renewable energy	114281	147780	226757	318900	440507	515248	593178	662294	769161	846491	885789	7.1	6.9	3.0	2.0
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122525	124926	129886	133333	135857	137763	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207413	262092	316799	356039	411094	450743	474229	20.7	9.4	4.3	2.0
Solar	180	1740	29846	76309	110837	127596	148184	171173	219008	253072	265913	66.7	14.0	2.9	3.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3268	5195	5726	6819	7884	0.0	21.3	7.0	4.5
Thermal power	398853	429386	480034	488084	467448	440791	421015	391964	401526	378882	371565	1.9	-0.3	-1.0	-0.6
of which cogeneration units	92439	98998	101203	102201	110979	109605	109469	114625	121685	123473	127484	0.9	0.9	-0.1	0.8
of which CCS units	0	0	0	0	904	904	904	7017	39838	112916	155344	0.0	0.0	0.0	29.3
Solids fired	186470	180630	175756	163212	140919	120425	101448	85067	86716	86825	91099	-0.6	-2.2	-3.2	-0.5
Gas fired	129190	169054	224922	253082	258579	255752	250579	235342	233215	208211	190620	5.7	1.4	-0.3	-1.4
Oil fired	67499	59434	54039	42252	32474	25963	21926	17249	14258	10845	8525	-2.2	-5.0	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34574	37740	46029	51694	63962	68864	76749	5.0	3.5	2.9	2.6
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1034	2612	3375	4137	4571	2.5	2.2	1.4	7.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	34.8	32.6	33.3	33.8	35.0	36.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.4	39.3	39.0	39.1	38.8	40.3				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.2	16.9	16.6	17.0	15.9	15.0				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.6	3.5	7.4	12.3				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.9	64.8	72.5	76.6	78.1	77.7	77.2				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.9	20.5	20.9	20.5	19.8	20.8				
- renewable energy forms	14.4	14.4	21.0	27.2	37.0	43.9	52.0	55.6	57.5	57.9	56.3				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7451.1**	**7847.0**	**8107.3**	**8321.8**	**8497.6**	**8736.7**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.4	603.7	624.8	654.3	672.4	691.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.2	5586.5	5687.5	5727.4	5774.6	5882.4	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.1	724.5	783.0	847.4	893.7	936.1	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	774.4	887.4	965.2	1044.0	1106.6	1175.4	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.8	48.7	50.3	51.6	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.0**	**3510.8**	**3635.2**	**3713.2**	**3802.0**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.4	2426.7	2501.4	2544.6	2599.7	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.3	640.5	674.9	699.1	720.7	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.3	443.6	458.9	469.5	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341190**	**332999**	**318900**	**299836**	**284378**	**276091**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7771	7807	7830	7409	7150	6799	6513	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141057	129020	117139	99984	86786	80259	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118898	118270	120869	119477	116806	114305	112009	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9908	10070	10174	10083	9922	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58073	58282	57569	58330	58926	59834	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6387	6751	7090	7236	7393	7480	7553	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE35DEC_c												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831443**	**798097**	**721554**	**649102**	**655124**	**708686**	**738516**	**772731**	**-1.2**	**-0.5**	**-2.0**	**0.9**
Solids	214627	196059	163855	149894	138022	120411	95355	73147	68307	66481	74661	-2.7	-1.7	-3.6	-1.2
Oil	176084	136469	103565	90642	76989	62929	51072	36190	24841	14597	9226	-5.2	-2.9	-4.0	-8.2
Natural gas	209437	190678	158525	149166	137906	104415	74720	66446	60892	56113	48137	-2.7	-1.4	-5.9	-2.2
Nuclear	243841	257516	236563	229104	189952	171908	157524	166417	177634	180590	197663	-0.3	-2.2	-1.9	1.1
Renewable energy sources	103944	123918	178977	212638	255227	261891	270431	312924	377010	420735	443046	5.6	3.6	0.6	2.5
Hydro	30818	26817	32208	31687	32180	32948	33863	35274	36210	36682	37175	0.4	0.0	0.5	0.5
Biomass & Waste	66071	84883	124361	136264	148525	138975	135192	152282	183737	206664	219019	6.5	1.8	-0.9	2.4
Wind	1913	6058	12829	22662	42457	54230	64111	73226	88366	97331	102001	21.0	12.7	4.2	2.3
Solar and others	430	806	3691	14051	22799	26599	27969	34472	41317	46941	48311	24.0	20.0	2.1	2.8
Geothermal	4712	5354	5888	7974	9267	9139	9295	17669	27380	33117	36540	2.3	4.6	0.0	7.1
Net Imports	**829314**	**988719**	**956735**	**967878**	**896579**	**832192**	**746859**	**678342**	**588415**	**532890**	**485823**	**1.4**	**-0.6**	**-1.8**	**-2.1**
Solids	98273	125211	110927	115995	91872	88795	77135	54512	33614	28266	33117	1.2	-1.9	-1.7	-4.1
Oil	535238	604030	563977	551794	524754	493926	462831	413413	348476	282617	230928	0.5	-0.7	-1.2	-3.4
- Crude oil and Feedstocks	518046	585121	541240	527781	504232	478665	452504	413957	364112	314538	272306	0.4	-0.7	-1.1	-2.5
- Oil products	17192	18909	22737	24013	20523	15260	10326	-544	-15636	-31921	-41378	2.8	-1.0	-6.6	0.0
Natural gas	193432	257849	276001	286177	260000	229334	184913	183587	172925	183431	179054	3.6	-0.6	-3.4	-0.2
Electricity	2029	1412	707	-129	-1602	-1508	-1488	-1740	-1819	-1880	-2097	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745856**	**1639260**	**1496318**	**1337283**	**1272821**	**1236646**	**1210247**	**1196253**	**0.2**	**-0.8**	**-2.0**	**-0.6**
Solids	321277	317986	280653	265889	229894	209206	172490	127659	101921	94747	107778	-1.3	-2.0	-2.8	-2.3
Oil	665142	683909	620735	589188	547246	501416	457872	393237	318552	243308	186463	-0.7	-1.3	-1.8	-4.4
Natural gas	396145	448380	444428	435126	396988	331758	256986	245755	228128	232291	218580	1.2	-1.1	-4.3	-0.8
Nuclear	243841	257516	236563	229104	189952	171908	157524	166417	177634	180590	197663	-0.3	-2.2	-1.9	1.1
Electricity	2029	1412	707	-129	-1602	-1508	-1488	-1740	-1819	-1880	-2097	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226679	276783	283537	293899	341494	412229	461192	487866	5.9	4.1	0.6	2.6
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	14.0	12.9	10.0	8.2	7.8	9.0				
Oil	38.4	37.3	35.1	33.7	33.4	33.5	34.2	30.9	25.8	20.1	15.6				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.2	19.2	19.3	18.4	19.2	18.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	11.8	13.1	14.4	14.9	16.5				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	18.9	22.0	26.8	33.3	38.1	40.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415616**	**3361174**	**3248860**	**3081596**	**3266216**	**3685356**	**3999283**	**4266953**	**1.0**	**0.1**	**-0.9**	**1.6**
Self consumption and grid losses	396970	407042	377767	368917	345669	330896	293605	293130	321803	358103	402709	-0.5	-0.9	-1.6	1.6
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383290**	**342379**	**306462**	**251160**	**240293**	**263396**	**292881**	**305139**	**0.8**	**-2.0**	**-3.1**	**1.0**
Solids	223038	228941	197605	186639	153980	145683	118800	82691	67484	67081	83372	-1.2	-2.5	-2.6	-1.8
Oil (including refinery gas)	40042	33244	20532	10891	5772	4526	3246	2877	2261	1759	1324	-6.5	-11.9	-5.6	-4.4
Gas (including derived gases)	102844	133713	149190	131871	121328	90859	60242	71658	76118	87162	78514	3.8	-2.0	-6.8	1.3
Biomass & Waste	14918	26452	45117	47914	54502	58541	61455	67591	87430	98490	99061	11.7	1.9	1.2	2.4
Geothermal heat	4114	4645	4828	5976	6796	6853	7416	15477	24875	30256	32981	1.6	3.5	0.9	7.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5227	8133	9887	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970990**	**901576**	**834079**	**774053**	**751647**	**722264**	**680808**	**668964**	**-0.7**	**-1.0**	**-1.5**	**-0.7**
Refineries	740500	763156	670015	646614	611888	572137	534023	479539	416152	352855	302891	-1.0	-0.9	-1.4	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25358	24591	55183	89206	114770	138649	34.1	6.9	-0.6	9.0
District heating	18667	19517	20813	22214	19374	16880	16836	15392	11457	9032	8466	1.1	-0.7	-1.4	-3.4
Derived gases, cokeries etc.	316475	324348	297391	283940	244285	219705	198604	201533	205449	204150	218957	-0.6	-1.9	-2.0	0.5
Energy Branch Consumption	**86990**	**91952**	**88327**	**82413**	**76461**	**68614**	**61707**	**55594**	**50071**	**46854**	**46409**	**0.2**	**-1.4**	**-2.1**	**-1.4**
Non-Energy Uses	**117117**	**120718**	**114884**	**119320**	**122392**	**117523**	**110687**	**105453**	**101389**	**98061**	**98032**	**-0.2**	**0.6**	**-1.0**	**-0.6**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170499**	**1120502**	**1022200**	**920075**	**870767**	**825095**	**786402**	**758883**	**0.3**	**-0.3**	**-2.0**	**-1.0**
by sector															
Industry	332412	330448	290978	304745	302877	280054	258754	240404	224866	216668	215641	-1.3	0.4	-1.6	-0.9
- energy intensive industries	217920	216886	187894	197049	195802	180295	164999	151021	140128	134921	132017	-1.5	0.4	-1.7	-1.1
- other industrial sectors	114492	113563	103085	107696	107075	99759	93755	89383	84738	81747	83624	-1.0	0.4	-1.3	-0.6
Residential	286291	311793	311545	311967	293092	251791	215196	200746	191367	179003	162158	0.8	-0.6	-3.0	-1.4
Tertiary	166083	179768	187856	181914	167514	146543	110285	107949	106466	103915	102487	1.2	-1.1	-4.1	-0.4
Transport	342901	368665	367191	371873	357021	343813	335840	321668	302395	286817	278598	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48392	45791	37307	30784	24756	19349	15032	12838	-2.2	-0.8	-3.9	-4.3
Oil	485890	502788	457366	440511	404794	370041	336053	282475	223560	171624	130236	-0.6	-1.2	-1.8	-4.6
Gas	266925	285438	269920	271648	246107	212814	172720	148895	120968	100246	84352	0.1	-0.9	-3.5	-3.5
Electricity	217599	239418	245271	254475	250763	243009	232195	235980	252502	267515	277267	1.2	0.2	-0.8	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55309	54749	52233	49602	48996	49000	48086	47269	1.5	0.2	-1.0	-0.2
Renewable energy forms	49480	56250	81825	100099	118037	106198	97670	117922	138284	157500	174420	5.2	3.7	-1.9	2.9
Other	0	0	0	65	261	597	1050	11743	21433	26399	32502	0.0	0.0	14.9	18.7
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194885**	**243413**	**247548**	**258410**	**295279**	**352999**	**390762**	**412300**	**5.4**	**5.0**	**0.6**	**2.4**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.2**	**4234.8**	**3831.5**	**3346.3**	**2731.5**	**2034.1**	**1473.0**	**1167.3**	**-0.7**	**-1.3**	**-2.3**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.5	1873.1	1708.6	1462.8	1226.1	851.2	513.1	358.2		-1.5	-2.4	-6.8
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.7	2361.7	2123.0	1883.6	1505.4	1182.8	959.9	809.1		-1.2	-2.2	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.3**	**3203.6**	**2836.0**	**2391.9**	**1987.8**	**1421.7**	**1025.6**	**770.7**	**-0.5**	**-1.6**	**-2.9**	**-5.5**
Power generation/District heating	1404.5	1483.1	1341.6	1200.5	1010.1	887.4	682.7	544.4	283.7	129.8	58.1	-0.5	-2.8	-3.8	-11.6
Energy Branch	170.1	174.2	159.8	149.6	138.6	119.8	106.6	92.7	75.0	62.0	53.0	-0.6	-1.4	-2.6	-3.4
Industry	693.6	640.7	520.3	538.6	503.0	445.3	390.3	322.6	235.8	191.3	167.5	-2.8	-0.3	-2.5	-4.1
Residential	461.0	491.2	457.9	430.9	384.1	301.2	230.4	184.0	143.8	103.9	65.0	-0.1	-1.7	-5.0	-6.1
Tertiary	255.7	266.4	249.2	220.7	189.8	150.8	88.9	76.4	65.3	51.8	39.0	-0.3	-2.7	-7.3	-4.0
Transport	1001.0	1082.7	1050.9	1049.9	978.1	931.6	893.1	767.6	618.1	486.8	388.0	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**275.5**	**280.0**	**252.6**	**213.1**	**85.0**	**45.4**	**-1.0**	**1.5**	**0.2**	**-8.7**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**67.4**	**58.9**	**48.1**	**35.8**	**25.9**	**20.5**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE35DEC_c			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.1	96.9	80.2	71.2	64.6	59.0	54.5	-1.2	-2.2	-3.5	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.90	1.79	1.56	1.15	0.85	0.64	-0.7	-0.9	-0.9	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.6	53.5	50.9	45.4	41.9	38.6				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.2	1705.8	1781.2	1971.4	2046.8	2229.5	2421.3	2543.6	3.4	1.9	1.5	1.3
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	11.8	11.5	11.6	11.8	11.6				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.2	78.2	68.4	60.7	54.1	50.0	47.6		-1.0	-2.7	-1.8
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.4	65.4	51.8	44.9	39.8	34.5	28.9	-0.5	-1.9	-4.5	-2.9
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.6	61.4	42.6	38.6	35.3	32.0	29.3	0.0	-2.6	-5.7	-1.9
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.6	23.2	20.6	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.18	0.14	0.07	0.03	0.01	-1.6	-2.9	-3.0	-12.7
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.79	1.74	1.55	1.29	1.06	0.87	-0.8	-0.7	-0.5	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.51	1.34	1.05	0.88	0.78	-1.5	-0.7	-1.0	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.20	1.07	0.92	0.75	0.58	0.40	-0.9	-1.1	-2.0	-4.8
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.81	0.71	0.61	0.50	0.38	-1.5	-1.6	-3.3	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.04	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.1	23.6	27.4	33.1	41.4	47.7	51.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.2	26.2	42.3	57.0	68.6				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415616**	**3361174**	**3248860**	**3081596**	**3266216**	**3685356**	**3999283**	**4266953**	**1.0**	**0.1**	**-0.9**	**1.6**
Nuclear energy	945027	997733	916685	887184	735586	669229	614947	659774	720713	744717	842447	-0.3	-2.2	-1.8	1.6
Solids	933660	974939	830048	802585	672393	640613	512510	347072	254027	279264	383058	-1.2	-2.1	-2.7	-1.4
Oil (including refinery gas)	181203	141358	86851	46106	25934	20837	15014	14592	11325	9041	6365	-7.1	-11.4	-5.3	-4.2
Gas (including derived gases)	514392	699743	795653	751990	686270	486846	332572	422612	470687	517385	495099	4.5	-1.5	-7.0	2.0
Biomass-waste	46848	83787	145901	190927	217341	235321	251362	287318	385914	420958	423826	12.0	4.1	1.5	2.6
Hydro (pumping excluded)	358408	311883	374576	368453	374186	383119	393758	410167	421052	426538	432263	0.4	0.0	0.5	0.5
Wind	22253	70453	149202	263516	493685	630586	745477	851466	1027510	1131758	1186061	21.0	12.7	4.2	2.3
Solar	118	1459	22363	96144	143662	166774	199365	242347	324463	380512	399815	68.9	20.4	3.3	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	16590	30867	42970	51601	56662	2.5	5.9	3.2	6.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	26696	37510	41357	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930099**	**1018489**	**1034966**	**1069732**	**1102173**	**1232199**	**1284806**	**1313671**	**2.6**	**2.0**	**0.5**	**1.0**
Nuclear energy	136924	134494	131323	123150	111162	92030	88076	89123	95965	99041	111503	-0.4	-1.7	-2.3	1.2
Renewable energy	114281	147780	226757	318900	440177	507020	569290	632812	751015	824198	856398	7.1	6.9	2.6	2.1
Hydro (pumping excluded)	101207	105529	112159	118306	120598	122324	124437	129518	133244	135613	137475	1.0	0.7	0.3	0.5
Wind	12893	40510	84512	123698	207087	255211	297577	333051	397636	434546	453476	20.7	9.4	3.7	2.1
Solar	180	1740	29846	76309	110837	126450	144021	165061	214442	247367	257956	66.7	14.0	2.7	3.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3256	5182	5692	6672	7490	0.0	21.3	7.0	4.3
Thermal power	398853	429386	480034	488050	467150	435917	412366	380238	385220	361567	345770	1.9	-0.3	-1.2	-0.9
of which cogeneration units	92439	98998	101203	102482	110690	107069	106056	106727	116105	120128	122405	0.9	0.9	-0.4	0.7
of which CCS units	0	0	0	0	904	904	904	2079	31330	100998	136082	0.0	0.0	0.0	28.5
Solids fired	186470	180630	175756	163212	140957	120336	101121	83728	81636	80081	80781	-0.6	-2.2	-3.3	-1.1
Gas fired	129190	169054	224922	253051	258083	251352	242831	225181	219910	195644	173275	5.7	1.4	-0.6	-1.7
Oil fired	67499	59434	54039	42249	32633	25945	21971	17654	14598	10928	8598	-2.2	-4.9	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34575	37374	45454	51620	65773	70898	78739	5.0	3.5	2.8	2.8
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	989	2055	3302	4016	4378	2.5	2.2	0.9	7.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	34.4	31.7	32.7	33.0	34.2	35.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.1	38.4	39.0	38.5	38.2	39.1				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	15.9	16.3	16.4	17.1	16.2	15.2				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	2.3	6.2	10.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.8	64.7	72.1	76.0	79.9	79.7	79.1				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.6	20.0	20.2	19.7	18.8	19.9				
- renewable energy forms	14.4	14.4	21.0	27.2	36.9	44.1	52.1	55.8	60.2	60.9	59.1				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7050.0**	**7452.1**	**7851.0**	**8111.2**	**8322.6**	**8497.1**	**8737.4**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.3	603.2	624.5	654.3	672.3	690.5	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.6	5410.5	5587.2	5688.6	5727.3	5773.8	5881.4	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.1	647.9	723.7	782.3	847.2	893.4	935.2	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.4	775.4	892.0	969.1	1045.2	1107.3	1178.7	1.4	2.6	2.8	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	44.9	46.7	48.6	50.3	51.5	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.4**	**3511.3**	**3635.6**	**3713.0**	**3801.5**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.4	2426.6	2501.4	2545.0	2599.8	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.7	641.0	675.2	698.7	720.2	-0.3	2.2	2.3	0.8
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.3	443.6	459.0	469.4	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354504**	**341294**	**333375**	**319214**	**299991**	**284477**	**276292**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7770	7806	7825	7403	7147	6800	6514	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156774	141065	129021	117140	99985	86784	80261	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118898	118271	120872	119462	116791	114294	111986	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9231	9910	10073	10178	10078	9918	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56124	58173	58663	57906	58498	59044	60067	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6386	6749	7083	7229	7391	7476	7548	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE40DEC_c												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831467**	**798182**	**721654**	**594126**	**601760**	**645922**	**686502**	**725722**	**-1.2**	**-0.5**	**-2.9**	**1.0**
Solids	214627	196059	163855	149909	138357	122588	88013	75580	67117	60562	71523	-2.7	-1.7	-4.4	-1.0
Oil	176084	136469	103565	90639	76992	62871	50594	35891	24685	14526	9193	-5.2	-2.9	-4.1	-8.2
Natural gas	209437	190678	158525	149168	137818	104402	65593	59388	56195	53182	45391	-2.7	-1.4	-7.2	-1.8
Nuclear	243841	257516	236563	229104	190026	172868	137809	145170	151578	160614	178766	-0.3	-2.2	-3.2	1.3
Renewable energy sources	103944	123918	178977	212647	254989	258925	252117	285731	346347	397618	420849	5.6	3.6	-0.1	2.6
Hydro	30818	26817	32208	31687	32180	32956	33532	34287	35802	36254	36918	0.4	0.0	0.4	0.5
Biomass & Waste	66071	84883	124361	136274	148474	138011	124759	141967	166669	198037	212409	6.5	1.8	-1.7	2.7
Wind	1913	6058	12829	22662	42272	52303	60668	65752	81456	90026	94075	21.0	12.7	3.7	2.2
Solar and others	430	806	3691	14050	22796	26526	24785	30544	37164	41902	42969	24.0	20.0	0.8	2.8
Geothermal	4712	5354	5888	7974	9267	9129	8374	13182	25256	31400	34479	2.3	4.6	-1.0	7.3
Net Imports	**829314**	**988719**	**956735**	**967871**	**897192**	**834294**	**707942**	**653319**	**571662**	**512780**	**465308**	**1.4**	**-0.6**	**-2.3**	**-2.1**
Solids	98273	125211	110927	116028	92380	91837	65754	54356	39287	28264	32001	1.2	-1.8	-3.3	-3.5
Oil	535238	604030	563977	551788	524779	492943	455032	407527	344764	280202	229748	0.5	-0.7	-1.4	-3.4
- Crude oil and Feedstocks	518046	585121	541240	527775	504240	477965	447164	409846	361424	312739	271449	0.4	-0.7	-1.2	-2.5
- Oil products	17192	18909	22737	24013	20538	14978	7868	-2320	-16660	-32538	-41702	2.8	-1.0	-9.1	0.0
Natural gas	193432	257849	276001	286142	260089	229511	166466	166071	156056	166898	161971	3.6	-0.6	-4.4	-0.1
Electricity	2029	1412	707	-129	-1602	-1507	-1490	-1736	-1819	-1887	-2089	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745873**	**1639958**	**1498520**	**1243389**	**1194435**	**1157129**	**1138123**	**1128729**	**0.2**	**-0.7**	**-2.7**	**-0.5**
Solids	321277	317986	280653	265938	230738	214425	153767	129936	106403	88826	103524	-1.3	-1.9	-4.0	-2.0
Oil	665142	683909	620735	589179	547273	500376	449594	387052	314684	240821	185250	-0.7	-1.3	-1.9	-4.3
Natural gas	396145	448380	444428	435092	396989	331922	229412	221181	206561	212827	198752	1.2	-1.1	-5.3	-0.7
Nuclear	243841	257516	236563	229104	190026	172868	137809	145170	151578	160614	178766	-0.3	-2.2	-3.2	1.3
Electricity	2029	1412	707	-129	-1602	-1507	-1490	-1736	-1819	-1887	-2089	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226690	276534	280435	274298	312833	379722	436921	464526	5.9	4.1	-0.1	2.7
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	14.3	12.4	10.9	9.2	7.8	9.2				
Oil	38.4	37.3	35.1	33.7	33.4	33.4	36.2	32.4	27.2	21.2	16.4				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.2	18.5	18.5	17.9	18.7	17.6				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	11.1	12.2	13.1	14.1	15.8				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	18.7	22.1	26.2	32.8	38.4	41.2				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415599**	**3363144**	**3255927**	**2804308**	**3004366**	**3423242**	**3703855**	**3968984**	**1.0**	**0.1**	**-1.8**	**1.8**
Self consumption and grid losses	396970	407042	377767	368936	346142	334042	261356	268879	295275	321605	369255	-0.5	-0.9	-2.8	1.7
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383320**	**343115**	**312621**	**223213**	**227200**	**247274**	**275839**	**290789**	**0.8**	**-1.9**	**-4.2**	**1.3**
Solids	223038	228941	197605	186660	154839	151933	103497	86710	71848	61126	79650	-1.2	-2.4	-3.9	-1.3
Oil (including refinery gas)	40042	33244	20532	10887	5786	4352	3158	2918	2269	1707	1313	-6.5	-11.9	-5.9	-4.3
Gas (including derived gases)	102844	133713	149190	131886	121199	91115	52958	62634	67127	79340	69361	3.8	-2.1	-7.9	1.4
Biomass & Waste	14918	26452	45117	47910	54494	58369	56735	63527	77803	97239	99097	11.7	1.9	0.4	2.8
Geothermal heat	4114	4645	4828	5976	6796	6851	6864	11411	23228	29110	31632	1.6	3.5	0.1	7.9
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4999	7317	9736	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970986**	**901663**	**832719**	**742152**	**719594**	**686953**	**651670**	**641675**	**-0.7**	**-1.0**	**-1.9**	**-0.7**
Refineries	740500	763156	670015	646606	611902	571290	527852	474892	413249	350939	301978	-1.0	-0.9	-1.5	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25359	24595	53757	86249	110546	134920	34.1	6.9	-0.6	8.9
District heating	18667	19517	20813	22216	19390	16564	12685	11810	7176	5305	4734	1.1	-0.7	-4.2	-4.8
Derived gases, cokeries etc.	316475	324348	297391	283942	244341	219506	177020	179134	180279	184880	200043	-0.6	-1.9	-3.2	0.6
Energy Branch Consumption	**86990**	**91952**	**88327**	**82408**	**76506**	**68665**	**59458**	**54181**	**48840**	**44715**	**44598**	**0.2**	**-1.4**	**-2.5**	**-1.4**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122391**	**116695**	**108596**	**103913**	**100940**	**97869**	**98038**	**-0.2**	**0.6**	**-1.2**	**-0.5**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170494**	**1120654**	**1020866**	**858690**	**816464**	**776267**	**738226**	**711900**	**0.3**	**-0.3**	**-2.6**	**-0.9**
by sector															
Industry	332412	330448	290978	304739	302929	278925	255989	238419	224364	216224	215251	-1.3	0.4	-1.7	-0.9
- energy intensive industries	217920	216886	187894	197042	195821	179152	161968	148782	139680	134616	131840	-1.5	0.4	-1.9	-1.0
- other industrial sectors	114492	113563	103085	107697	107107	99773	94021	89636	84684	81608	83411	-1.0	0.4	-1.3	-0.6
Residential	286291	311793	311545	311967	293086	251356	180244	169433	161469	149291	133559	0.8	-0.6	-4.7	-1.5
Tertiary	166083	179768	187856	181915	167577	146523	86398	86442	87331	85438	84513	1.2	-1.1	-6.4	-0.1
Transport	342901	368665	367191	371873	357063	344062	336059	322170	303104	287273	278578	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48413	45741	36612	28972	23511	19266	14984	12769	-2.2	-0.8	-4.5	-4.0
Oil	485890	502788	457366	440495	404845	369931	330059	278025	220184	169503	129150	-0.6	-1.2	-2.0	-4.6
Gas	266925	285438	269920	271612	246200	212909	153899	134429	110162	90003	74938	0.1	-0.9	-4.6	-3.5
Electricity	217599	239418	245271	254471	250887	243332	211399	217179	235509	249796	258410	1.2	0.2	-1.7	1.0
Heat (from CHP and District Heating)	46015	52355	53515	55316	54725	52089	42745	42851	43173	42133	41944	1.5	0.2	-2.4	-0.1
Renewable energy forms	49480	56250	81825	100121	117994	105396	90561	109905	128800	148145	165222	5.2	3.7	-2.6	3.1
Other	0	0	0	65	261	597	1055	10564	19173	23662	29468	0.0	0.0	15.0	18.1
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194970**	**242986**	**244446**	**239514**	**270796**	**323447**	**366990**	**389609**	**5.4**	**5.0**	**-0.1**	**2.5**
TOTAL GHG emissions (Mt of CO_2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.3**	**4238.7**	**3853.8**	**3185.7**	**2711.2**	**2133.0**	**1451.4**	**1123.8**	**-0.7**	**-1.3**	**-2.8**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.0	1876.7	1731.6	1367.8	1256.2	986.8	522.7	339.2		-1.5	-3.1	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.3	2362.0	2122.2	1817.9	1455.0	1146.2	928.7	784.6		-1.2	-2.6	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.4**	**3207.3**	**2857.0**	**2230.9**	**1938.4**	**1516.5**	**1002.0**	**727.4**	**-0.5**	**-1.6**	**-3.6**	**-5.4**
Power generation/District heating	1404.5	1483.1	1341.6	1200.6	1013.0	908.7	593.9	543.4	407.5	136.4	41.3	-0.5	-2.8	-5.2	-12.5
Energy Branch	170.1	174.2	159.8	149.7	138.5	118.7	103.9	91.5	75.6	61.8	52.3	-0.6	-1.4	-2.8	-3.4
Industry	693.6	640.7	520.3	538.6	503.7	447.5	385.1	325.8	246.9	193.8	165.6	-2.8	-0.3	-2.6	-4.1
Residential	461.0	491.2	457.9	430.9	384.1	300.2	182.2	146.4	112.7	79.0	47.5	-0.1	-1.7	-7.2	-6.5
Tertiary	255.7	266.4	249.2	220.7	189.7	149.5	71.9	62.0	53.9	43.2	32.8	-0.3	-2.7	-9.2	-3.9
Transport	1001.0	1082.7	1050.9	1049.9	978.3	932.3	893.9	769.2	619.9	487.8	387.9	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.9**	**276.8**	**280.4**	**281.7**	**217.2**	**87.0**	**45.2**	**-1.0**	**1.5**	**0.2**	**-8.7**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.6**	**67.8**	**56.0**	**47.7**	**37.5**	**25.5**	**19.8**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE40DEC_c			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.1	97.0	74.6	66.9	60.4	55.5	51.4	-1.2	-2.2	-4.2	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.91	1.79	1.62	1.31	0.88	0.64	-0.7	-0.9	-0.9	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.6	54.4	52.1	47.0	42.8	39.1				
Total energy-rel. and other mitigation costs (in 000 M	1017.7	1222.4	1419.5	1580.2	1706.5	1782.8	2167.0	2217.6	2389.6	2608.0	2760.9	3.4	1.9	2.4	1.2
as % of GDP	9.5	10.4	11.5	12.0	12.0	11.5	13.0	12.4	12.5	12.7	12.6				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.2	77.9	67.7	60.2	54.0	49.9	47.6		-1.0	-2.8	-1.7
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.4	65.3	43.4	37.9	33.5	28.7	23.8	-0.5	-1.9	-6.2	-3.0
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.6	61.4	33.4	30.9	29.0	26.3	24.2	0.0	-2.6	-8.0	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.7	23.3	20.7	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.23	0.17	0.15	0.10	0.03	0.01	-1.6	-2.9	-3.4	-13.7
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.79	1.79	1.60	1.33	1.09	0.89	-0.8	-0.7	-0.3	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.60	1.50	1.37	1.10	0.90	0.77	-1.5	-0.7	-1.0	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.19	1.01	0.86	0.70	0.53	0.36	-0.9	-1.1	-2.6	-5.1
Tertiary	1.54	1.48	1.33	1.21	1.13	1.02	0.83	0.72	0.62	0.51	0.39	-1.5	-1.6	-3.0	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.05	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.1	23.3	27.4	32.6	40.5	48.0	52.4				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.4	26.3	42.3	57.5	68.9				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415599**	**3363144**	**3255927**	**2804308**	**3004366**	**3423242**	**3703855**	**3968984**	**1.0**	**0.1**	**-1.8**	**1.8**
Nuclear energy	945027	997733	916685	887185	735874	673556	536430	570593	608066	658356	759401	-0.3	-2.2	-3.1	1.8
Solids	933660	974939	830048	802733	676404	666387	433376	368393	312489	244337	355684	-1.2	-2.0	-4.4	-1.0
Oil (including refinery gas)	181203	141358	86851	45969	26009	19984	14419	14214	11321	8686	5273	-7.1	-11.4	-5.7	-4.9
Gas (including derived gases)	514392	699743	795653	752003	685820	487963	290207	364085	405726	463517	434346	4.5	-1.5	-8.2	2.0
Biomass-waste	46848	83787	145901	190884	217533	234409	232058	271052	349523	422133	424394	12.0	4.1	0.6	3.1
Hydro (pumping excluded)	358408	311883	374576	368453	374186	383210	389910	398682	416298	421554	429275	0.4	0.0	0.4	0.5
Wind	22253	70453	149202	263516	491540	608172	705437	764556	947168	1046811	1093895	21.0	12.7	3.7	2.2
Solar	118	1459	22363	96144	143662	166878	186689	227932	307285	356600	373788	68.9	20.4	2.7	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15368	15783	24859	39611	48636	52932	2.5	5.9	2.7	6.2
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	25755	33225	39996	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930117**	**1017665**	**1025340**	**1040514**	**1041376**	**1159956**	**1208177**	**1231823**	**2.6**	**2.0**	**0.2**	**0.8**
Nuclear energy	136924	134494	131323	123150	111162	91595	85077	81388	81611	87645	100457	-0.4	-1.7	-2.6	0.8
Renewable energy	114281	147780	226757	318900	439349	498334	548216	592728	708714	776055	806035	7.1	6.8	2.2	1.9
Hydro (pumping excluded)	101207	105529	112159	118306	120598	122346	124018	126767	131195	133426	136486	1.0	0.7	0.3	0.5
Wind	12893	40510	84512	123698	206259	246614	283136	303191	367918	402833	418949	20.7	9.3	3.2	2.0
Solar	180	1740	29846	76309	110837	126407	137873	158087	204541	233861	244110	66.7	14.0	2.2	2.9
Other renewables (tidal etc.)	0	0	240	586	1655	2967	3188	4683	5061	5936	6491	0.0	21.3	6.8	3.6
Thermal power	398853	429386	480034	488068	467155	435411	407222	367261	369631	344477	325331	1.9	-0.3	-1.4	-1.1
of which cogeneration units	92439	98998	101203	102224	110690	106163	101682	99932	110710	115158	115917	0.9	0.9	-0.8	0.7
of which CCS units	0	0	0	0	904	904	904	904	11046	84221	127005	0.0	0.0	0.0	28.0
Solids fired	186470	180630	175756	163212	141085	120710	101239	83482	80448	76328	77196	-0.6	-2.2	-3.3	-1.3
Gas fired	129190	169054	224922	253066	257793	250302	240038	216231	209465	183114	157776	5.7	1.4	-0.7	-2.1
Oil fired	67499	59434	54039	42252	32647	25926	21875	17342	14391	10933	8611	-2.2	-4.9	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34727	37564	43154	48690	62243	70237	77547	5.0	3.5	2.2	3.0
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	915	1515	3084	3864	4199	2.5	2.2	0.1	7.9
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.2	34.8	29.7	31.8	32.6	33.7	35.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.5	39.0	37.7	39.0	39.4	37.6	38.4				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.6	15.5	16.2	16.2	17.4	16.6	15.3				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	1.3	4.6	10.2				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.7	63.9	73.7	75.1	78.5	80.5	79.8				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.7	19.1	19.0	17.9	17.9	19.3				
- renewable energy forms	14.4	14.4	21.0	27.2	36.8	43.2	54.6	56.2	60.6	62.5	60.4				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7050.3**	**7454.4**	**7853.0**	**8116.4**	**8331.3**	**8502.4**	**8734.5**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.8	575.0	603.0	623.9	653.4	671.9	691.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.7	5411.0	5587.4	5689.2	5730.0	5775.2	5879.3	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.1	647.4	722.9	781.4	845.4	892.1	935.7	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.8	778.0	894.9	975.3	1054.1	1113.0	1176.9	1.4	2.6	2.8	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	42.9	44.8	46.6	48.5	50.1	51.6	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.4**	**3385.7**	**3511.9**	**3635.6**	**3712.7**	**3801.2**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.2	2346.6	2426.5	2501.7	2545.0	2600.0	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	607.9	641.6	674.9	698.2	719.7	-0.3	2.2	2.3	0.8
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.8	459.0	469.4	481.5	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354546**	**341541**	**333642**	**319752**	**300729**	**284965**	**276309**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7770	7803	7826	7395	7136	6791	6513	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156777	141081	129027	117154	100042	86814	80247	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118899	118275	120887	119476	116805	114271	111965	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9230	9895	10075	10170	10074	9915	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56163	58408	58933	58431	59201	59549	60118	0.9	1.2	0.5	0.1
Inland navigation	5973	6575	5892	6143	6386	6745	7074	7220	7375	7467	7550	-0.1	0.8	1.0	0.3

Source: PRIMES

Cost reporting method: d

EU28: REF2012tplusF											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831587**	**806999**	**774028**	**750386**	**756269**	**758942**	**756325**	**741591**	**-1.2**	**-0.4**	**-0.7**	**-0.1**
Solids	214627	196059	163855	149946	139419	127372	88814	78810	74257	72656	68963	-2.7	-1.6	-4.4	-1.3
Oil	176084	136469	103565	90795	77412	65152	55157	43065	33789	22982	16197	-5.2	-2.9	-3.3	-5.9
Natural gas	209437	190678	158525	149165	140761	124871	110507	103426	97087	84365	71349	-2.7	-1.2	-2.4	-2.2
Nuclear	243841	257516	236563	229091	192194	179601	200958	215101	218499	220909	216248	-0.3	-2.1	0.4	0.4
Renewable energy sources	103944	123918	178977	212589	257212	277033	294950	315867	335310	355412	368835	5.6	3.7	1.4	1.1
Hydro	30818	26817	32208	31687	32181	32955	34082	35124	35706	36025	36580	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136218	150600	151413	152531	154423	160741	163611	162741	6.5	1.9	0.1	0.3
Wind	1913	6058	12829	22663	42406	54639	66346	73718	78176	85525	93351	21.0	12.7	4.6	1.7
Solar and others	430	806	3691	14047	22777	28573	32011	37261	41669	45099	45953	24.0	20.0	3.5	1.8
Geothermal	4712	5354	5888	7974	9248	9453	9979	15341	19017	25152	30210	2.3	4.6	0.8	5.7
Net Imports	**829314**	**988719**	**956735**	**967965**	**909430**	**914865**	**920857**	**911994**	**917314**	**940317**	**961688**	**1.4**	**-0.5**	**0.1**	**0.2**
Solids	98273	125211	110927	116119	95051	87995	85092	61658	54216	54638	54894	1.2	-1.5	-1.1	-2.2
Oil	535238	604030	563977	551754	527894	519346	516402	517466	518318	527807	532886	0.5	-0.7	-0.2	0.2
- Crude oil and Feedstocks	518046	585121	541240	527813	506534	496537	490142	488282	485469	489278	488275	0.4	-0.7	-0.3	0.0
- Oil products	17192	18909	22737	23941	21361	22809	26260	29184	32849	38529	44612	2.8	-0.6	2.1	2.7
Natural gas	193432	257849	276001	286188	266292	285786	295737	308333	317942	330144	345370	3.6	-0.4	1.1	0.8
Electricity	2029	1412	707	-129	-1602	-1507	-1489	-1740	-1819	-1880	-2096	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1746078**	**1660906**	**1631144**	**1611172**	**1605665**	**1611671**	**1628926**	**1632192**	**0.2**	**-0.6**	**-0.3**	**0.1**
Solids	321277	317986	280653	266064	234470	215366	173905	140468	128472	127295	123857	-1.3	-1.8	-2.9	-1.7
Oil	665142	683909	620735	589293	550703	528750	514194	502296	493414	490670	487100	-0.7	-1.2	-0.7	-0.3
Natural gas	396145	448380	444428	435135	406133	408655	403538	407397	409137	406913	407615	1.2	-0.9	-0.1	0.1
Nuclear	243841	257516	236563	229091	192194	179601	200958	215101	218499	220909	216248	-0.3	-2.1	0.4	0.4
Electricity	2029	1412	707	-129	-1602	-1507	-1489	-1740	-1819	-1880	-2096	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226624	279007	300279	320066	342143	363967	385020	399468	5.9	4.2	1.4	1.1
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.2	10.8	8.7	8.0	7.8	7.6				
Oil	38.4	37.3	35.1	33.7	33.2	32.4	31.9	31.3	30.6	30.1	29.8				
Natural gas	22.9	24.5	25.1	24.9	24.5	25.1	25.0	25.4	25.4	25.0	25.0				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.0	12.5	13.4	13.6	13.6	13.2				
Renewable energy forms	6.0	6.8	10.4	13.0	16.8	18.4	19.9	21.3	22.6	23.6	24.5				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3416143**	**3417103**	**3526993**	**3667044**	**3810604**	**3999241**	**4210248**	**4347499**	**1.0**	**0.3**	**0.7**	**0.9**
Self consumption and grid losses	396970	407042	377767	369020	352626	359642	367834	384934	414973	448155	474233	-0.5	-0.7	0.4	1.3
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383279**	**350653**	**338227**	**299628**	**283107**	**287705**	**299279**	**300677**	**0.8**	**-1.7**	**-1.6**	**0.0**
Solids	223038	228941	197605	186789	158213	143833	105916	76434	68124	69913	68236	-1.2	-2.2	-3.9	-2.2
Oil (including refinery gas)	40042	33244	20532	10888	5907	5284	4524	4024	4157	4106	3999	-6.5	-11.7	-2.6	-0.6
Gas (including derived gases)	102844	133713	149190	131860	124637	126186	124553	127862	129233	128779	124793	3.8	-1.8	0.0	0.0
Biomass & Waste	14918	26452	45117	47765	55099	56071	57403	62394	70305	74626	76713	11.7	2.0	0.4	1.5
Geothermal heat	4114	4645	4828	5976	6796	6853	7232	12393	15886	21855	26937	1.6	3.5	0.6	6.8
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971213**	**907635**	**869885**	**873784**	**869927**	**857971**	**852563**	**841625**	**-0.7**	**-1.0**	**-0.4**	**-0.2**
Refineries	740500	763156	670015	646759	614530	592841	577534	564620	552898	546497	538635	-1.0	-0.9	-0.6	-0.3
Biofuels and hydrogen production	705	3101	13296	18232	26203	26359	26690	26750	26670	27551	28879	34.1	7.0	0.2	0.4
District heating	18667	19517	20813	22289	20164	19238	19339	18308	17120	16930	17867	1.1	-0.3	-0.4	-0.4
Derived gases, cokeries etc.	316475	324348	297391	283934	246737	231448	250222	260249	261282	261585	256244	-0.6	-1.8	0.1	0.1
Energy Branch Consumption	**86990**	**91952**	**88327**	**82447**	**77111**	**73795**	**70810**	**68774**	**68154**	**68439**	**68633**	**0.2**	**-1.3**	**-0.8**	**-0.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119317**	**122300**	**121539**	**121545**	**121156**	**119756**	**119349**	**119926**	**-0.2**	**0.6**	**-0.1**	**-0.1**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170679**	**1135707**	**1129540**	**1125739**	**1126378**	**1134045**	**1145322**	**1151911**	**0.3**	**-0.2**	**-0.1**	**0.1**
by sector															
Industry	332412	330448	290978	304790	306458	305818	306946	304679	304286	307156	309068	-1.3	0.5	0.0	0.0
- energy intensive industries	217920	216886	187894	197097	197798	195317	194779	192244	190028	190299	188589	-1.5	0.5	-0.2	-0.2
- other industrial sectors	114492	113563	103085	107693	108660	110501	112167	112436	114258	116857	120479	-1.0	0.5	0.3	0.4
Residential	286291	311793	311545	311971	298542	299594	296933	298540	301009	303725	303245	0.8	-0.4	-0.1	0.1
Tertiary	166083	179768	187856	181930	172265	171368	167259	168215	169544	172346	172611	1.2	-0.9	-0.3	0.2
Transport	342901	368665	367191	371987	358443	352759	354602	354943	359206	362096	366986	0.7	-0.2	-0.1	0.2
by fuel															
Solids	61779	54424	49673	48396	46049	43058	41182	39790	37899	36225	34454	-2.2	-0.8	-1.1	-0.9
Oil	485890	502788	457366	440656	407882	391518	379332	370260	365014	363481	361555	-0.6	-1.1	-0.7	-0.2
Gas	266925	285438	269920	271580	251689	251363	248334	247896	247261	245785	249377	0.1	-0.7	-0.1	0.0
Electricity	217599	239418	245271	254509	254919	264128	275763	286183	299289	314052	323069	1.2	0.4	0.8	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55316	55781	56041	55856	56417	57242	58019	58386	1.5	0.4	0.0	0.2
Renewable energy forms	49480	56250	81825	100154	119123	123004	124620	124896	125946	125902	122809	5.2	3.8	0.5	-0.1
Other	0	0	0	67	264	428	652	935	1394	1858	2261	0.0	0.0	9.5	6.4
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194876**	**245063**	**264319**	**282449**	**299844**	**316529**	**330560**	**342242**	**5.4**	**5.1**	**1.4**	**1.0**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4624.2**	**4285.8**	**4111.8**	**3785.7**	**3540.4**	**3385.4**	**3208.5**	**3125.4**	**-0.7**	**-1.2**	**-1.2**	**-1.0**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.3	1903.9	1829.4	1603.2	1395.2	1265.6	1097.0	1017.9		-1.3	-1.7	-2.2
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.8	2382.0	2282.4	2182.5	2145.2	2119.8	2111.5	2107.5		-1.1	-0.9	-0.2
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3591.2**	**3254.6**	**3114.0**	**2872.9**	**2644.0**	**2503.9**	**2425.0**	**2357.1**	**-0.5**	**-1.5**	**-1.2**	**-1.0**
Power generation/District heating	1404.5	1483.1	1341.6	1201.0	1037.0	969.8	790.8	618.5	518.0	459.9	400.7	-0.5	-2.5	-2.7	-3.3
Energy Branch	170.1	174.2	159.8	149.8	139.4	130.8	124.3	116.3	110.5	106.1	103.4	-0.6	-1.4	-1.1	-0.9
Industry	693.6	640.7	520.3	538.9	508.4	492.9	483.8	457.0	433.4	425.6	424.0	-2.8	-0.2	-0.5	-0.7
Residential	461.0	491.2	457.9	430.8	392.4	379.8	359.2	350.0	339.2	332.2	323.2	-0.1	-1.5	-0.9	-0.5
Tertiary	255.7	266.4	249.2	220.6	195.4	181.5	159.5	151.7	144.9	140.5	137.5	-0.3	-2.4	-2.0	-0.7
Transport	1001.0	1082.7	1050.9	1050.1	982.0	959.3	955.3	950.4	958.0	960.7	968.4	0.5	-0.7	-0.3	0.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**277.8**	**238.5**	**225.6**	**210.1**	**105.5**	**84.2**	**-1.0**	**1.5**	**-1.4**	**-5.1**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**670.8**	**671.4**	**678.0**	**684.1**	**-1.5**	**-0.9**	**-1.2**	**0.1**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.4**	**75.4**	**72.3**	**66.6**	**62.3**	**59.6**	**56.4**	**55.0**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: REF2012tplusF			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.6	105.6	96.7	89.9	84.2	79.4	74.4	-1.2	-2.1	-1.9	-1.3
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.91	1.78	1.65	1.55	1.49	1.44	-0.7	-0.9	-0.9	-1.0
Import Dependency %	46.7	52.5	52.7	53.8	53.0	54.2	55.1	54.7	54.7	55.4	56.5				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.5	2042.1	2151.7	2252.0	2318.1	2406.7	2509.3	2596.8	3.7	2.7	1.0	0.7
as % of GDP	10.2	11.4	12.8	14.1	14.3	13.9	13.5	13.0	12.6	12.2	11.8				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.3	85.4	81.1	76.9	73.3	70.8	68.3		-0.9	-1.2	-0.9
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	84.0	77.8	71.4	66.8	62.5	58.5	54.1	-0.5	-1.7	-1.6	-1.4
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	78.7	71.8	64.6	60.2	56.2	53.0	49.3	0.0	-2.4	-2.0	-1.3
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.1	29.0	26.8	25.5	24.8	24.3	24.0	-0.6	-1.6	-1.8	-0.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.8	44.2	41.9	40.4	39.4	38.4	37.7	37.1	0.3	-0.9	-0.9	-0.4
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.23	0.18	0.13	0.11	0.09	0.08	-1.6	-2.8	-3.2	-4.1
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.74	1.69	1.65	1.62	1.61	-0.8	-0.7	-0.5	-0.4
Industry	2.09	1.94	1.79	1.77	1.66	1.61	1.58	1.50	1.42	1.39	1.37	-1.5	-0.7	-0.5	-0.7
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.17	1.13	1.09	1.07	-0.9	-1.1	-0.8	-0.6
Tertiary	1.54	1.48	1.33	1.21	1.13	1.06	0.95	0.90	0.85	0.81	0.80	-1.5	-1.6	-1.7	-0.9
Transport	2.92	2.94	2.86	2.82	2.74	2.72	2.69	2.68	2.67	2.65	2.64	-0.2	-0.4	-0.2	-0.1
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.0	22.7	24.4	25.8	27.0	27.9	28.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.2	12.0	12.5	12.9	13.4	14.1				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3416143**	**3417103**	**3526993**	**3667044**	**3810604**	**3999241**	**4210248**	**4347499**	**1.0**	**0.3**	**0.7**	**0.9**
Nuclear energy	945027	997733	916685	887133	744275	700745	798536	868963	899072	923584	925368	-0.3	-2.1	0.7	0.7
Solids	933660	974939	830048	802985	695187	634705	475408	338823	316001	348162	364411	-1.2	-1.8	-3.7	-1.3
Oil (including refinery gas)	181203	141358	86851	46047	26351	24719	20367	20887	21379	22072	21396	-7.1	-11.2	-2.5	0.2
Gas (including derived gases)	514392	699743	795653	752612	707159	724245	738503	771635	789791	800906	787806	4.5	-1.2	0.4	0.3
Biomass-waste	46848	83787	145901	190537	221059	232213	244380	272146	315813	329348	341583	12.0	4.2	1.0	1.7
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383199	396304	408416	415190	418892	425350	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263519	493091	635340	771467	857183	909025	994478	1085475	21.0	12.7	4.6	1.7
Solar	118	1459	22363	96144	143662	176869	206134	250245	305813	332001	347866	68.9	20.4	3.7	2.7
Geothermal and other renewables	5358	5930	6831	8712	12116	14959	15945	22307	27156	40804	48243	2.5	5.9	2.8	5.7
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930091**	**1020608**	**1068184**	**1139437**	**1200565**	**1276176**	**1332501**	**1384829**	**2.6**	**2.0**	**1.1**	**1.0**
Nuclear energy	136924	134494	131323	123150	111162	96620	107067	115262	119221	122229	122236	-0.4	-1.7	-0.4	0.7
Renewable energy	114281	147780	226757	318900	439930	518253	583930	638972	695773	745304	788875	7.1	6.9	2.9	1.5
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122425	124880	128891	130589	132262	134472	1.0	0.7	0.3	0.4
Wind	12893	40510	84512	123698	206837	259330	306665	336105	356156	386066	416514	20.7	9.4	4.0	1.5
Solar	180	1740	29846	76309	110837	133698	149351	170783	205486	220708	230983	66.7	14.0	3.0	2.2
Other renewables (tidal etc.)	0	0	240	586	1655	2800	3033	3193	3542	6268	6906	0.0	21.3	6.2	4.2
Thermal power	398853	429386	480034	488042	469516	453312	448440	446331	461183	464968	473718	1.9	-0.2	-0.5	0.3
of which cogeneration units	92439	98998	101203	102082	112459	114394	114917	120643	127184	136115	138177	0.9	1.1	0.2	0.9
of which CCS units	0	0	0	0	904	904	1614	7554	18146	34422	38409	0.0	0.0	6.0	17.2
Solids fired	186470	180630	175756	163212	141533	121308	103796	90400	87684	86635	81361	-0.6	-2.1	-3.1	-1.2
Gas fired	129190	169054	224922	253067	259228	266067	280845	291675	296751	298216	302087	5.7	1.4	0.8	0.4
Oil fired	67499	59434	54039	42254	33187	27457	23519	19708	20759	19695	21359	-2.2	-4.8	-3.4	-0.5
Biomass-waste fired	15128	19615	24590	28716	34666	37570	39320	42903	53878	57521	65334	5.0	3.5	1.3	2.6
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	960	1645	2109	2901	3576	2.5	2.2	0.6	6.8
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.6	36.2	35.4	35.0	34.5	34.7	34.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.7	41.3	42.7	43.1	43.7	43.9	44.2				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.5	16.1	16.4	16.8	16.7	16.1				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.7	3.4	5.0	6.9				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.2	60.8	66.3	70.3	71.8	72.2	73.0				
- nuclear	31.4	30.4	27.5	26.0	21.8	19.9	21.8	22.8	22.5	21.9	21.3				
- renewable energy forms	14.4	14.4	21.0	27.1	36.4	40.9	44.6	47.5	49.3	50.2	51.7				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6756.2**	**7047.8**	**7494.3**	**7964.8**	**8291.0**	**8630.6**	**8887.9**	**9151.0**	**0.9**	**0.9**	**1.2**	**0.7**
Public road transport	519.6	527.2	512.8	531.4	550.2	574.3	600.9	620.7	642.2	656.8	671.8	-0.1	0.7	0.9	0.6
Private cars and motorcycles	4425.4	4694.5	4893.4	5053.0	5195.5	5454.8	5711.8	5881.1	6051.7	6176.6	6302.7	1.0	0.6	1.0	0.5
Rail	447.8	459.7	496.4	536.6	583.4	647.0	720.7	775.2	829.4	867.0	904.4	1.0	1.6	2.1	1.1
Aviation	459.7	530.7	525.6	595.7	677.8	775.3	886.4	967.5	1059.2	1138.1	1221.5	1.4	2.6	2.7	1.6
Inland navigation	41.7	39.5	38.1	39.4	41.0	42.9	45.0	46.6	48.1	49.4	50.6	-0.9	0.7	0.9	0.6
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.9**	**2937.3**	**3173.4**	**3426.8**	**3564.2**	**3709.0**	**3806.2**	**3904.6**	**1.1**	**1.7**	**1.6**	**0.7**
Trucks	1522.0	1803.3	1764.4	1921.1	2074.7	2232.5	2397.2	2492.9	2593.3	2659.8	2731.0	1.5	1.6	1.5	0.7
Rail	405.5	416.0	392.5	435.7	486.0	540.3	601.9	631.8	663.1	684.1	702.1	-0.3	2.2	2.2	0.8
Inland navigation	300.1	325.9	336.6	356.1	376.6	400.6	427.6	439.5	452.6	462.3	471.5	1.2	1.1	1.3	0.5
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369510**	**355913**	**350138**	**351907**	**352189**	**356402**	**359261**	**364112**	**0.7**	**-0.3**	**-0.1**	**0.2**
Public road transport	7580	7663	7522	7716	7793	7841	7915	7986	8113	8157	8235	-0.1	0.4	0.2	0.2
Private cars and motorcycles	178015	181818	182270	176044	157092	145691	141615	140285	140674	141079	142285	0.2	-1.5	-1.0	0.0
Trucks	95660	111643	112043	117814	120021	122576	127381	129214	131227	132138	133971	1.6	0.7	0.6	0.3
Rail	8093	7855	7399	7954	8553	9177	9823	9955	10003	9856	9635	-0.9	1.5	1.4	-0.1
Aviation	45492	50512	49820	53837	56062	58139	58115	57554	59065	60644	62563	0.9	1.2	0.4	0.4
Inland navigation	5973	6575	5892	6145	6392	6715	7059	7195	7320	7386	7423	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EEREF2012tp												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831603**	**807039**	**768617**	**759481**	**762551**	**773611**	**772270**	**756520**	**-1.2**	**-0.4**	**-0.6**	**0.0**
Solids	214627	196059	163855	149978	139407	124742	85254	68644	68188	65787	70844	-2.7	-1.6	-4.8	-0.9
Oil	176084	136469	103565	90791	77413	65119	55076	43039	33760	22939	16155	-5.2	-2.9	-3.3	-5.9
Natural gas	209437	190678	158525	149149	140909	124742	107197	99034	94013	82152	69868	-2.7	-1.2	-2.7	-2.1
Nuclear	243841	257516	236563	229092	192130	172826	184787	189566	194621	197371	194952	-0.3	-2.1	-0.4	0.3
Renewable energy sources	103944	123918	178977	212593	257179	281188	327166	362268	383030	404022	404702	5.6	3.7	2.4	1.1
Hydro	30818	26817	32208	31687	32181	33035	34543	35845	36525	36945	37347	0.4	0.0	0.7	0.4
Biomass & Waste	66071	84883	124361	136223	150582	151760	170091	174442	181727	186996	179818	6.5	1.9	1.2	0.3
Wind	1913	6058	12829	22662	42384	58213	74562	84338	88134	95665	100008	21.0	12.7	5.8	1.5
Solar and others	430	806	3691	14047	22785	28727	33075	38333	43412	46834	47258	24.0	20.0	3.8	1.8
Geothermal	4712	5354	5888	7974	9247	9453	14895	29310	33231	37582	40271	2.3	4.6	4.9	5.1
Net Imports	**829314**	**988719**	**956735**	**967983**	**909455**	**911750**	**890923**	**885671**	**892039**	**906624**	**937124**	**1.4**	**-0.5**	**-0.2**	**0.3**
Solids	98273	125211	110927	116118	94901	86721	75633	56766	46073	42460	48371	1.2	-1.5	-2.2	-2.2
Oil	535238	604030	563977	551740	527919	519052	515366	517145	518000	526469	531046	0.5	-0.7	-0.2	0.1
- Crude oil and Feedstocks	518046	585121	541240	527800	506550	496323	489514	488315	485583	488871	487639	0.4	-0.7	-0.3	0.0
- Oil products	17192	18909	22737	23940	21370	22729	25852	28830	32417	37597	43407	2.8	-0.6	1.9	2.6
Natural gas	193432	257849	276001	286216	266445	284172	273437	283704	297630	305955	326010	3.6	-0.4	0.3	0.9
Electricity	2029	1412	707	-129	-1602	-1507	-1492	-1742	-1819	-1880	-2103	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1746112**	**1660971**	**1622617**	**1590334**	**1585625**	**1601066**	**1611178**	**1622558**	**0.2**	**-0.6**	**-0.4**	**0.1**
Solids	321277	317986	280653	266096	234308	211463	160887	125410	114262	108248	119215	-1.3	-1.8	-3.7	-1.5
Oil	665142	683909	620735	589276	550730	528423	513078	501948	493067	489287	485218	-0.7	-1.2	-0.7	-0.3
Natural gas	396145	448380	444428	435148	406434	406912	377929	378376	385751	380511	386774	1.2	-0.9	-0.7	0.1
Nuclear	243841	257516	236563	229092	192130	172826	184787	189566	194621	197371	194952	-0.3	-2.1	-0.4	0.3
Electricity	2029	1412	707	-129	-1602	-1507	-1492	-1742	-1819	-1880	-2103	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226630	278971	304500	355144	392066	415184	437641	438502	5.9	4.2	2.4	1.1
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.0	10.1	7.9	7.1	6.7	7.3				
Oil	38.4	37.3	35.1	33.7	33.2	32.6	32.3	31.7	30.8	30.4	29.9				
Natural gas	22.9	24.5	25.1	24.9	24.5	25.1	23.8	23.9	24.1	23.6	23.8				
Nuclear	14.1	14.0	13.4	13.1	11.6	10.7	11.6	12.0	12.2	12.3	12.0				
Renewable energy forms	6.0	6.8	10.4	13.0	16.8	18.8	22.3	24.7	25.9	27.2	27.0				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3416273**	**3417499**	**3512449**	**3635152**	**3768975**	**4006180**	**4174632**	**4325409**	**1.0**	**0.3**	**0.6**	**0.9**
Self consumption and grid losses	396970	407042	377767	369057	352584	355557	360733	379366	423931	450668	490285	-0.5	-0.7	0.2	1.5
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383287**	**350708**	**332646**	**288803**	**277186**	**288098**	**292659**	**303342**	**0.8**	**-1.7**	**-1.9**	**0.2**
Solids	223038	228941	197605	186820	158055	139972	94843	63404	54962	53043	66290	-1.2	-2.2	-5.0	-1.8
Oil (including refinery gas)	40042	33244	20532	10882	5905	5166	4432	4145	3946	3881	3933	-6.5	-11.7	-2.8	-0.6
Gas (including derived gases)	102844	133713	149190	131875	124913	124644	107638	104907	112247	110239	109159	3.8	-1.8	-1.5	0.1
Biomass & Waste	14918	26452	45117	47734	55038	56010	69740	78362	86837	91211	86960	11.7	2.0	2.4	1.1
Geothermal heat	4114	4645	4828	5976	6796	6853	12149	26368	30105	34285	37000	1.6	3.5	6.0	5.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971267**	**907652**	**863046**	**853513**	**842500**	**833304**	**827128**	**817913**	**-0.7**	**-1.0**	**-0.6**	**-0.2**
Refineries	740500	763156	670015	646746	614553	592625	576768	564502	552799	545771	537607	-1.0	-0.9	-0.6	-0.4
Biofuels and hydrogen production	705	3101	13296	18232	26203	26358	26693	26752	26670	27518	28765	34.1	7.0	0.2	0.4
District heating	18667	19517	20813	22356	20225	19400	20165	19713	19207	18301	19022	1.1	-0.3	0.0	-0.3
Derived gases, cokeries etc.	316475	324348	297391	283933	246672	224664	229887	231533	234629	235539	232520	-0.6	-1.9	-0.7	0.1
Energy Branch Consumption	**86990**	**91952**	**88327**	**82441**	**77114**	**73358**	**69035**	**67496**	**68305**	**68067**	**69841**	**0.2**	**-1.3**	**-1.1**	**0.1**
Non-Energy Uses	**117117**	**120718**	**114884**	**119319**	**122303**	**121539**	**121555**	**121161**	**119760**	**119345**	**119914**	**-0.2**	**0.6**	**-0.1**	**-0.1**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170647**	**1135779**	**1128931**	**1122601**	**1123096**	**1133454**	**1140807**	**1146350**	**0.3**	**-0.2**	**-0.1**	**0.1**
by sector															
Industry	332412	330448	290978	304797	306480	305658	304669	303472	306200	306833	309171	-1.3	0.5	-0.1	0.1
- energy intensive industries	217920	216886	187894	197107	197778	195190	193640	191295	192262	189981	188173	-1.5	0.5	-0.2	-0.1
- other industrial sectors	114492	113563	103085	107689	108701	110468	111029	112177	113938	116852	120998	-1.0	0.5	0.2	0.4
Residential	286291	311793	311545	311942	298600	299525	296866	298046	300500	302878	302160	0.8	-0.4	-0.1	0.1
Tertiary	166083	179768	187856	181920	172256	171034	166580	167238	168512	171020	171155	1.2	-0.9	-0.3	0.1
Transport	342901	368665	367191	371988	358443	352714	354487	354340	358241	360076	363863	0.7	-0.2	-0.1	0.1
by fuel															
Solids	61779	54424	49673	48387	46039	43054	40853	39199	37796	35424	33225	-2.2	-0.8	-1.2	-1.0
Oil	485890	502788	457366	440593	407865	391561	379259	370256	364917	362479	359464	-0.6	-1.1	-0.7	-0.3
Gas	266925	285438	269920	271625	251721	251100	239185	241483	241473	238544	244010	0.1	-0.7	-0.5	0.1
Electricity	217599	239418	245271	254518	254958	263298	273814	283397	299364	311037	319921	1.2	0.4	0.7	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55313	55800	56261	57373	57090	57454	57545	56575	1.5	0.4	0.3	-0.1
Renewable energy forms	49480	56250	81825	100144	119133	123229	131465	130736	131057	133922	130898	5.2	3.8	1.0	0.0
Other	0	0	0	67	264	428	652	935	1394	1856	2257	0.0	0.0	9.5	6.4
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194777**	**245087**	**269100**	**315349**	**338256**	**357293**	**373697**	**372667**	**5.4**	**5.1**	**2.6**	**0.8**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4624.3**	**4285.9**	**4088.6**	**3657.4**	**3380.7**	**3093.8**	**2980.3**	**2920.6**	**-0.7**	**-1.2**	**-1.6**	**-1.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.6	1903.8	1806.5	1491.9	1244.5	981.4	885.9	826.5		-1.3	-2.4	-2.9
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.7	2382.1	2282.0	2165.6	2136.2	2112.4	2094.4	2094.2		-1.1	-0.9	-0.2
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3591.3**	**3254.7**	**3091.1**	**2748.3**	**2487.2**	**2316.4**	**2227.3**	**2173.0**	**-0.5**	**-1.5**	**-1.7**	**-1.2**
Power generation/District heating	1404.5	1483.1	1341.6	1201.3	1037.1	948.5	700.2	488.8	348.8	291.3	246.1	-0.5	-2.5	-3.9	-5.1
Energy Branch	170.1	174.2	159.8	149.8	139.5	130.2	118.8	113.4	108.9	104.9	102.7	-0.6	-1.4	-1.6	-0.7
Industry	693.6	640.7	520.3	538.8	508.3	491.3	454.5	432.6	417.1	400.8	401.0	-2.8	-0.2	-1.1	-0.6
Residential	461.0	491.2	457.9	430.8	392.4	379.8	359.1	349.9	339.1	332.2	323.2	-0.1	-1.5	-0.9	-0.5
Tertiary	255.7	266.4	249.2	220.6	195.5	182.1	160.7	153.8	147.1	143.1	140.3	-0.3	-2.4	-1.9	-0.7
Transport	1001.0	1082.7	1050.9	1050.1	982.0	959.2	955.0	948.7	955.3	955.1	959.7	0.5	-0.7	-0.3	0.0
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**277.5**	**234.8**	**222.7**	**106.0**	**75.0**	**63.6**	**-1.0**	**1.5**	**-1.5**	**-6.3**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**670.8**	**671.4**	**678.0**	**684.1**	**-1.5**	**-0.9**	**-1.2**	**0.1**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.4**	**75.4**	**71.9**	**64.3**	**59.5**	**54.4**	**52.4**	**51.4**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EEREF2012tp			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.6	105.0	95.4	88.7	83.6	78.5	73.9	-1.2	-2.1	-2.0	-1.3
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.90	1.73	1.57	1.45	1.38	1.34	-0.7	-0.9	-1.2	-1.3
Import Dependency %	46.7	52.5	52.7	53.8	53.0	54.3	54.0	53.7	53.6	54.0	55.3				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.5	2041.6	2155.4	2256.0	2326.1	2426.0	2515.7	2597.6	3.7	2.7	1.0	0.7
as % of GDP	10.2	11.4	12.8	14.1	14.3	14.0	13.5	13.0	12.7	12.3	11.8				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.3	85.4	80.5	76.6	73.7	70.7	68.3		-0.9	-1.2	-0.8
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	84.0	77.8	71.4	66.7	62.4	58.3	53.9	-0.5	-1.7	-1.6	-1.4
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	78.7	71.7	64.3	59.8	55.9	52.6	48.9	0.0	-2.4	-2.0	-1.4
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.1	29.0	26.8	25.5	24.7	24.2	23.7	-0.6	-1.6	-1.8	-0.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.8	44.2	41.9	40.4	39.4	38.4	37.7	37.1	0.3	-0.9	-0.9	-0.4
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.16	0.11	0.07	0.06	0.05	-1.6	-2.8	-4.4	-5.8
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.72	1.68	1.64	1.61	1.59	-0.8	-0.7	-0.6	-0.4
Industry	2.09	1.94	1.79	1.77	1.66	1.61	1.49	1.43	1.36	1.31	1.30	-1.5	-0.8	-1.1	-0.7
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.17	1.13	1.10	1.07	-0.9	-1.1	-0.8	-0.6
Tertiary	1.54	1.48	1.33	1.21	1.13	1.06	0.96	0.92	0.87	0.84	0.82	-1.5	-1.5	-1.6	-0.8
Transport	2.92	2.94	2.86	2.82	2.74	2.72	2.69	2.68	2.67	2.65	2.64	-0.2	-0.4	-0.2	-0.1
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.0	23.2	27.3	29.2	30.5	31.6	31.3				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.2	12.2	12.9	13.2	13.8	14.3				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3416273**	**3417499**	**3512449**	**3635152**	**3768975**	**4006180**	**4174632**	**4325409**	**1.0**	**0.3**	**0.6**	**0.9**
Nuclear energy	945027	997733	916685	887134	744027	674641	728730	757233	793580	819198	830918	-0.3	-2.1	-0.2	0.7
Solids	933660	974939	830048	803284	694245	616329	423482	286975	279546	289864	383486	-1.2	-1.8	-4.8	-0.5
Oil (including refinery gas)	181203	141358	86851	46006	26248	24143	21609	21936	20680	21092	21014	-7.1	-11.3	-1.9	-0.1
Gas (including derived gases)	514392	699743	795653	752631	709359	712182	650916	656965	698438	685021	684939	4.5	-1.1	-0.9	0.3
Biomass-waste	46848	83787	145901	190393	220804	230831	301859	347900	395384	411046	386208	12.0	4.2	3.2	1.2
Hydro (pumping excluded)	358408	311883	374576	368453	374203	384124	401665	416802	424714	429587	434269	0.4	0.0	0.7	0.4
Wind	22253	70453	149202	263517	492833	676897	867003	980678	1024811	1112385	1162884	21.0	12.7	5.8	1.5
Solar	118	1459	22363	96144	143662	177766	215788	257904	316342	342089	352437	68.9	20.4	4.2	2.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	24101	42581	52683	64351	69255	2.5	5.9	7.1	5.4
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930079**	**1020452**	**1083464**	**1176138**	**1248640**	**1330980**	**1376611**	**1411747**	**2.6**	**2.0**	**1.4**	**0.9**
Nuclear energy	136924	134494	131323	123150	111162	96796	98875	100424	104980	108188	109688	-0.4	-1.7	-1.2	0.5
Renewable energy	114281	147780	226757	318900	439843	535831	627363	695178	751925	801282	828136	7.1	6.8	3.6	1.4
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122643	127080	132075	134547	136767	138749	1.0	0.7	0.5	0.4
Wind	12893	40510	84512	123698	206749	276105	342752	383896	402069	432537	449562	20.7	9.4	5.2	1.4
Solar	180	1740	29846	76309	110837	134048	153503	174390	208118	221989	229103	66.7	14.0	3.3	2.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	4029	4817	7192	9989	10722	0.0	21.3	9.3	5.0
Thermal power	398853	429386	480034	488029	469448	450838	449899	453037	474075	467141	473922	1.9	-0.2	-0.4	0.3
of which cogeneration units	92439	98998	101203	102095	112523	115228	121759	127854	135206	144381	147777	0.9	1.1	0.8	1.0
of which CCS units	0	0	0	0	904	904	1217	11168	46040	53428	76417	0.0	0.0	3.0	23.0
Solids fired	186470	180630	175756	163212	141533	120625	99240	84100	80329	76657	76662	-0.6	-2.1	-3.5	-1.3
Gas fired	129190	169054	224922	253067	259247	263993	272388	285689	296238	284709	282117	5.7	1.4	0.5	0.2
Oil fired	67499	59434	54039	42242	33119	27379	23315	19619	19190	19793	22407	-2.2	-4.8	-3.4	-0.2
Biomass-waste fired	15128	19615	24590	28716	34646	37931	53343	60129	74321	81430	87824	5.0	3.5	4.4	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1613	3500	3996	4551	4912	2.5	2.2	6.0	5.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.6	35.6	34.1	33.3	33.0	33.2	33.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.7	41.2	42.1	41.7	42.7	42.5	43.1				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.3	17.7	17.8	17.8	17.0	15.8				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	2.5	6.2	7.3	10.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.2	61.5	69.8	74.4	75.1	76.1	74.8				
- nuclear	31.4	30.4	27.5	26.0	21.8	19.2	20.0	20.1	19.8	19.6	19.2				
- renewable energy forms	14.4	14.4	21.0	27.1	36.4	42.3	49.8	54.3	55.3	56.5	55.6				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6756.2**	**7047.8**	**7493.9**	**7963.7**	**8283.6**	**8618.3**	**8861.3**	**9109.6**	**0.9**	**0.9**	**1.2**	**0.7**
Public road transport	519.6	527.2	512.8	531.4	550.2	574.4	601.0	621.5	643.4	659.5	675.8	-0.1	0.7	0.9	0.6
Private cars and motorcycles	4425.4	4694.5	4893.4	5053.0	5195.5	5454.7	5711.6	5879.5	6048.7	6170.1	6292.1	1.0	0.6	1.0	0.5
Rail	447.8	459.7	496.4	536.6	583.4	647.1	720.9	776.4	831.5	871.5	911.6	1.0	1.6	2.1	1.2
Aviation	459.7	530.7	525.6	595.7	677.8	774.9	885.2	959.4	1046.3	1110.3	1178.7	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.4	41.0	42.9	45.0	46.8	48.4	49.9	51.4	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.9**	**2937.3**	**3173.4**	**3426.4**	**3563.5**	**3708.0**	**3804.2**	**3902.3**	**1.1**	**1.7**	**1.6**	**0.7**
Trucks	1522.0	1803.3	1764.4	1921.1	2074.7	2232.5	2397.3	2493.0	2593.4	2659.9	2730.9	1.5	1.6	1.5	0.7
Rail	405.5	416.0	392.5	435.7	486.0	540.3	601.5	631.1	662.2	682.4	700.3	-0.3	2.2	2.2	0.8
Inland navigation	300.1	325.9	336.6	356.1	376.6	400.6	427.5	439.4	452.4	461.9	471.1	1.2	1.1	1.3	0.5
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369510**	**355913**	**350095**	**351819**	**351611**	**355469**	**357288**	**361034**	**0.7**	**-0.3**	**-0.1**	**0.1**
Public road transport	7580	7663	7522	7716	7793	7841	7917	7993	8124	8179	8267	-0.1	0.4	0.2	0.2
Private cars and motorcycles	178015	181818	182270	176044	157092	145688	141628	140278	140656	140994	142096	0.2	-1.5	-1.0	0.0
Trucks	95660	111643	112043	117814	120021	122573	127385	129218	131228	132137	133974	1.6	0.7	0.6	0.3
Rail	8093	7855	7399	7954	8553	9177	9818	9947	9991	9841	9620	-0.9	1.5	1.4	-0.1
Aviation	45492	50512	49820	53837	56062	58101	58010	56970	58131	58713	59598	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6145	6392	6715	7060	7206	7338	7423	7478	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE25DEC_d											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831444**	**803947**	**765326**	**741079**	**792186**	**865854**	**914808**	**969301**	**-1.2**	**-0.5**	**-0.8**	**1.4**
Solids	214627	196059	163855	149857	138706	123526	79364	75176	86364	85004	95055	-2.7	-1.7	-5.4	0.9
Oil	176084	136469	103565	90650	77089	63740	52994	38066	26283	15501	9717	-5.2	-2.9	-3.7	-8.1
Natural gas	209437	190678	158525	149175	139739	117107	98366	86336	77911	72198	62656	-2.7	-1.3	-3.4	-2.2
Nuclear	243841	257516	236563	229106	191457	180335	190315	216393	237802	246410	259453	-0.3	-2.1	-0.1	1.6
Renewable energy sources	103944	123918	178977	212656	256956	280618	320040	376215	437494	495696	542420	5.6	3.7	2.2	2.7
Hydro	30818	26817	32208	31687	32181	33025	34206	35763	36482	36980	37600	0.4	0.0	0.6	0.5
Biomass & Waste	66071	84883	124361	136284	150330	150673	162906	184375	212922	244428	268747	6.5	1.9	0.8	2.5
Wind	1913	6058	12829	22662	42397	59186	76354	87526	103384	113076	122446	21.0	12.7	6.1	2.4
Solar and others	430	806	3691	14049	22796	28247	34224	42054	51533	60737	65708	24.0	20.0	4.1	3.3
Geothermal	4712	5354	5888	7974	9252	9486	12350	26497	33173	40474	47919	2.3	4.6	2.9	7.0
Net Imports	**829314**	**988719**	**956735**	**967825**	**903668**	**875647**	**835281**	**771247**	**697164**	**652326**	**609655**	**1.4**	**-0.6**	**-0.8**	**-1.6**
Solids	98273	125211	110927	115959	93849	84961	66850	50931	42165	47070	54267	1.2	-1.7	-3.3	-1.0
Oil	535238	604030	563977	551776	526129	506067	490765	445719	380361	311606	250227	0.5	-0.7	-0.7	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527783	505240	486722	471795	436711	386824	335671	286898	0.4	-0.7	-0.7	-2.5
- Oil products	17192	18909	22737	23992	20889	19345	18970	9008	-6462	-24065	-36671	2.8	-0.8	-1.0	0.0
Natural gas	193432	257849	276001	286170	263551	262916	252177	243394	236661	248595	253511	3.6	-0.5	-0.4	0.0
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1740	-1818	-1879	-2096	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745803**	**1652199**	**1583545**	**1517682**	**1502789**	**1502564**	**1505976**	**1516655**	**0.2**	**-0.7**	**-0.8**	**0.0**
Solids	321277	317986	280653	265816	232554	208487	146214	126107	128529	132074	149323	-1.3	-1.9	-4.5	0.1
Oil	665142	683909	620735	589177	548720	514369	487727	427419	351879	273200	206253	-0.7	-1.2	-1.2	-4.2
Natural gas	396145	448380	444428	435128	402372	378032	347896	325453	308882	313541	307557	1.2	-1.0	-1.4	-0.6
Nuclear	243841	257516	236563	229106	191457	180335	190315	216393	237802	246410	259453	-0.3	-2.1	-0.1	1.6
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1740	-1818	-1879	-2096	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226705	278698	303830	347021	409159	477290	542631	596166	5.9	4.2	2.2	2.7
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	13.2	9.6	8.4	8.6	8.8	9.8				
Oil	38.4	37.3	35.1	33.7	33.2	32.5	32.1	28.4	23.4	18.1	13.6				
Natural gas	22.9	24.5	25.1	24.9	24.4	23.9	22.9	21.7	20.6	20.8	20.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.4	12.5	14.4	15.8	16.4	17.1				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.2	22.9	27.2	31.8	36.0	39.3				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415864**	**3392575**	**3433983**	**3521066**	**3877566**	**4497350**	**4933460**	**5378081**	**1.0**	**0.2**	**0.4**	**2.1**
Self consumption and grid losses	396970	407042	377767	368942	349448	346313	354118	384977	469412	537575	628480	-0.5	-0.8	0.1	2.9
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383167**	**347005**	**319581**	**263260**	**276844**	**318740**	**355937**	**387617**	**0.8**	**-1.8**	**-2.7**	**2.0**
Solids	223038	228941	197605	186548	156397	139728	83915	71852	83291	92584	113913	-1.2	-2.3	-6.0	1.5
Oil (including refinery gas)	40042	33244	20532	10903	5853	4753	3682	3106	2605	2131	1453	-6.5	-11.8	-4.5	-4.5
Gas (including derived gases)	102844	133713	149190	131882	122847	107176	93753	98940	105870	115096	114231	3.8	-1.9	-2.7	1.0
Biomass & Waste	14918	26452	45117	47857	55113	61019	72167	79529	91656	101837	106318	11.7	2.0	2.7	2.0
Geothermal heat	4114	4645	4828	5976	6796	6905	9744	23417	29558	36119	41961	1.6	3.5	3.7	7.6
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5760	8170	9741	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971028**	**905006**	**855510**	**834844**	**839867**	**831019**	**800692**	**783325**	**-0.7**	**-1.0**	**-0.8**	**-0.3**
Refineries	740500	763156	670015	646609	612971	581569	556452	505593	441463	375620	318228	-1.0	-0.9	-1.0	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24912	60738	102228	133347	162195	34.1	6.9	-0.4	9.8
District heating	18667	19517	20813	22253	20061	17368	17959	16226	13430	11832	12670	1.1	-0.4	-1.1	-1.7
Derived gases, cokeries etc.	316475	324348	297391	283945	245945	231217	235520	257309	273897	279893	290233	-0.6	-1.9	-0.4	1.0
Energy Branch Consumption	**86990**	**91952**	**88327**	**82420**	**76779**	**70555**	**65335**	**61094**	**59588**	**57117**	**57871**	**0.2**	**-1.4**	**-1.6**	**-0.6**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122348**	**121118**	**118980**	**116711**	**112934**	**111914**	**111803**	**-0.2**	**0.6**	**-0.3**	**-0.3**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170526**	**1129628**	**1091988**	**1064222**	**1027644**	**996806**	**976814**	**963921**	**0.3**	**-0.2**	**-0.6**	**-0.5**
by sector															
Industry	332412	330448	290978	304773	305551	296688	287661	275233	262820	258400	255269	-1.3	0.5	-0.6	-0.6
- energy intensive industries	217920	216886	187894	197085	197311	189748	182711	174499	167879	163910	159223	-1.5	0.5	-0.8	-0.7
- other industrial sectors	114492	113563	103085	107688	108240	106940	104950	100734	94941	94490	96046	-1.0	0.5	-0.3	-0.4
Residential	286291	311793	311545	311966	297301	287029	280591	270390	269207	267629	266350	0.8	-0.5	-0.6	-0.3
Tertiary	166083	179768	187856	181913	169791	164596	157477	154657	154035	152932	153116	1.2	-1.0	-0.8	-0.1
Transport	342901	368665	367191	371873	356986	343675	338492	327364	310744	297853	289186	0.7	-0.3	-0.5	-0.8
by fuel															
Solids	61779	54424	49673	48406	45963	41407	37989	32461	26404	21976	19050	-2.2	-0.8	-1.9	-3.4
Oil	485890	502788	457366	440511	406073	379371	357925	306473	247536	194098	145528	-0.6	-1.2	-1.3	-4.4
Gas	266925	285438	269920	271611	249818	241390	226204	197505	167812	146177	128524	0.1	-0.8	-1.0	-2.8
Electricity	217599	239418	245271	254494	253109	257380	264688	276023	299154	318899	336301	1.2	0.3	0.4	1.2
Heat (from CHP and District Heating)	46015	52355	53515	55297	55505	53991	55135	53738	54700	54578	55243	1.5	0.4	-0.1	0.0
Renewable energy forms	49480	56250	81825	100141	118900	117853	121427	146472	172345	204206	232560	5.2	3.8	0.2	3.3
Other	0	0	0	65	261	597	855	14970	28854	36880	46715	0.0	0.0	12.6	22.1
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194892**	**244883**	**266631**	**307278**	**353668**	**410539**	**463124**	**506893**	**5.4**	**5.1**	**2.3**	**2.5**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4622.9**	**4263.0**	**3966.6**	**3444.7**	**2814.6**	**2108.3**	**1679.8**	**1346.0**	**-0.7**	**-1.3**	**-2.1**	**-4.6**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.3	1890.3	1744.7	1371.1	1130.5	751.5	553.9	394.4		-1.4	-3.2	-6.0
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.6	2372.6	2221.9	2073.5	1684.1	1356.7	1125.9	951.7		-1.2	-1.3	-3.8
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.0**	**3231.8**	**2970.1**	**2538.8**	**2100.8**	**1608.9**	**1255.4**	**960.5**	**-0.5**	**-1.6**	**-2.4**	**-4.7**
Power generation/District heating	1404.5	1483.1	1341.6	1200.1	1025.1	904.7	609.5	443.4	248.2	141.8	61.6	-0.5	-2.7	-5.1	-10.8
Energy Branch	170.1	174.2	159.8	149.7	138.9	123.3	111.9	98.8	83.5	70.9	60.1	-0.6	-1.4	-2.1	-3.1
Industry	693.6	640.7	520.3	538.7	506.5	472.0	423.0	356.9	281.9	239.3	206.4	-2.8	-0.3	-1.8	-3.5
Residential	461.0	491.2	457.9	430.9	390.8	363.8	339.1	285.8	238.1	191.5	143.5	-0.1	-1.6	-1.4	-4.2
Tertiary	255.7	266.4	249.2	220.7	192.5	175.3	151.5	125.7	107.6	88.0	68.6	-0.3	-2.5	-2.4	-3.9
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.1	903.8	790.3	649.5	524.0	420.1	0.5	-0.7	-0.8	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.6**	**276.5**	**231.6**	**222.7**	**100.1**	**61.9**	**34.4**	**-1.0**	**1.5**	**-1.7**	**-9.1**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**75.0**	**69.8**	**60.6**	**49.5**	**37.1**	**29.6**	**23.7**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE25DEC_d			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	116.0	102.5	91.1	84.1	78.5	73.4	69.1	-1.2	-2.1	-2.4	-1.4
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.88	1.67	1.40	1.07	0.83	0.63	-0.7	-0.9	-1.6	-4.7
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	53.0	49.3	44.6	41.6	38.6				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.4	2037.6	2156.4	2291.1	2408.7	2619.3	2807.1	2982.0	3.7	2.6	1.2	1.3
as % of GDP	10.2	11.4	12.8	14.1	14.3	14.0	13.7	13.5	13.7	13.7	13.6				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	91.0	82.9	76.0	69.4	63.3	59.6	56.4		-0.9	-1.8	-1.5
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	83.6	74.6	67.5	60.5	55.9	51.5	47.5	-0.5	-1.8	-2.1	-1.7
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	77.6	69.0	60.8	55.3	51.1	47.0	43.8	0.0	-2.5	-2.4	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.9	23.9	21.5	19.8	18.6	-0.6	-1.6	-2.1	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.5	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.14	0.10	0.05	0.03	0.01	-1.6	-2.9	-5.3	-12.4
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.52	1.28	1.07	0.87	-0.8	-0.7	-0.7	-3.3
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.47	1.30	1.07	0.93	0.81	-1.5	-0.8	-1.2	-2.9
Residential	1.61	1.58	1.47	1.38	1.31	1.27	1.21	1.06	0.88	0.72	0.54	-0.9	-1.1	-0.8	-4.0
Tertiary	1.54	1.48	1.33	1.21	1.13	1.07	0.96	0.81	0.70	0.58	0.45	-1.5	-1.6	-1.6	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.67	2.41	2.09	1.76	1.45	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.1	23.7	28.0	33.3	39.3	44.8	49.2				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	13.6	24.6	39.0	52.8	64.6				
Gross Electricity generation by source (in GWh$_e$)	**3007267**	**3287285**	**3328110**	**3415864**	**3392575**	**3433983**	**3521066**	**3877566**	**4497350**	**4933460**	**5378081**	**1.0**	**0.2**	**0.4**	**2.1**
Nuclear energy	945027	997733	916685	887192	741418	704452	752816	874405	983767	1035489	1115566	-0.3	-2.1	0.2	2.0
Solids	933660	974939	830048	802058	685246	606329	359147	279629	355482	439716	580505	-1.2	-1.9	-6.3	2.4
Oil (including refinery gas)	181203	141358	86851	46072	26110	21836	17087	16396	13294	10941	7080	-7.1	-11.3	-4.2	-4.3
Gas (including derived gases)	514392	699743	795653	752907	695759	592916	548708	606114	654270	701570	741852	4.5	-1.3	-2.3	1.5
Biomass-waste	46848	83787	145901	190811	221073	245047	302579	343878	398663	436508	452663	12.0	4.2	3.2	2.0
Hydro (pumping excluded)	358408	311883	374576	368453	374203	384015	397739	415852	424213	429997	437204	0.4	0.0	0.6	0.5
Wind	22253	70453	149202	263516	492988	688212	887839	1017740	1202144	1314840	1423788	21.0	12.7	6.1	2.4
Solar	118	1459	22363	96144	143662	174692	232960	281339	384382	459385	497917	68.9	20.4	5.0	3.9
Geothermal and other renewables	5358	5930	6831	8712	12116	16485	22193	42213	51146	65067	78412	2.5	5.9	6.2	6.5
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	29989	39947	43095	0.0	0.0	0.0	0.0
Net Generation Capacity in MW$_e$	**650058**	**711660**	**838114**	**930134**	**1019630**	**1078153**	**1177866**	**1253288**	**1434303**	**1517723**	**1605698**	**2.6**	**2.0**	**1.5**	**1.6**
Nuclear energy	136924	134494	131323	123150	111162	96480	101529	115363	129789	136412	146220	-0.4	-1.7	-0.9	1.8
Renewable energy	114281	147780	226757	318900	439905	536700	641546	721130	857145	952070	1018172	7.1	6.9	3.8	2.3
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122569	125387	131897	134294	136796	139263	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	206812	279169	348044	394609	463825	504441	542322	20.7	9.4	5.3	2.2
Solar	180	1740	29846	76309	110837	131564	163724	188558	252207	301387	324358	66.7	14.0	4.0	3.5
Other renewables (tidal etc.)	0	0	240	586	1655	3397	4391	6066	6818	9446	12229	0.0	21.3	10.2	5.3
Thermal power	398853	429386	480034	488085	468562	444973	434790	416796	447369	429241	441306	1.9	-0.2	-0.7	0.1
of which cogeneration units	92439	98998	101203	102144	112030	112469	119635	124845	134219	141086	145414	0.9	1.0	0.7	1.0
of which CCS units	0	0	0	0	904	904	2914	17342	86936	140736	205417	0.0	0.0	12.4	23.7
Solids fired	186470	180630	175756	163212	141212	120935	103545	87105	95824	99277	105655	-0.6	-2.2	-3.1	0.1
Gas fired	129190	169054	224922	253079	258989	258688	258402	252743	266496	238259	236467	5.7	1.4	0.0	-0.4
Oil fired	67499	59434	54039	42257	32824	26311	22176	17903	15113	11806	10104	-2.2	-4.9	-3.8	-3.9
Biomass-waste fired	15128	19615	24590	28744	34635	38121	49373	55936	66012	75104	83510	5.0	3.5	3.6	2.7
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	917	1294	3109	3924	4795	5570	2.5	2.2	3.7	7.6
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.4	34.9	33.0	34.1	34.3	35.4	36.2				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.6	39.7	40.5	39.6	40.1	40.4	41.6				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.3	17.4	17.1	16.6	15.7	14.9				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.7	1.7	7.3	9.9	15.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.5	64.4	73.7	76.7	77.1	76.5	75.1				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.5	21.4	22.6	22.0	21.2	20.9				
- renewable energy forms	14.4	14.4	21.0	27.2	36.7	43.9	52.4	54.2	55.1	55.3	54.2				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7450.1**	**7866.6**	**8129.5**	**8371.8**	**8563.6**	**8768.3**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.5	603.5	624.3	649.7	666.0	688.2	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.0	5613.5	5719.4	5791.3	5857.5	5930.9	1.0	0.6	0.8	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.3	724.4	783.1	844.4	889.4	936.2	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	773.3	880.2	955.9	1037.7	1100.4	1161.1	1.4	2.6	2.6	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.1	46.9	48.7	50.3	51.8	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3385.1**	**3510.2**	**3635.2**	**3713.0**	**3799.7**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.9	2426.9	2502.0	2545.1	2598.4	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	607.2	639.9	674.4	698.6	719.9	-0.3	2.2	2.2	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.0	443.4	458.8	469.3	481.3	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341091**	**335882**	**324776**	**308209**	**295372**	**286747**	**0.7**	**-0.3**	**-0.5**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7808	7830	7417	7126	6765	6517	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141051	132491	123761	108956	98351	91716	0.2	-1.5	-1.7	-1.8
Trucks	95660	111643	112043	117988	118898	118269	120893	119505	116870	114453	112314	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9891	10058	10158	10059	9897	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	57978	57687	56798	57704	58264	58739	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6143	6387	6752	7090	7237	7394	7479	7564	-0.1	0.8	1.1	0.3

Source: PRIMES

EU28: EE28DEC_d												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831437**	**801762**	**755841**	**725478**	**752677**	**809776**	**844531**	**893883**	**-1.2**	**-0.5**	**-1.0**	**1.0**
Solids	214627	196059	163855	149869	138232	123154	90202	72964	82829	79852	87778	-2.7	-1.7	-4.2	-0.1
Oil	176084	136469	103565	90646	77048	63601	52502	37441	25814	15218	9563	-5.2	-2.9	-3.8	-8.2
Natural gas	209437	190678	158525	149171	139082	113313	91950	80998	72555	64788	56354	-2.7	-1.3	-4.1	-2.4
Nuclear	243841	257516	236563	229105	190830	179824	187307	202952	217736	222201	240338	-0.3	-2.1	-0.2	1.3
Renewable energy sources	103944	123918	178977	212646	256569	275950	303517	358323	410842	462472	499849	5.6	3.7	1.7	2.5
Hydro	30818	26817	32208	31687	32181	33018	34250	35506	36325	36829	37369	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136273	149839	148537	152949	174836	200774	226912	246363	6.5	1.9	0.2	2.4
Wind	1913	6058	12829	22662	42476	57343	72675	82478	95714	106730	114608	21.0	12.7	5.5	2.3
Solar and others	430	806	3691	14050	22800	27677	32338	39917	48264	54969	58808	24.0	20.0	3.6	3.0
Geothermal	4712	5354	5888	7974	9273	9375	11305	25586	29765	37033	42702	2.3	4.6	2.0	6.9
Net Imports	**829314**	**988719**	**956735**	**967839**	**900458**	**866965**	**807173**	**734965**	**658732**	**602199**	**548661**	**1.4**	**-0.6**	**-1.1**	**-1.9**
Solids	98273	125211	110927	115992	93136	88046	69163	49599	39910	41369	42222	1.2	-1.7	-2.9	-2.4
Oil	535238	604030	563977	551766	525490	503628	482210	434054	369310	302311	243972	0.5	-0.7	-0.9	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527775	504790	485072	465782	428610	379144	329168	282412	0.4	-0.7	-0.8	-2.5
- Oil products	17192	18909	22737	23990	20700	18556	16428	5444	-9835	-26856	-38440	2.8	-0.9	-2.3	0.0
Natural gas	193432	257849	276001	286167	261728	253924	231722	221579	213435	216501	214771	3.6	-0.5	-1.2	-0.4
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1741	-1819	-1881	-2097	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745811**	**1646805**	**1565378**	**1473972**	**1426998**	**1408053**	**1385572**	**1380243**	**0.2**	**-0.7**	**-1.1**	**-0.3**
Solids	321277	317986	280653	265860	231368	211199	159365	122563	122739	121221	130000	-1.3	-1.9	-3.7	-1.0
Oil	665142	683909	620735	589163	548041	511791	478681	415129	340359	263623	199845	-0.7	-1.2	-1.3	-4.3
Natural gas	396145	448380	444428	435120	399892	365248	321025	298299	280301	274037	262515	1.2	-1.1	-2.2	-1.0
Nuclear	243841	257516	236563	229105	190830	179824	187307	202952	217736	222201	240338	-0.3	-2.1	-0.2	1.3
Electricity	2029	1412	707	-129	-1602	-1508	-1491	-1741	-1819	-1881	-2097	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226691	278276	298824	329085	389798	448738	506371	549642	5.9	4.2	1.7	2.6
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.5	10.8	8.6	8.7	8.7	9.4				
Oil	38.4	37.3	35.1	33.7	33.3	32.7	32.5	29.1	24.2	19.0	14.5				
Natural gas	22.9	24.5	25.1	24.9	24.3	23.3	21.8	20.9	19.9	19.8	19.0				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	12.7	14.2	15.5	16.0	17.4				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.1	22.3	27.3	31.9	36.5	39.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415806**	**3378459**	**3399299**	**3466728**	**3677657**	**4190014**	**4551660**	**4935085**	**1.0**	**0.2**	**0.3**	**1.8**
Self consumption and grid losses	396970	407042	377767	368945	347832	345068	347652	361511	432009	490276	567575	-0.5	-0.8	0.0	2.5
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383216**	**344914**	**318554**	**268464**	**269109**	**303605**	**329854**	**352983**	**0.8**	**-1.9**	**-2.5**	**1.4**
Solids	223038	228941	197605	186589	155340	143922	99837	74431	84828	90376	104545	-1.2	-2.4	-4.3	0.2
Oil (including refinery gas)	40042	33244	20532	10888	5803	4686	3564	2920	2502	1907	1431	-6.5	-11.9	-4.8	-4.5
Gas (including derived gases)	102844	133713	149190	131898	121704	101946	87327	91534	97445	99960	99748	3.8	-2.0	-3.3	0.7
Biomass & Waste	14918	26452	45117	47866	55270	61147	68894	77562	87490	95746	99228	11.7	2.1	2.2	1.8
Geothermal heat	4114	4645	4828	5976	6796	6853	8842	22662	26372	32968	37446	1.6	3.5	2.7	7.5
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4967	8898	10585	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970995**	**903441**	**851671**	**823574**	**813426**	**796188**	**762278**	**747900**	**-0.7**	**-1.0**	**-0.9**	**-0.5**
Refineries	740500	763156	670015	646597	612472	579693	549709	496255	432678	368330	313275	-1.0	-0.9	-1.1	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24801	58617	96526	127165	152884	34.1	6.9	-0.5	9.5
District heating	18667	19517	20813	22232	19700	16928	17643	19353	19464	18876	20172	1.1	-0.5	-1.1	0.7
Derived gases, cokeries etc.	316475	324348	297391	283944	245240	229693	231421	239201	247520	247907	261570	-0.6	-1.9	-0.6	0.6
Energy Branch Consumption	**86990**	**91952**	**88327**	**82418**	**76623**	**70107**	**64646**	**59052**	**56495**	**53300**	**52898**	**0.2**	**-1.4**	**-1.7**	**-1.0**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122382**	**120824**	**118046**	**112393**	**107013**	**102441**	**99350**	**-0.2**	**0.6**	**-0.4**	**-0.9**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170503**	**1125938**	**1074992**	**1019819**	**971214**	**932494**	**900118**	**875831**	**0.3**	**-0.3**	**-1.0**	**-0.8**
by sector															
Industry	332412	330448	290978	304755	304156	290815	278346	256170	238416	225347	217675	-1.3	0.4	-0.9	-1.2
- energy intensive industries	217920	216886	187894	197065	196528	186844	178020	162912	152944	142970	133937	-1.5	0.5	-1.0	-1.4
- other industrial sectors	114492	113563	103085	107690	107628	103972	100326	93258	85471	82377	83738	-1.0	0.4	-0.7	-0.9
Residential	286291	311793	311545	311961	295956	279524	261677	248674	244598	238965	230897	0.8	-0.5	-1.2	-0.6
Tertiary	166083	179768	187856	181913	168844	160950	142207	140414	139763	138463	138593	1.2	-1.1	-1.7	-0.1
Transport	342901	368665	367191	371873	356983	343702	337590	325955	309718	297343	288666	0.7	-0.3	-0.6	-0.8
by fuel															
Solids	61779	54424	49673	48409	45883	40364	35492	27909	21324	16194	12956	-2.2	-0.8	-2.5	-4.9
Oil	485890	502788	457366	440538	405482	377234	349893	298038	240280	188670	142341	-0.6	-1.2	-1.5	-4.4
Gas	266925	285438	269920	271576	248550	234260	206680	177468	147177	124456	103580	0.1	-0.8	-1.8	-3.4
Electricity	217599	239418	245271	254489	252048	254540	260468	262824	281431	296228	312482	1.2	0.3	0.3	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55297	55197	52788	53266	56559	59270	59540	60160	1.5	0.3	-0.4	0.6
Renewable energy forms	49480	56250	81825	100128	118517	115209	113098	134845	157626	183641	205790	5.2	3.8	-0.5	3.0
Other	0	0	0	65	261	597	922	13571	25387	31390	38522	0.0	0.0	13.4	20.5
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194992**	**244149**	**261570**	**290397**	**334459**	**385558**	**431496**	**468980**	**5.4**	**5.0**	**1.7**	**2.4**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.0**	**4250.0**	**3940.0**	**3431.6**	**2718.0**	**2031.0**	**1605.5**	**1250.7**	**-0.7**	**-1.3**	**-2.1**	**-4.9**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.7	1881.1	1740.8	1427.5	1106.0	738.9	542.1	360.3		-1.5	-2.7	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.3	2368.8	2199.2	2004.1	1612.0	1292.2	1063.4	890.4		-1.2	-1.7	-4.0
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.1**	**3218.9**	**2944.3**	**2519.7**	**2006.2**	**1518.8**	**1169.6**	**864.8**	**-0.5**	**-1.6**	**-2.4**	**-5.2**
Power generation/District heating	1404.5	1483.1	1341.6	1200.3	1017.4	908.1	668.7	445.7	256.1	156.1	69.3	-0.5	-2.7	-4.1	-10.7
Energy Branch	170.1	174.2	159.8	149.7	138.8	122.2	111.3	95.4	79.6	66.4	54.8	-0.6	-1.4	-2.2	-3.5
Industry	693.6	640.7	520.3	538.7	504.2	461.7	414.3	328.4	248.9	199.2	160.9	-2.8	-0.3	-1.9	-4.6
Residential	461.0	491.2	457.9	430.9	389.0	351.9	307.1	247.6	200.2	155.0	107.1	-0.1	-1.6	-2.3	-5.1
Tertiary	255.7	266.4	249.2	220.7	191.4	169.2	118.0	103.9	88.4	71.2	54.8	-0.3	-2.6	-4.7	-3.8
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.2	900.3	785.1	645.7	521.7	417.9	0.5	-0.7	-0.8	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.7**	**237.6**	**220.8**	**113.0**	**73.4**	**34.8**	**-1.0**	**1.5**	**-1.4**	**-9.2**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.8**	**69.3**	**60.4**	**47.8**	**35.7**	**28.2**	**22.0**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE28DEC_d			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.6	101.3	88.4	79.9	73.5	67.5	62.9	-1.2	-2.2	-2.6	-1.7
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.71	1.41	1.08	0.84	0.63	-0.7	-0.9	-1.3	-4.9
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	52.7	49.4	44.9	41.6	38.0				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.4	2037.6	2154.9	2282.9	2396.0	2603.5	2797.2	2966.8	3.7	2.6	1.1	1.3
as % of GDP	10.2	11.4	12.8	14.1	14.3	13.9	13.7	13.4	13.6	13.6	13.5				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.6	81.2	73.6	64.6	57.4	52.0	48.1		-1.0	-2.1	-2.1
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	83.2	72.6	62.9	55.6	50.8	46.0	41.2	-0.5	-1.8	-2.8	-2.1
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	77.2	67.4	54.9	50.2	46.4	42.6	39.6	0.0	-2.6	-3.3	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.8	23.7	21.4	19.7	18.6	-0.6	-1.6	-2.1	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.5	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.16	0.10	0.05	0.03	0.01	-1.6	-2.9	-4.2	-12.1
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.51	1.27	1.05	0.85	-0.8	-0.7	-0.7	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.49	1.28	1.04	0.88	0.74	-1.5	-0.8	-1.1	-3.4
Residential	1.61	1.58	1.47	1.38	1.31	1.26	1.17	1.00	0.82	0.65	0.46	-0.9	-1.1	-1.1	-4.5
Tertiary	1.54	1.48	1.33	1.21	1.13	1.05	0.83	0.74	0.63	0.51	0.40	-1.5	-1.6	-3.1	-3.6
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.67	2.41	2.08	1.75	1.45	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.1	23.7	27.7	33.4	39.5	45.3	50.1				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	13.7	24.9	39.4	53.4	65.2				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415806**	**3378459**	**3399299**	**3466728**	**3677657**	**4190014**	**4551660**	**4935085**	**1.0**	**0.2**	**0.3**	**1.8**
Nuclear energy	945027	997733	916685	887191	738989	702340	740054	816776	896746	928842	1031485	-0.3	-2.1	0.0	1.7
Solids	933660	974939	830048	802211	680083	629832	432779	288140	349610	413849	527273	-1.2	-2.0	-4.4	1.0
Oil (including refinery gas)	181203	141358	86851	45943	25921	21502	16650	15385	12995	9758	5890	-7.1	-11.4	-4.3	-5.1
Gas (including derived gases)	514392	699743	795653	752725	688399	562102	508135	550300	591950	622355	631414	4.5	-1.4	-3.0	1.1
Biomass-waste	46848	83787	145901	190910	221182	246702	288607	330875	376774	399427	416538	12.0	4.2	2.7	1.9
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383935	398253	412865	422378	428244	434522	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263517	493905	666774	845061	959050	1112954	1241041	1332651	21.0	12.7	5.5	2.3
Solar	118	1459	22363	96144	143662	170576	218794	264894	358113	413029	443996	68.9	20.4	4.3	3.6
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	18395	39374	44906	55857	67319	2.5	5.9	4.3	6.7
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	23588	39255	43996	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930139**	**1019358**	**1060619**	**1144729**	**1201223**	**1350698**	**1414248**	**1479188**	**2.6**	**2.0**	**1.2**	**1.3**
Nuclear energy	136924	134494	131323	123150	111162	95269	99226	107997	118651	122740	135749	-0.4	-1.7	-1.1	1.6
Renewable energy	114281	147780	226757	318900	440313	522735	614650	686494	805206	887091	941755	7.1	6.9	3.4	2.2
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122535	125565	131188	133642	136131	138195	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207219	268269	330274	371379	429150	474066	506362	20.7	9.4	4.8	2.2
Solar	180	1740	29846	76309	110837	128896	155543	178669	236628	269739	287359	66.7	14.0	3.4	3.1
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3268	5258	5785	7154	9839	0.0	21.3	7.0	5.7
Thermal power	398853	429386	480034	488089	467884	442615	430853	406733	426841	404417	401685	1.9	-0.3	-0.8	-0.3
of which cogeneration units	92439	98998	101203	102206	111262	111094	114309	120483	126026	128250	131587	0.9	1.0	0.3	0.7
of which CCS units	0	0	0	0	904	904	1783	16078	78375	121021	176213	0.0	0.0	7.0	25.8
Solids fired	186470	180630	175756	163212	141039	120703	102985	87183	93454	94747	99301	-0.6	-2.2	-3.1	-0.2
Gas fired	129190	169054	224922	253085	258726	256881	258153	246702	252869	226531	212698	5.7	1.4	0.0	-1.0
Oil fired	67499	59434	54039	42254	32648	26149	22149	17516	14575	11145	9053	-2.2	-4.9	-3.8	-4.4
Biomass-waste fired	15128	19615	24590	28744	34568	37972	46393	52324	62443	67618	75663	5.0	3.5	3.0	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1174	3009	3501	4376	4971	2.5	2.2	2.7	7.5
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.3	35.1	33.3	33.8	34.0	35.1	36.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.5	39.6	40.3	38.7	39.3	39.7	40.7				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.1	16.9	16.8	16.7	15.5	14.6				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.5	1.4	6.4	9.5	13.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.7	64.3	72.4	76.8	77.1	76.8	76.2				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.7	21.3	22.2	21.5	20.6	21.1				
- renewable energy forms	14.4	14.4	21.0	27.2	36.9	43.6	51.0	54.6	55.6	56.2	55.1				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7450.5**	**7862.8**	**8125.9**	**8368.6**	**8567.1**	**8778.8**	**0.9**	**0.9**	**1.1**	**0.6**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.5	603.3	624.3	650.1	666.0	687.8	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.1	5606.3	5714.1	5784.8	5856.4	5936.6	1.0	0.6	0.8	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.2	724.1	783.0	844.4	888.8	934.7	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	773.7	884.0	957.6	1040.6	1105.8	1168.1	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.9	48.6	50.2	51.7	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3385.8**	**3510.3**	**3635.2**	**3713.3**	**3801.1**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.7	2426.9	2502.0	2545.1	2599.1	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.0	640.0	674.4	698.8	720.4	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.5	458.8	469.4	481.5	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341130**	**335023**	**323408**	**307230**	**294916**	**286281**	**0.7**	**-0.3**	**-0.6**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7808	7826	7413	7123	6756	6497	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141053	131328	122232	107730	97534	90905	0.2	-1.5	-1.8	-1.8
Trucks	95660	111643	112043	117988	118898	118269	120885	119497	116860	114419	112190	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9900	10061	10161	10062	9908	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58016	57997	56968	57966	58674	59224	0.9	1.2	0.3	0.1
Inland navigation	5973	6575	5892	6143	6387	6752	7087	7237	7390	7472	7558	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE30EC_d											SUMMARY ENERGY BALANCE AND INDICATORS (A)				
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831440**	**799875**	**743685**	**701180**	**705973**	**762343**	**788381**	**831896**	**-1.2**	**-0.5**	**-1.3**	**0.9**
Solids	214627	196059	163855	149881	137862	122299	91633	70653	78043	73804	81348	-2.7	-1.7	-4.0	-0.6
Oil	176084	136469	103565	90646	77001	63361	51913	36860	25431	15030	9475	-5.2	-2.9	-3.9	-8.2
Natural gas	209437	190678	158525	149167	138308	109242	86359	72823	66612	60095	52276	-2.7	-1.4	-4.6	-2.5
Nuclear	243841	257516	236563	229104	190370	178631	178835	186348	197044	199502	220234	-0.3	-2.1	-0.6	1.0
Renewable energy sources	103944	123918	178977	212643	256335	270153	292441	339288	395213	439951	468564	5.6	3.7	1.3	2.4
Hydro	30818	26817	32208	31687	32181	33015	34057	35347	36238	36724	37241	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136270	149552	144438	147330	164985	192847	216951	232725	6.5	1.9	-0.1	2.3
Wind	1913	6058	12829	22663	42529	56256	70034	79190	91665	101234	107079	21.0	12.7	5.1	2.1
Solar and others	430	806	3691	14049	22800	27188	30766	37543	45490	50444	52829	24.0	20.0	3.0	2.7
Geothermal	4712	5354	5888	7974	9272	9255	10254	22224	28973	34597	38691	2.3	4.6	1.0	6.9
Net Imports	**829314**	**988719**	**956735**	**967865**	**896858**	**851897**	**781960**	**703647**	**622500**	**568983**	**516147**	**1.4**	**-0.6**	**-1.4**	**-2.1**
Solids	98273	125211	110927	115986	92085	88383	69208	48698	34135	34684	37988	1.2	-1.8	-2.8	-3.0
Oil	535238	604030	563977	551783	524921	499562	474115	424096	360728	296187	241093	0.5	-0.7	-1.0	-3.3
- Crude oil and Feedstocks	518046	585121	541240	527785	504377	482326	460142	421475	373059	324755	280194	0.4	-0.7	-0.9	-2.4
- Oil products	17192	18909	22737	23998	20544	17236	13972	2621	-12331	-28568	-39101	2.8	-1.0	-3.8	0.0
Natural gas	193432	257849	276001	286182	259779	243145	215430	202788	192843	197665	191804	3.6	-0.6	-1.9	-0.6
Electricity	2029	1412	707	-129	-1603	-1508	-1489	-1740	-1816	-1876	-2084	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745840**	**1641318**	**1538154**	**1424462**	**1348976**	**1324389**	**1296206**	**1285743**	**0.2**	**-0.7**	**-1.4**	**-0.5**
Solids	321277	317986	280653	265867	229947	210682	160840	119352	112178	108488	119336	-1.3	-2.0	-3.5	-1.5
Oil	665142	683909	620735	589181	547424	507485	469996	404589	331395	257310	196877	-0.7	-1.2	-1.5	-4.3
Natural gas	396145	448380	444428	435131	397168	350396	299142	271333	253765	250508	235469	1.2	-1.1	-2.8	-1.2
Nuclear	243841	257516	236563	229104	190370	178631	178835	186348	197044	199502	220234	-0.3	-2.1	-0.6	1.0
Electricity	2029	1412	707	-129	-1603	-1508	-1489	-1740	-1816	-1876	-2084	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226686	278011	292467	317138	369094	431823	482274	515911	5.9	4.2	1.3	2.5
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.7	11.3	8.8	8.5	8.4	9.3				
Oil	38.4	37.3	35.1	33.7	33.4	33.0	33.0	30.0	25.0	19.9	15.3				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.8	21.0	20.1	19.2	19.3	18.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.6	12.6	13.8	14.9	15.4	17.1				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.0	22.3	27.4	32.6	37.2	40.1				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415901**	**3364258**	**3354597**	**3345224**	**3477585**	**3928955**	**4229680**	**4560022**	**1.0**	**0.1**	**-0.1**	**1.6**
Self consumption and grid losses	396970	407042	377767	368960	346100	341018	327452	325368	369662	414848	477805	-0.5	-0.9	-0.6	1.9
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383240**	**342669**	**314342**	**262790**	**250347**	**285890**	**309431**	**324588**	**0.8**	**-2.0**	**-2.6**	**1.1**
Solids	223038	228941	197605	186586	154012	144346	103084	72208	76026	79294	94598	-1.2	-2.5	-3.9	-0.4
Oil (including refinery gas)	40042	33244	20532	10887	5748	4534	3408	2846	2364	1856	1411	-6.5	-12.0	-5.1	-4.3
Gas (including derived gases)	102844	133713	149190	131885	120828	98403	80926	81726	88245	92479	85378	3.8	-2.1	-3.9	0.3
Biomass & Waste	14918	26452	45117	47906	55284	60204	67359	73896	88093	96433	99088	11.7	2.1	2.0	1.9
Geothermal heat	4114	4645	4828	5976	6796	6853	8014	19671	26030	31164	34353	1.6	3.5	1.7	7.5
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5133	8204	9760	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971007**	**902315**	**846802**	**808194**	**784669**	**760011**	**723080**	**711920**	**-0.7**	**-1.0**	**-1.1**	**-0.6**
Refineries	740500	763156	670015	646610	612017	576578	543143	488133	425887	363546	310943	-1.0	-0.9	-1.2	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24665	56942	93286	121756	146384	34.1	6.9	-0.5	9.3
District heating	18667	19517	20813	22233	19528	16633	17491	16697	15087	13577	13157	1.1	-0.6	-1.1	-1.4
Derived gases, cokeries etc.	316475	324348	297391	283943	244740	228234	222894	222898	225752	224200	241436	-0.6	-1.9	-0.9	0.4
Energy Branch Consumption	**86990**	**91952**	**88327**	**82420**	**76470**	**69593**	**63435**	**57201**	**52873**	**49874**	**49702**	**0.2**	**-1.4**	**-1.9**	**-1.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119319**	**122388**	**120219**	**115589**	**108895**	**103746**	**99548**	**98032**	**-0.2**	**0.6**	**-0.6**	**-0.8**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170516**	**1122037**	**1051763**	**982544**	**921756**	**879825**	**844651**	**818430**	**0.3**	**-0.3**	**-1.3**	**-0.9**
by sector															
Industry	332412	330448	290978	304758	303324	288362	272460	249504	231894	219876	215796	-1.3	0.4	-1.1	-1.2
- energy intensive industries	217920	216886	187894	197068	196069	185031	172991	156761	146989	137759	132040	-1.5	0.4	-1.2	-1.3
- other industrial sectors	114492	113563	103085	107691	107255	103331	99469	92743	84905	82117	83757	-1.0	0.4	-0.8	-0.9
Residential	286291	311793	311545	311965	293837	265513	244073	224369	217458	208100	194938	0.8	-0.6	-1.8	-1.1
Tertiary	166083	179768	187856	181919	167895	154151	129807	123577	122353	120513	119851	1.2	-1.1	-2.5	-0.4
Transport	342901	368665	367191	371873	356981	343737	336203	324307	308120	296163	287844	0.7	-0.3	-0.6	-0.8
by fuel															
Solids	61779	54424	49673	48418	45836	39463	33608	26598	20367	15504	12819	-2.2	-0.8	-3.1	-4.7
Oil	485890	502788	457366	440563	404972	373700	343639	290716	234082	184001	140138	-0.6	-1.2	-1.6	-4.4
Gas	266925	285438	269920	271582	246780	223631	192715	162950	132572	111236	92936	0.1	-0.9	-2.4	-3.6
Electricity	217599	239418	245271	254495	250988	251095	251802	250167	267207	280010	293861	1.2	0.2	0.0	0.8
Heat (from CHP and District Heating)	46015	52355	53515	55298	54920	52113	52793	52191	54294	53734	52884	1.5	0.3	-0.4	0.0
Renewable energy forms	49480	56250	81825	100093	118281	111163	107002	126549	148234	171980	191234	5.2	3.8	-1.0	2.9
Other	0	0	0	65	261	597	984	12586	23069	28187	34558	0.0	0.0	14.2	19.5
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194862**	**244210**	**255521**	**279728**	**318093**	**370608**	**410496**	**439323**	**5.4**	**5.0**	**1.4**	**2.3**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.1**	**4235.7**	**3892.8**	**3407.3**	**2708.3**	**1990.8**	**1554.3**	**1219.1**	**-0.7**	**-1.3**	**-2.2**	**-5.0**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.4	1872.2	1731.4	1454.7	1147.7	750.6	532.2	360.2		-1.5	-2.5	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.8	2363.5	2161.4	1952.6	1560.6	1240.2	1022.1	858.9		-1.2	-1.9	-4.0
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.2**	**3204.7**	**2897.3**	**2464.6**	**1990.7**	**1472.4**	**1107.6**	**826.3**	**-0.5**	**-1.6**	**-2.6**	**-5.3**
Power generation/District heating	1404.5	1483.1	1341.6	1200.2	1009.5	901.1	674.8	481.7	269.4	143.8	63.3	-0.5	-2.8	-3.9	-11.2
Energy Branch	170.1	174.2	159.8	149.7	138.5	121.4	109.5	95.3	77.3	64.8	54.2	-0.6	-1.4	-2.3	-3.5
Industry	693.6	640.7	520.3	538.8	502.9	457.8	404.1	330.8	240.3	193.9	164.4	-2.8	-0.3	-2.2	-4.4
Residential	461.0	491.2	457.9	430.9	385.4	326.6	276.3	216.0	170.7	127.9	84.2	-0.1	-1.7	-3.3	-5.8
Tertiary	255.7	266.4	249.2	220.7	190.4	159.0	104.6	88.2	75.2	59.9	45.5	-0.3	-2.7	-5.8	-4.1
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.3	895.3	778.7	639.6	517.4	414.7	0.5	-0.7	-0.9	-3.8
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.6**	**268.3**	**226.5**	**119.1**	**84.2**	**41.6**	**-1.0**	**1.5**	**-0.2**	**-8.9**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**68.5**	**59.9**	**47.6**	**35.0**	**27.3**	**21.4**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)															EU28: EE30EC_d
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.2	99.6	85.5	75.5	69.2	63.2	58.6	-1.2	-2.2	-2.9	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.73	1.48	1.11	0.85	0.64	-0.7	-0.9	-1.2	-4.8
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.4	52.7	49.9	45.0	41.9	38.3				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.3	2035.4	2157.6	2318.2	2440.0	2642.8	2880.9	3048.4	3.7	2.6	1.3	1.4
as % of GDP	10.2	11.4	12.8	14.1	14.3	14.0	13.9	13.7	13.8	14.0	13.9				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.3	80.5	72.0	63.0	55.8	50.7	47.7		-1.0	-2.2	-2.0
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.6	69.0	58.7	50.2	45.2	40.1	34.7	-0.5	-1.9	-3.4	-2.6
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.7	64.6	50.1	44.2	40.6	37.1	34.2	0.0	-2.6	-4.2	-1.9
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.7	23.5	21.2	19.7	18.5	-0.6	-1.6	-2.2	-1.6
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.9	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.24	0.22	0.17	0.12	0.06	0.03	0.01	-1.6	-3.0	-3.8	-12.3
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.71	1.53	1.28	1.06	0.87	-0.8	-0.7	-0.7	-3.3
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.48	1.33	1.04	0.88	0.76	-1.5	-0.8	-1.1	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.23	1.13	0.96	0.78	0.61	0.43	-0.9	-1.1	-1.5	-4.7
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.81	0.71	0.61	0.50	0.38	-1.5	-1.6	-3.4	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.40	2.08	1.75	1.44	-0.2	-0.4	-0.3	-3.0
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.2	23.6	27.7	33.6	40.5	46.3	50.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.0	25.5	40.3	54.3	66.0				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415901**	**3364258**	**3354597**	**3345224**	**3477585**	**3928955**	**4229680**	**4560022**	**1.0**	**0.1**	**-0.1**	**1.6**
Nuclear energy	945027	997733	916685	887185	737206	697551	703936	745532	805231	828021	942094	-0.3	-2.2	-0.5	1.5
Solids	933660	974939	830048	802248	672875	633340	445974	290407	296392	343369	460318	-1.2	-2.1	-4.0	0.2
Oil (including refinery gas)	181203	141358	86851	46138	25643	21236	15863	15003	12161	9521	6818	-7.1	-11.5	-4.7	-4.1
Gas (including derived gases)	514392	699743	795653	752506	682930	535702	461222	485358	527364	561565	537679	4.5	-1.5	-3.8	0.8
Biomass-waste	46848	83787	145901	190998	221100	243967	279555	316897	383126	404743	419314	12.0	4.2	2.4	2.0
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383900	396014	411008	421373	427027	433031	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263517	494523	654141	814344	920816	1065871	1177141	1245105	21.0	12.7	5.1	2.1
Solar	118	1459	22363	96144	143662	169222	210907	256819	347455	389884	415082	68.9	20.4	3.9	3.4
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	17408	35745	44467	52941	58842	2.5	5.9	3.7	6.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	25514	35468	41738	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930117**	**1019066**	**1051883**	**1118578**	**1159634**	**1289256**	**1335777**	**1381991**	**2.6**	**2.0**	**0.9**	**1.1**
Nuclear energy	136924	134494	131323	123150	111162	94547	95440	99378	106810	109859	124496	-0.4	-1.7	-1.5	1.3
Renewable energy	114281	147780	226757	318900	440528	516836	598131	666532	779590	847363	887761	7.1	6.9	3.1	2.0
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122519	124892	129931	133343	135775	137741	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207434	263223	319570	357961	412770	451631	475383	20.7	9.4	4.4	2.0
Solar	180	1740	29846	76309	110837	128059	150414	173458	227705	253137	266843	66.7	14.0	3.1	2.9
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3256	5182	5772	6819	7794	0.0	21.3	7.0	4.5
Thermal power	398853	429386	480034	488067	467376	440499	425007	393724	402856	378555	369733	1.9	-0.3	-0.9	-0.7
of which cogeneration units	92439	98998	101203	102193	110999	110785	112357	116951	122443	123037	127535	0.9	0.9	0.1	0.6
of which CCS units	0	0	0	0	904	904	929	7041	54353	109237	152359	0.0	0.0	0.3	29.0
Solids fired	186470	180630	175756	163212	140915	120678	101809	84889	86940	86592	90109	-0.6	-2.2	-3.2	-0.6
Gas fired	129190	169054	224922	253060	258508	255100	253809	236957	233930	208106	189793	5.7	1.4	-0.2	-1.4
Oil fired	67499	59434	54039	42258	32481	25979	21937	17295	14324	10933	8658	-2.2	-5.0	-3.8	-4.5
Biomass-waste fired	15128	19615	24590	28745	34570	37832	46389	51971	64207	68787	76613	5.0	3.5	3.0	2.5
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1064	2612	3455	4137	4560	2.5	2.2	1.7	7.5
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	35.0	32.9	33.1	33.5	34.7	35.8				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.5	39.7	38.8	38.4	38.7	39.9				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.1	17.0	16.8	17.1	15.9	15.1				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.5	3.5	7.4	11.8				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.9	64.5	72.4	77.3	78.6	78.2	77.8				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.8	21.0	21.4	20.6	19.7	20.9				
- renewable energy forms	14.4	14.4	21.0	27.2	37.0	43.7	51.4	55.8	58.0	58.5	56.9				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7451.1**	**7855.0**	**8124.7**	**8368.9**	**8550.3**	**8780.6**	**0.9**	**0.9**	**1.1**	**0.6**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.4	603.4	623.9	650.1	668.2	688.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.2	5595.7	5706.9	5781.9	5833.5	5930.2	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.1	724.0	782.0	843.7	890.5	934.3	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	774.4	887.0	965.1	1044.6	1108.1	1176.5	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.7	48.5	50.1	51.5	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.0**	**3510.6**	**3635.4**	**3713.0**	**3801.7**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.6	2426.9	2502.1	2544.8	2599.7	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.2	640.2	674.5	698.7	720.5	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.5	458.8	469.4	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341190**	**333676**	**321809**	**305674**	**293781**	**285504**	**0.7**	**-0.3**	**-0.6**	**-0.8**
Public road transport	7580	7663	7522	7714	7771	7807	7827	7408	7126	6777	6497	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141057	129744	120077	105833	96151	89639	0.2	-1.5	-1.9	-1.8
Trucks	95660	111643	112043	117988	118898	118270	120880	119493	116856	114368	112069	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9902	10060	10154	10066	9912	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58073	58237	57543	58324	58951	59842	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6387	6751	7086	7228	7382	7469	7546	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE32DEC_d												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831468**	**799964**	**740446**	**686479**	**697777**	**753848**	**786422**	**826944**	**-1.2**	**-0.5**	**-1.5**	**0.9**
Solids	214627	196059	163855	149901	137886	121487	92642	71589	77783	74783	80855	-2.7	-1.7	-3.9	-0.7
Oil	176084	136469	103565	90643	77000	63188	51467	36453	24996	14671	9255	-5.2	-2.9	-3.9	-8.2
Natural gas	209437	190678	158525	149164	138410	108293	82862	72235	66426	60400	52290	-2.7	-1.3	-5.0	-2.3
Nuclear	243841	257516	236563	229106	190341	178241	171298	181853	195667	202321	222536	-0.3	-2.2	-1.0	1.3
Renewable energy sources	103944	123918	178977	212653	256326	269236	288211	335647	388977	434247	462008	5.6	3.7	1.2	2.4
Hydro	30818	26817	32208	31687	32181	33016	34060	35321	36238	36754	37250	0.4	0.0	0.6	0.4
Biomass & Waste	66071	84883	124361	136279	149547	143841	145115	162264	189122	211665	226728	6.5	1.9	-0.3	2.3
Wind	1913	6058	12829	22662	42525	56066	69039	78836	91364	101175	106983	21.0	12.7	5.0	2.2
Solar and others	430	806	3691	14050	22800	27070	30051	37033	43931	50108	52354	24.0	20.0	2.8	2.8
Geothermal	4712	5354	5888	7974	9273	9242	9945	22193	28322	34545	38693	2.3	4.6	0.7	7.0
Net Imports	**829314**	**988719**	**956735**	**967842**	**896951**	**845485**	**767260**	**697431**	**610672**	**560112**	**510299**	**1.4**	**-0.6**	**-1.5**	**-2.0**
Solids	98273	125211	110927	115977	92086	86603	71563	50346	33547	35484	39779	1.2	-1.8	-2.5	-2.9
Oil	535238	604030	563977	551775	524913	497891	468781	418135	352234	285209	231795	0.5	-0.7	-1.1	-3.5
- Crude oil and Feedstocks	518046	585121	541240	527771	504350	481251	456554	417176	366720	316376	272960	0.4	-0.7	-1.0	-2.5
- Oil products	17192	18909	22737	24004	20563	16640	12228	959	-14487	-31167	-41165	2.8	-1.0	-5.1	0.0
Natural gas	193432	257849	276001	286173	259880	240341	203996	201265	190777	200167	194805	3.6	-0.6	-2.4	-0.2
Electricity	2029	1412	707	-129	-1602	-1508	-1486	-1740	-1816	-1878	-2099	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745845**	**1641499**	**1528503**	**1395061**	**1334563**	**1304066**	**1285376**	**1274943**	**0.2**	**-0.7**	**-1.6**	**-0.4**
Solids	321277	317986	280653	265879	229971	208090	164205	121935	111331	110267	120634	-1.3	-2.0	-3.3	-1.5
Oil	665142	683909	620735	589170	547415	505642	464217	398221	322465	245974	187359	-0.7	-1.2	-1.6	-4.4
Natural gas	396145	448380	444428	435120	397373	346644	284212	269222	251512	253315	238485	1.2	-1.1	-3.3	-0.9
Nuclear	243841	257516	236563	229106	190341	178241	171298	181853	195667	202321	222536	-0.3	-2.2	-1.0	1.3
Electricity	2029	1412	707	-129	-1602	-1508	-1486	-1740	-1816	-1878	-2099	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226699	278001	291393	312616	365073	424907	475377	508027	5.9	4.2	1.2	2.5
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	13.6	11.8	9.1	8.5	8.6	9.5				
Oil	38.4	37.3	35.1	33.7	33.3	33.1	33.3	29.8	24.7	19.1	14.7				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.7	20.4	20.2	19.3	19.7	18.7				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.7	12.3	13.6	15.0	15.7	17.5				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	19.1	22.4	27.4	32.6	37.0	39.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415816**	**3365366**	**3336026**	**3276046**	**3469911**	**3916439**	**4276554**	**4603950**	**1.0**	**0.1**	**-0.3**	**1.7**
Self consumption and grid losses	396970	407042	377767	368942	346243	339638	322853	325994	372051	422057	486850	-0.5	-0.9	-0.7	2.1
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383270**	**342902**	**311500**	**260315**	**253664**	**283396**	**315940**	**329255**	**0.8**	**-1.9**	**-2.7**	**1.2**
Solids	223038	228941	197605	186612	154047	142724	108644	75790	75764	81507	95989	-1.2	-2.5	-3.4	-0.6
Oil (including refinery gas)	40042	33244	20532	10894	5780	4530	3342	2862	2326	1774	1382	-6.5	-11.9	-5.3	-4.3
Gas (including derived gases)	102844	133713	149190	131897	121019	96899	72885	82284	87917	97108	89307	3.8	-2.1	-4.9	1.0
Biomass & Waste	14918	26452	45117	47890	55259	60493	67659	73056	87612	96763	99208	11.7	2.0	2.0	1.9
Geothermal heat	4114	4645	4828	5976	6796	6853	7785	19671	25422	31164	34436	1.6	3.5	1.4	7.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4354	7624	8933	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**971003**	**902264**	**844055**	**794081**	**773655**	**747918**	**711552**	**700279**	**-0.7**	**-1.0**	**-1.3**	**-0.6**
Refineries	740500	763156	670015	646602	612015	575176	538738	483283	419083	354850	303582	-1.0	-0.9	-1.3	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25357	24592	56290	90339	117093	140679	34.1	6.9	-0.6	9.1
District heating	18667	19517	20813	22236	19511	16517	17100	16519	14649	13006	12337	1.1	-0.6	-1.3	-1.6
Derived gases, cokeries etc.	316475	324348	297391	283943	244709	227005	213651	217563	223847	226602	243681	-0.6	-1.9	-1.3	0.7
Energy Branch Consumption	**86990**	**91952**	**88327**	**82417**	**76473**	**69205**	**62612**	**56616**	**52250**	**49421**	**49582**	**0.2**	**-1.4**	**-2.0**	**-1.2**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122386**	**118832**	**112517**	**107050**	**102422**	**98660**	**98024**	**-0.2**	**0.6**	**-0.8**	**-0.7**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170498**	**1122131**	**1045780**	**961900**	**910592**	**865633**	**829576**	**804488**	**0.3**	**-0.3**	**-1.5**	**-0.9**
by sector															
Industry	332412	330448	290978	304746	303294	284070	264250	244678	227059	218180	215824	-1.3	0.4	-1.4	-1.0
- energy intensive industries	217920	216886	187894	197056	196038	182527	167633	153488	142215	136075	131971	-1.5	0.4	-1.6	-1.2
- other industrial sectors	114492	113563	103085	107690	107256	101543	96618	91190	84844	82105	83853	-1.0	0.4	-1.0	-0.7
Residential	286291	311793	311545	311966	293951	264442	237183	222346	215230	205525	191961	0.8	-0.6	-2.1	-1.1
Tertiary	166083	179768	187856	181912	167904	153537	124963	122181	121073	119121	118281	1.2	-1.1	-2.9	-0.3
Transport	342901	368665	367191	371873	356981	343731	335504	321387	302271	286749	278421	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48401	45820	38896	32222	25970	20044	15289	12806	-2.2	-0.8	-3.5	-4.5
Oil	485890	502788	457366	440528	404993	373025	340679	286063	226544	173713	131120	-0.6	-1.2	-1.7	-4.7
Gas	266925	285438	269920	271568	246738	221648	186717	160769	131160	110035	92259	0.1	-0.9	-2.7	-3.5
Electricity	217599	239418	245271	254490	251071	249644	246274	249412	266659	283267	296658	1.2	0.2	-0.2	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55313	54931	51874	51261	51518	53599	53119	52135	1.5	0.3	-0.7	0.1
Renewable energy forms	49480	56250	81825	100133	118316	110095	103700	124219	144397	165330	184049	5.2	3.8	-1.3	2.9
Other	0	0	0	65	261	597	1048	12642	23231	28823	35460	0.0	0.0	14.9	19.3
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194912**	**244213**	**254336**	**275168**	**313975**	**364278**	**403415**	**430964**	**5.4**	**5.0**	**1.2**	**2.3**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.1**	**4236.3**	**3870.9**	**3380.1**	**2700.2**	**2081.7**	**1524.7**	**1198.9**	**-0.7**	**-1.3**	**-2.2**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.5	1872.8	1714.7	1447.8	1156.1	865.4	535.4	368.1		-1.5	-2.5	-6.6
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.6	2363.4	2156.1	1932.2	1544.1	1216.4	989.3	830.7		-1.2	-2.0	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.2**	**3205.3**	**2875.5**	**2434.4**	**1982.1**	**1478.9**	**1078.0**	**802.9**	**-0.5**	**-1.6**	**-2.7**	**-5.4**
Power generation/District heating	1404.5	1483.1	1341.6	1200.4	1010.2	890.0	676.1	496.0	304.2	150.2	69.2	-0.5	-2.8	-3.9	-10.8
Energy Branch	170.1	174.2	159.8	149.7	138.4	120.7	107.7	94.1	76.1	63.4	53.3	-0.6	-1.4	-2.5	-3.5
Industry	693.6	640.7	520.3	538.6	502.9	450.5	391.8	324.8	238.6	193.1	165.7	-2.8	-0.3	-2.5	-4.2
Residential	461.0	491.2	457.9	430.9	385.4	324.7	266.2	213.4	168.2	125.6	82.2	-0.1	-1.7	-3.6	-5.7
Tertiary	255.7	266.4	249.2	220.7	190.3	158.2	100.6	86.9	74.0	58.9	44.7	-0.3	-2.7	-6.2	-4.0
Transport	1001.0	1082.7	1050.9	1049.9	978.0	931.3	892.1	766.9	617.8	486.7	387.7	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.5**	**275.4**	**271.3**	**227.1**	**203.6**	**84.3**	**44.8**	**-1.0**	**1.5**	**-0.1**	**-8.6**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**68.1**	**59.5**	**47.5**	**36.6**	**26.8**	**21.1**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE32DEC_d			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.2	98.9	83.7	74.7	68.1	62.6	58.1	-1.2	-2.2	-3.1	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.88	1.75	1.49	1.13	0.84	0.63	-0.7	-0.9	-1.1	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.3	52.8	50.0	44.8	41.6	38.2				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.2	2035.4	2161.7	2352.0	2462.9	2686.4	2926.6	3068.6	3.7	2.6	1.5	1.3
as % of GDP	10.2	11.4	12.8	14.1	14.3	14.0	14.1	13.8	14.0	14.3	14.0				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.3	79.3	69.9	61.7	54.7	50.3	47.7		-1.0	-2.5	-1.9
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.7	68.7	57.1	49.8	44.7	39.6	34.2	-0.5	-1.9	-3.6	-2.5
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.7	64.3	48.2	43.7	40.2	36.6	33.8	0.0	-2.6	-4.5	-1.8
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.6	23.2	20.6	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.17	0.12	0.07	0.03	0.01	-1.6	-3.0	-3.6	-12.0
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.78	1.72	1.53	1.27	1.04	0.85	-0.8	-0.7	-0.7	-3.5
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.48	1.33	1.05	0.89	0.77	-1.5	-0.8	-1.1	-3.2
Residential	1.61	1.58	1.47	1.38	1.31	1.23	1.12	0.96	0.78	0.61	0.43	-0.9	-1.1	-1.5	-4.7
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.80	0.71	0.61	0.49	0.38	-1.5	-1.6	-3.4	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.04	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.2	23.6	27.8	33.5	40.5	46.3	50.6				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.2	26.2	41.7	56.1	67.6				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415816**	**3365366**	**3336026**	**3276046**	**3469911**	**3916439**	**4276554**	**4603950**	**1.0**	**0.1**	**-0.3**	**1.7**
Nuclear energy	945027	997733	916685	887192	737094	695966	671581	726105	798952	840125	951928	-0.3	-2.2	-0.9	1.8
Solids	933660	974939	830048	802441	673122	626542	472340	309132	296674	353066	471389	-1.2	-2.1	-3.5	0.0
Oil (including refinery gas)	181203	141358	86851	46090	25933	20996	15476	14946	11957	9079	6804	-7.1	-11.4	-5.0	-4.0
Gas (including derived gases)	514392	699743	795653	752382	683775	527858	412106	489498	545965	585388	564000	4.5	-1.5	-4.9	1.6
Biomass-waste	46848	83787	145901	190886	220979	244742	280971	313979	382009	408675	423080	12.0	4.2	2.4	2.1
Hydro (pumping excluded)	358408	311883	374576	368453	374203	383908	396051	410707	421369	427378	433145	0.4	0.0	0.6	0.4
Wind	22253	70453	149202	263516	494482	651933	802781	916701	1062374	1176449	1243985	21.0	12.7	5.0	2.2
Solar	118	1459	22363	96144	143662	168544	207575	253072	332020	389257	413030	68.9	20.4	3.7	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	17165	35769	43673	52941	59113	2.5	5.9	3.5	6.4
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	21447	34196	37477	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930133**	**1019117**	**1050394**	**1107267**	**1151276**	**1276755**	**1336932**	**1383221**	**2.6**	**2.0**	**0.8**	**1.1**
Nuclear energy	136924	134494	131323	123150	111162	94355	93074	97019	106069	111559	125868	-0.4	-1.7	-1.8	1.5
Renewable energy	114281	147780	226757	318900	440507	515248	593178	662294	769161	846491	885789	7.1	6.9	3.0	2.0
Hydro (pumping excluded)	101207	105529	112159	118306	120602	122525	124926	129886	133333	135857	137763	1.0	0.7	0.4	0.5
Wind	12893	40510	84512	123698	207413	262092	316799	356039	411094	450743	474229	20.7	9.4	4.3	2.0
Solar	180	1740	29846	76309	110837	127596	148184	171173	219008	253072	265913	66.7	14.0	2.9	3.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3268	5195	5726	6819	7884	0.0	21.3	7.0	4.5
Thermal power	398853	429386	480034	488084	467448	440791	421015	391964	401526	378882	371565	1.9	-0.3	-1.0	-0.6
of which cogeneration units	92439	98998	101203	102201	110979	109605	109469	114625	121685	123473	127484	0.9	0.9	-0.1	0.8
of which CCS units	0	0	0	0	904	904	904	7017	39838	112916	155344	0.0	0.0	0.0	29.3
Solids fired	186470	180630	175756	163212	140919	120425	101448	85067	86716	86825	91099	-0.6	-2.2	-3.2	-0.5
Gas fired	129190	169054	224922	253082	258579	255752	250579	235342	233215	208211	190620	5.7	1.4	-0.3	-1.4
Oil fired	67499	59434	54039	42252	32474	25963	21926	17249	14258	10845	8525	-2.2	-5.0	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34574	37740	46029	51694	63962	68864	76749	5.0	3.5	2.9	2.6
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	1034	2612	3375	4137	4571	2.5	2.2	1.4	7.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	34.8	32.6	33.3	33.8	35.0	36.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.4	39.3	39.0	39.1	38.8	40.3				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	16.2	16.9	16.6	17.0	15.9	15.0				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.6	3.5	7.4	12.3				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.9	64.8	72.5	76.6	78.1	77.7	77.2				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.9	20.5	20.9	20.5	19.8	20.8				
- renewable energy forms	14.4	14.4	21.0	27.2	37.0	43.9	52.0	55.6	57.5	57.9	56.3				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7049.6**	**7451.1**	**7847.0**	**8107.3**	**8321.8**	**8497.6**	**8736.7**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.4	603.7	624.8	654.3	672.4	691.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.5	5410.2	5586.5	5687.5	5727.4	5774.6	5882.4	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.2	648.1	724.5	783.0	847.4	893.7	936.1	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.0	774.4	887.4	965.2	1044.0	1106.6	1175.4	1.4	2.6	2.7	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	45.0	46.8	48.7	50.3	51.6	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.0**	**3510.8**	**3635.2**	**3713.2**	**3802.0**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.4	2426.7	2501.4	2544.6	2599.7	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.3	640.5	674.9	699.1	720.7	-0.3	2.2	2.3	0.9
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.3	443.6	458.9	469.5	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354463**	**341190**	**332999**	**318900**	**299836**	**284378**	**276091**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7771	7807	7830	7409	7150	6799	6513	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156771	141057	129020	117139	99984	86786	80259	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118898	118270	120869	119477	116806	114305	112009	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9232	9908	10070	10174	10083	9922	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56084	58073	58282	57569	58330	58926	59834	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6387	6751	7090	7236	7393	7480	7553	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE35DEC_d												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831443**	**798097**	**721554**	**649102**	**655124**	**708686**	**738516**	**772731**	**-1.2**	**-0.5**	**-2.0**	**0.9**
Solids	214627	196059	163855	149894	138022	120411	95355	73147	68307	66481	74661	-2.7	-1.7	-3.6	-1.2
Oil	176084	136469	103565	90642	76989	62929	51072	36190	24841	14597	9226	-5.2	-2.9	-4.0	-8.2
Natural gas	209437	190678	158525	149166	137906	104415	74720	66446	60892	56113	48137	-2.7	-1.4	-5.9	-2.2
Nuclear	243841	257516	236563	229104	189952	171908	157524	166417	177634	180590	197663	-0.3	-2.2	-1.9	1.1
Renewable energy sources	103944	123918	178977	212638	255227	261891	270431	312924	377010	420735	443046	5.6	3.6	0.6	2.5
Hydro	30818	26817	32208	31687	32180	32948	33863	35274	36210	36682	37175	0.4	0.0	0.5	0.5
Biomass & Waste	66071	84883	124361	136264	148525	138975	135192	152282	183737	206664	219019	6.5	1.8	-0.9	2.4
Wind	1913	6058	12829	22662	42457	54230	64111	73226	88366	97331	102001	21.0	12.7	4.2	2.3
Solar and others	430	806	3691	14051	22799	26599	27969	34472	41317	46941	48311	24.0	20.0	2.1	2.8
Geothermal	4712	5354	5888	7974	9267	9139	9295	17669	27380	33117	36540	2.3	4.6	0.0	7.1
Net Imports	**829314**	**988719**	**956735**	**967878**	**896579**	**832192**	**746859**	**678342**	**588415**	**532890**	**485823**	**1.4**	**-0.6**	**-1.8**	**-2.1**
Solids	98273	125211	110927	115995	91872	88795	77135	54512	33614	28266	33117	1.2	-1.9	-1.7	-4.1
Oil	535238	604030	563977	551794	524754	493926	462831	413413	348476	282617	230928	0.5	-0.7	-1.2	-3.4
- Crude oil and Feedstocks	518046	585121	541240	527781	504232	478665	452504	413957	364112	314538	272306	0.4	-0.7	-1.1	-2.5
- Oil products	17192	18909	22737	24013	20523	15260	10326	-544	-15636	-31921	-41378	2.8	-1.0	-6.6	0.0
Natural gas	193432	257849	276001	286177	260000	229334	184913	183587	172925	183431	179054	3.6	-0.6	-3.4	-0.2
Electricity	2029	1412	707	-129	-1602	-1508	-1488	-1740	-1819	-1880	-2097	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745856**	**1639260**	**1496318**	**1337283**	**1272821**	**1236646**	**1210247**	**1196253**	**0.2**	**-0.8**	**-2.0**	**-0.6**
Solids	321277	317986	280653	265889	229894	209206	172490	127659	101921	94747	107778	-1.3	-2.0	-2.8	-2.3
Oil	665142	683909	620735	589188	547246	501416	457872	393237	318552	243308	186463	-0.7	-1.3	-1.8	-4.4
Natural gas	396145	448380	444428	435126	396988	331758	256986	245755	228128	232291	218580	1.2	-1.1	-4.3	-0.8
Nuclear	243841	257516	236563	229104	189952	171908	157524	166417	177634	180590	197663	-0.3	-2.2	-1.9	1.1
Electricity	2029	1412	707	-129	-1602	-1508	-1488	-1740	-1819	-1880	-2097	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226679	276783	283537	293899	341494	412229	461192	487866	5.9	4.1	0.6	2.6
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.0	14.0	12.9	10.0	8.2	7.8	9.0				
Oil	38.4	37.3	35.1	33.7	33.4	33.5	34.2	30.9	25.8	20.1	15.6				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.2	19.2	19.3	18.4	19.2	18.3				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	11.8	13.1	14.4	14.9	16.5				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	18.9	22.0	26.8	33.3	38.1	40.8				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415616**	**3361174**	**3248860**	**3081596**	**3266216**	**3685356**	**3999283**	**4266953**	**1.0**	**0.1**	**-0.9**	**1.6**
Self consumption and grid losses	396970	407042	377767	368917	345669	330896	293605	293130	321803	358103	402709	-0.5	-0.9	-1.6	1.6
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383290**	**342379**	**306462**	**251160**	**240293**	**263396**	**292881**	**305139**	**0.8**	**-2.0**	**-3.1**	**1.0**
Solids	223038	228941	197605	186639	153980	145683	118800	82691	67484	67081	83372	-1.2	-2.5	-2.6	-1.8
Oil (including refinery gas)	40042	33244	20532	10891	5772	4526	3246	2877	2261	1759	1324	-6.5	-11.9	-5.6	-4.4
Gas (including derived gases)	102844	133713	149190	131871	121328	90859	60242	71658	76118	87162	78514	3.8	-2.0	-6.8	1.3
Biomass & Waste	14918	26452	45117	47914	54502	58541	61455	67591	87430	98490	99061	11.7	1.9	1.2	2.4
Geothermal heat	4114	4645	4828	5976	6796	6853	7416	15477	24875	30256	32981	1.6	3.5	0.9	7.7
Hydrogen - Methanol	0	0	0	0	0	0	0	0	5227	8133	9887	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970990**	**901576**	**834079**	**774053**	**751647**	**722264**	**680808**	**668964**	**-0.7**	**-1.0**	**-1.5**	**-0.7**
Refineries	740500	763156	670015	646614	611888	572137	534023	479539	416152	352855	302891	-1.0	-0.9	-1.4	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25358	24591	55183	89206	114770	138649	34.1	6.9	-0.6	9.0
District heating	18667	19517	20813	22214	19374	16880	16836	15392	11457	9032	8466	1.1	-0.7	-1.4	-3.4
Derived gases, cokeries etc.	316475	324348	297391	283940	244285	219705	198604	201533	205449	204150	218957	-0.6	-1.9	-2.0	0.5
Energy Branch Consumption	**86990**	**91952**	**88327**	**82413**	**76461**	**68614**	**61707**	**55594**	**50071**	**46854**	**46409**	**0.2**	**-1.4**	**-2.1**	**-1.4**
Non-Energy Uses	**117117**	**120718**	**114884**	**119320**	**122392**	**117523**	**110687**	**105453**	**101389**	**98061**	**98032**	**-0.2**	**0.6**	**-1.0**	**-0.6**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170499**	**1120502**	**1022200**	**920075**	**870767**	**825095**	**786402**	**758883**	**0.3**	**-0.3**	**-2.0**	**-1.0**
by sector															
Industry	332412	330448	290978	304745	302877	280054	258754	240404	224866	216668	215641	-1.3	0.4	-1.6	-0.9
- energy intensive industries	217920	216886	187894	197049	195802	180295	164999	151021	140128	134921	132017	-1.5	0.4	-1.7	-1.1
- other industrial sectors	114492	113563	103085	107696	107075	99759	93755	89383	84738	81747	83624	-1.0	0.4	-1.3	-0.6
Residential	286291	311793	311545	311967	293092	251791	215196	200746	191367	179003	162158	0.8	-0.6	-3.0	-1.4
Tertiary	166083	179768	187856	181914	167514	146543	110285	107949	106466	103915	102487	1.2	-1.1	-4.1	-0.4
Transport	342901	368665	367191	371873	357021	343813	335840	321668	302395	286817	278598	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48392	45791	37307	30784	24756	19349	15032	12838	-2.2	-0.8	-3.9	-4.3
Oil	485890	502788	457366	440511	404794	370041	336053	282475	223560	171624	130236	-0.6	-1.2	-1.8	-4.6
Gas	266925	285438	269920	271648	246107	212814	172720	148895	120968	100246	84352	0.1	-0.9	-3.5	-3.5
Electricity	217599	239418	245271	254475	250763	243009	232195	235980	252502	267515	277267	1.2	0.2	-0.8	0.9
Heat (from CHP and District Heating)	46015	52355	53515	55309	54749	52233	49602	48996	49000	48086	47269	1.5	0.2	-1.0	-0.2
Renewable energy forms	49480	56250	81825	100099	118037	106198	97670	117922	138284	157500	174420	5.2	3.7	-1.9	2.9
Other	0	0	0	65	261	597	1050	11743	21433	26399	32502	0.0	0.0	14.9	18.7
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194885**	**243413**	**247548**	**258410**	**295279**	**352999**	**390762**	**412300**	**5.4**	**5.0**	**0.6**	**2.4**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.2**	**4234.8**	**3831.5**	**3346.3**	**2731.5**	**2034.1**	**1473.0**	**1167.3**	**-0.7**	**-1.3**	**-2.3**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2088.5	1873.1	1708.6	1462.8	1226.1	851.2	513.1	358.2		-1.5	-2.4	-6.8
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.7	2361.7	2123.0	1883.6	1505.4	1182.8	959.9	809.1		-1.2	-2.2	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.3**	**3203.6**	**2836.0**	**2391.9**	**1987.8**	**1421.7**	**1025.6**	**770.7**	**-0.5**	**-1.6**	**-2.9**	**-5.5**
Power generation/District heating	1404.5	1483.1	1341.6	1200.5	1010.1	887.4	682.7	544.4	283.7	129.8	58.1	-0.5	-2.8	-3.8	-11.6
Energy Branch	170.1	174.2	159.8	149.6	138.6	119.8	106.6	92.7	75.0	62.0	53.0	-0.6	-1.4	-2.6	-3.4
Industry	693.6	640.7	520.3	538.6	503.0	445.3	390.3	322.6	235.8	191.3	167.5	-2.8	-0.3	-2.5	-4.1
Residential	461.0	491.2	457.9	430.9	384.1	301.2	230.4	184.0	143.8	103.9	65.0	-0.1	-1.7	-5.0	-6.1
Tertiary	255.7	266.4	249.2	220.7	189.8	150.8	88.9	76.4	65.3	51.8	39.0	-0.3	-2.7	-7.3	-4.0
Transport	1001.0	1082.7	1050.9	1049.9	978.1	931.6	893.1	767.6	618.1	486.8	388.0	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.7**	**275.5**	**280.0**	**252.6**	**213.1**	**85.0**	**45.4**	**-1.0**	**1.5**	**0.2**	**-8.7**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.5**	**67.4**	**58.9**	**48.1**	**35.8**	**25.9**	**20.5**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE35DEC_d			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.1	96.9	80.2	71.2	64.6	59.0	54.5	-1.2	-2.2	-3.5	-1.9
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.95	1.90	1.79	1.56	1.15	0.85	0.64	-0.7	-0.9	-0.9	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.6	53.5	50.9	45.4	41.9	38.6				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.4	2034.3	2162.7	2449.4	2540.3	2791.1	3058.3	3227.2	3.7	2.6	1.9	1.4
as % of GDP	10.2	11.4	12.8	14.1	14.3	14.0	14.7	14.2	14.6	14.9	14.7				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.2	78.2	68.4	60.7	54.1	50.0	47.6		-1.0	-2.7	-1.8
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.4	65.4	51.8	44.9	39.8	34.5	28.9	-0.5	-1.9	-4.5	-2.9
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.6	61.4	42.6	38.6	35.3	32.0	29.3	0.0	-2.6	-5.7	-1.9
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.6	23.2	20.6	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.22	0.18	0.14	0.07	0.03	0.01	-1.6	-2.9	-3.0	-12.7
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.79	1.74	1.55	1.29	1.06	0.87	-0.8	-0.7	-0.5	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.59	1.51	1.34	1.05	0.88	0.78	-1.5	-0.7	-1.0	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.20	1.07	0.92	0.75	0.58	0.40	-0.9	-1.1	-2.0	-4.8
Tertiary	1.54	1.48	1.33	1.21	1.13	1.03	0.81	0.71	0.61	0.50	0.38	-1.5	-1.6	-3.3	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.04	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.1	21.1	23.6	27.4	33.1	41.4	47.7	51.7				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.2	26.2	42.3	57.0	68.6				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415616**	**3361174**	**3248860**	**3081596**	**3266216**	**3685356**	**3999283**	**4266953**	**1.0**	**0.1**	**-0.9**	**1.6**
Nuclear energy	945027	997733	916685	887184	735586	669229	614947	659774	720713	744717	842447	-0.3	-2.2	-1.8	1.6
Solids	933660	974939	830048	802585	672393	640613	512510	347072	254027	279264	383058	-1.2	-2.1	-2.7	-1.4
Oil (including refinery gas)	181203	141358	86851	46106	25934	20837	15014	14592	11325	9041	6365	-7.1	-11.4	-5.3	-4.2
Gas (including derived gases)	514392	699743	795653	751990	686270	486846	332572	422612	470687	517385	495099	4.5	-1.5	-7.0	2.0
Biomass-waste	46848	83787	145901	190927	217341	235321	251362	287318	385914	420958	423826	12.0	4.1	1.5	2.6
Hydro (pumping excluded)	358408	311883	374576	368453	374186	383119	393758	410167	421052	426538	432263	0.4	0.0	0.5	0.5
Wind	22253	70453	149202	263516	493685	630586	745477	851466	1027510	1131758	1186061	21.0	12.7	4.2	2.3
Solar	118	1459	22363	96144	143662	166774	199365	242347	324463	380512	399815	68.9	20.4	3.3	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15536	16590	30867	42970	51601	56662	2.5	5.9	3.2	6.3
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	26696	37510	41357	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930099**	**1018489**	**1034966**	**1069732**	**1102173**	**1232199**	**1284806**	**1313671**	**2.6**	**2.0**	**0.5**	**1.0**
Nuclear energy	136924	134494	131323	123150	111162	92030	88076	89123	95965	99041	111503	-0.4	-1.7	-2.3	1.2
Renewable energy	114281	147780	226757	318900	440177	507020	569290	632812	751015	824198	856398	7.1	6.9	2.6	2.1
Hydro (pumping excluded)	101207	105529	112159	118306	120598	122324	124437	129518	133244	135613	137475	1.0	0.7	0.3	0.5
Wind	12893	40510	84512	123698	207087	255211	297577	333051	397636	434546	453476	20.7	9.4	3.7	2.1
Solar	180	1740	29846	76309	110837	126450	144021	165061	214442	247367	257956	66.7	14.0	2.7	3.0
Other renewables (tidal etc.)	0	0	240	586	1655	3035	3256	5182	5692	6672	7490	0.0	21.3	7.0	4.3
Thermal power	398853	429386	480034	488050	467150	435917	412366	380238	385220	361567	345770	1.9	-0.3	-1.2	-0.9
of which cogeneration units	92439	98998	101203	102482	110690	107069	106056	106727	116105	120128	122405	0.9	0.9	-0.4	0.7
of which CCS units	0	0	0	0	904	904	904	2079	31330	100998	136082	0.0	0.0	0.0	28.5
Solids fired	186470	180630	175756	163212	140957	120336	101121	83728	81636	80081	80781	-0.6	-2.2	-3.3	-1.1
Gas fired	129190	169054	224922	253051	258083	251352	242831	225181	219910	195644	173275	5.7	1.4	-0.6	-1.7
Oil fired	67499	59434	54039	42249	32633	25945	21971	17654	14598	10928	8598	-2.2	-4.9	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34575	37374	45454	51620	65773	70898	78739	5.0	3.5	2.8	2.8
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	989	2055	3302	4016	4378	2.5	2.2	0.9	7.7
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.1	34.4	31.7	32.7	33.0	34.2	35.4				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.4	39.1	38.4	39.0	38.5	38.2	39.1				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.7	15.9	16.3	16.4	17.1	16.2	15.2				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	2.3	6.2	10.6				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.8	64.7	72.1	76.0	79.9	79.7	79.1				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.6	20.0	20.2	19.7	18.8	19.9				
- renewable energy forms	14.4	14.4	21.0	27.2	36.9	44.1	52.1	55.8	60.2	60.9	59.1				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7050.0**	**7452.1**	**7851.0**	**8111.2**	**8322.6**	**8497.1**	**8737.4**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.9	575.3	603.2	624.5	654.3	672.3	690.5	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.6	5410.5	5587.2	5688.6	5727.3	5773.8	5881.4	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.1	647.9	723.7	782.3	847.2	893.4	935.2	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.4	775.4	892.0	969.1	1045.2	1107.3	1178.7	1.4	2.6	2.8	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	43.0	44.9	46.7	48.6	50.3	51.5	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.3**	**3386.4**	**3511.3**	**3635.6**	**3713.0**	**3801.5**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.1	2346.4	2426.6	2501.4	2545.0	2599.8	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	608.7	641.0	675.2	698.7	720.2	-0.3	2.2	2.3	0.8
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.3	443.6	459.0	469.4	481.6	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354504**	**341294**	**333375**	**319214**	**299991**	**284477**	**276292**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7770	7806	7825	7403	7147	6800	6514	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156774	141065	129021	117140	99985	86784	80261	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118898	118271	120872	119462	116791	114294	111986	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9231	9910	10073	10178	10078	9918	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56124	58173	58663	57906	58498	59044	60067	0.9	1.2	0.4	0.1
Inland navigation	5973	6575	5892	6143	6386	6749	7083	7229	7391	7476	7548	-0.1	0.8	1.0	0.3

Source: PRIMES

EU28: EE40DEC_d												SUMMARY ENERGY BALANCE AND INDICATORS (A)			
ktoe	**2000**	**2005**	**2010**	**2015**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**	**2050**	**'00-'10**	**'10-'20**	**'20-'30**	**'30-'50**
												Annual % Change			
Production (incl.recovery of products)	**947932**	**904640**	**841485**	**831467**	**798182**	**721654**	**594126**	**601760**	**645922**	**686502**	**725722**	**-1.2**	**-0.5**	**-2.9**	**1.0**
Solids	214627	196059	163855	149909	138357	122588	88013	75580	67117	60562	71523	-2.7	-1.7	-4.4	-1.0
Oil	176084	136469	103565	90639	76992	62871	50594	35891	24685	14526	9193	-5.2	-2.9	-4.1	-8.2
Natural gas	209437	190678	158525	149168	137818	104402	65593	59388	56195	53182	45391	-2.7	-1.4	-7.2	-1.8
Nuclear	243841	257516	236563	229104	190026	172868	137809	145170	151578	160614	178766	-0.3	-2.2	-3.2	1.3
Renewable energy sources	103944	123918	178977	212647	254989	258925	252117	285731	346347	397618	420849	5.6	3.6	-0.1	2.6
Hydro	30818	26817	32208	31687	32180	32956	33532	34287	35802	36254	36918	0.4	0.0	0.4	0.5
Biomass & Waste	66071	84883	124361	136274	148474	138011	124759	141967	166669	198037	212409	6.5	1.8	-1.7	2.7
Wind	1913	6058	12829	22662	42272	52303	60668	65752	81456	90026	94075	21.0	12.7	3.7	2.2
Solar and others	430	806	3691	14050	22796	26526	24785	30544	37164	41902	42969	24.0	20.0	0.8	2.8
Geothermal	4712	5354	5888	7974	9267	9129	8374	13182	25256	31400	34479	2.3	4.6	-1.0	7.3
Net Imports	**829314**	**988719**	**956735**	**967871**	**897192**	**834294**	**707942**	**653319**	**571662**	**512780**	**465308**	**1.4**	**-0.6**	**-2.3**	**-2.1**
Solids	98273	125211	110927	116028	92380	91837	65754	54356	39287	28264	32001	1.2	-1.8	-3.3	-3.5
Oil	535238	604030	563977	551788	524779	492943	455032	407527	344764	280202	229748	0.5	-0.7	-1.4	-3.4
- Crude oil and Feedstocks	518046	585121	541240	527775	504240	477965	447164	409846	361424	312739	271449	0.4	-0.7	-1.2	-2.5
- Oil products	17192	18909	22737	24013	20538	14978	7868	-2320	-16660	-32538	-41702	2.8	-1.0	-9.1	0.0
Natural gas	193432	257849	276001	286142	260089	229511	166466	166071	156056	166898	161971	3.6	-0.6	-4.4	-0.1
Electricity	2029	1412	707	-129	-1602	-1507	-1490	-1736	-1819	-1887	-2089	-10.0	0.0	0.0	0.0
Gross Inland Consumption	**1732712**	**1833269**	**1767474**	**1745873**	**1639958**	**1498520**	**1243389**	**1194435**	**1157129**	**1138123**	**1128729**	**0.2**	**-0.7**	**-2.7**	**-0.5**
Solids	321277	317986	280653	265938	230738	214425	153767	129936	106403	88826	103524	-1.3	-1.9	-4.0	-2.0
Oil	665142	683909	620735	589179	547273	500376	449594	387052	314684	240821	185250	-0.7	-1.3	-1.9	-4.3
Natural gas	396145	448380	444428	435092	396989	331922	229412	221181	206561	212827	198752	1.2	-1.1	-5.3	-0.7
Nuclear	243841	257516	236563	229104	190026	172868	137809	145170	151578	160614	178766	-0.3	-2.2	-3.2	1.3
Electricity	2029	1412	707	-129	-1602	-1507	-1490	-1736	-1819	-1887	-2089	-10.0	0.0	0.0	0.0
Renewable energy forms	104278	124065	184389	226690	276534	280435	274298	312833	379722	436921	464526	5.9	4.1	-0.1	2.7
as % in Gross Inland Consumption															
Solids	18.5	17.3	15.9	15.2	14.1	14.3	12.4	10.9	9.2	7.8	9.2				
Oil	38.4	37.3	35.1	33.7	33.4	33.4	36.2	32.4	27.2	21.2	16.4				
Natural gas	22.9	24.5	25.1	24.9	24.2	22.2	18.5	18.5	17.9	18.7	17.6				
Nuclear	14.1	14.0	13.4	13.1	11.6	11.5	11.1	12.2	13.1	14.1	15.8				
Renewable energy forms	6.0	6.8	10.4	13.0	16.9	18.7	22.1	26.2	32.8	38.4	41.2				
Gross Electricity Generation in GWh_e	**3006692**	**3286660**	**3327452**	**3415599**	**3363144**	**3255927**	**2804308**	**3004366**	**3423242**	**3703855**	**3968984**	**1.0**	**0.1**	**-1.8**	**1.8**
Self consumption and grid losses	396970	407042	377767	368936	346142	334042	261356	268879	295275	321605	369255	-0.5	-0.9	-2.8	1.7
Fuel Inputs to Thermal Power Generation	**384957**	**426995**	**417273**	**383320**	**343115**	**312621**	**223213**	**227200**	**247274**	**275839**	**290789**	**0.8**	**-1.9**	**-4.2**	**1.3**
Solids	223038	228941	197605	186660	154839	151933	103497	86710	71848	61126	79650	-1.2	-2.4	-3.9	-1.3
Oil (including refinery gas)	40042	33244	20532	10887	5786	4352	3158	2918	2269	1707	1313	-6.5	-11.9	-5.9	-4.3
Gas (including derived gases)	102844	133713	149190	131886	121199	91115	52958	62634	67127	79340	69361	3.8	-2.1	-7.9	1.4
Biomass & Waste	14918	26452	45117	47910	54494	58369	56735	63527	77803	97239	99097	11.7	1.9	0.4	2.8
Geothermal heat	4114	4645	4828	5976	6796	6851	6864	11411	23228	29110	31632	1.6	3.5	0.1	7.9
Hydrogen - Methanol	0	0	0	0	0	0	0	0	4999	7317	9736	0.0	0.0	0.0	0.0
Fuel Input to other conversion processes	**1076346**	**1110121**	**1001515**	**970986**	**901663**	**832719**	**742152**	**719594**	**686953**	**651670**	**641675**	**-0.7**	**-1.0**	**-1.9**	**-0.7**
Refineries	740500	763156	670015	646606	611902	571290	527852	474892	413249	350939	301978	-1.0	-0.9	-1.5	-2.8
Biofuels and hydrogen production	705	3101	13296	18222	26029	25359	24595	53757	86249	110546	134920	34.1	6.9	-0.6	8.9
District heating	18667	19517	20813	22216	19390	16564	12685	11810	7176	5305	4734	1.1	-0.7	-4.2	-4.8
Derived gases, cokeries etc.	316475	324348	297391	283942	244341	219506	177020	179134	180279	184880	200043	-0.6	-1.9	-3.2	0.6
Energy Branch Consumption	**86990**	**91952**	**88327**	**82408**	**76506**	**68665**	**59458**	**54181**	**48840**	**44715**	**44598**	**0.2**	**-1.4**	**-2.5**	**-1.4**
Non-Energy Uses	**117117**	**120718**	**114884**	**119318**	**122391**	**116695**	**108596**	**103913**	**100940**	**97869**	**98038**	**-0.2**	**0.6**	**-1.2**	**-0.5**
Final Energy Demand	**1127687**	**1190674**	**1157570**	**1170494**	**1120654**	**1020866**	**858690**	**816464**	**776267**	**738226**	**711900**	**0.3**	**-0.3**	**-2.6**	**-0.9**
by sector															
Industry	332412	330448	290978	304739	302929	278925	255989	238419	224364	216224	215251	-1.3	0.4	-1.7	-0.9
- energy intensive industries	217920	216886	187894	197042	195821	179152	161968	148782	139680	134616	131840	-1.5	0.4	-1.9	-1.0
- other industrial sectors	114492	113563	103085	107697	107107	99773	94021	89636	84684	81608	83411	-1.0	0.4	-1.3	-0.6
Residential	286291	311793	311545	311967	293086	251356	180244	169433	161469	149291	133559	0.8	-0.6	-4.7	-1.5
Tertiary	166083	179768	187856	181915	167577	146523	86398	86442	87331	85438	84513	1.2	-1.1	-6.4	-0.1
Transport	342901	368665	367191	371873	357063	344062	336059	322170	303104	287273	278578	0.7	-0.3	-0.6	-0.9
by fuel															
Solids	61779	54424	49673	48413	45741	36612	28972	23511	19266	14984	12769	-2.2	-0.8	-4.5	-4.0
Oil	485890	502788	457366	440495	404845	369931	330059	278025	220184	169503	129150	-0.6	-1.2	-2.0	-4.6
Gas	266925	285438	269920	271612	246200	212909	153899	134429	110162	90003	74938	0.1	-0.9	-4.6	-3.5
Electricity	217599	239418	245271	254471	250887	243332	211399	217179	235509	249796	258410	1.2	0.2	-1.7	1.0
Heat (from CHP and District Heating)	46015	52355	53515	55316	54725	52089	42745	42851	43173	42133	41944	1.5	0.2	-2.4	-0.1
Renewable energy forms	49480	56250	81825	100121	117994	105396	90561	109905	128800	148145	165222	5.2	3.7	-2.6	3.1
Other	0	0	0	65	261	597	1055	10564	19173	23662	29468	0.0	0.0	15.0	18.1
RES in Gross Final Energy Consumption [A]	**88147**	**104692**	**149354**	**194970**	**242986**	**244446**	**239514**	**270796**	**323447**	**366990**	**389609**	**5.4**	**5.0**	**-0.1**	**2.5**
TOTAL GHG emissions (Mt of CO2 eq.)	**5215.6**	**5321.9**	**4846.8**	**4623.3**	**4238.7**	**3853.8**	**3185.7**	**2711.2**	**2133.0**	**1451.4**	**1123.8**	**-0.7**	**-1.3**	**-2.8**	**-5.1**
of which ETS sectors (2013 scope) GHG emissions		2513.8	2180.0	2089.0	1876.7	1731.6	1367.8	1256.2	986.8	522.7	339.2		-1.5	-3.1	-6.7
of which non ETS sectors GHG emissions		2808.1	2666.7	2534.3	2362.0	2122.2	1817.9	1455.0	1146.2	928.7	784.6		-1.2	-2.6	-4.1
CO_2 Emissions (energy related)	**3985.8**	**4138.3**	**3779.7**	**3590.4**	**3207.3**	**2857.0**	**2230.9**	**1938.4**	**1516.5**	**1002.0**	**727.4**	**-0.5**	**-1.6**	**-3.6**	**-5.4**
Power generation/District heating	1404.5	1483.1	1341.6	1200.6	1013.0	908.7	593.9	543.4	407.5	136.4	41.3	-0.5	-2.8	-5.2	-12.5
Energy Branch	170.1	174.2	159.8	149.7	138.5	118.7	103.9	91.5	75.6	61.8	52.3	-0.6	-1.4	-2.8	-3.4
Industry	693.6	640.7	520.3	538.6	503.7	447.5	385.1	325.8	246.9	193.8	165.6	-2.8	-0.3	-2.6	-4.1
Residential	461.0	491.2	457.9	430.9	384.1	300.2	182.2	146.4	112.7	79.0	47.5	-0.1	-1.7	-7.2	-6.5
Tertiary	255.7	266.4	249.2	220.7	189.7	149.5	71.9	62.0	53.9	43.2	32.8	-0.3	-2.7	-9.2	-3.9
Transport	1001.0	1082.7	1050.9	1049.9	978.3	932.3	893.9	769.2	619.9	487.8	387.9	0.5	-0.7	-0.9	-4.1
CO_2 Emissions (non energy related)	**262.3**	**280.3**	**236.1**	**257.0**	**273.9**	**276.8**	**280.4**	**281.7**	**217.2**	**87.0**	**45.2**	**-1.0**	**1.5**	**0.2**	**-8.7**
Non-CO2 GHG emissions	**967.4**	**903.3**	**830.9**	**775.9**	**757.5**	**720.0**	**674.4**	**491.1**	**399.3**	**362.4**	**351.2**	**-1.5**	**-0.9**	**-1.2**	**-3.2**
TOTAL GHG emissions Index (1990=100)	**91.8**	**93.6**	**85.3**	**81.3**	**74.6**	**67.8**	**56.0**	**47.7**	**37.5**	**25.5**	**19.8**				

Source: PRIMES

SUMMARY ENERGY BALANCE AND INDICATORS (B)											EU28: EE40DEC_d			
	2000	2005	2010	2015	2020	2025	2030	2035	2040	2045	2050	'00-'10	'10-'20	'20-'30	'30-'50
												Annual % Change			
Main Energy System Indicators															
Population (Million)	485.587	493.791	503.626	510.817	516.986	521.721	524.921	527.075	528.203	528.090	526.472	0.4	0.3	0.2	0.0
GDP (in 000 M€10)	10705.8	11766.2	12301.9	13210.2	14246.4	15448.3	16667.7	17866.6	19150.8	20517.0	21944.1	1.4	1.5	1.6	1.4
Gross Inl. Cons./GDP (toe/M€10)	161.8	155.8	143.7	132.2	115.1	97.0	74.6	66.9	60.4	55.5	51.4	-1.2	-2.2	-4.2	-1.8
Carbon intensity (t of CO_2/toe of GIC)	2.30	2.26	2.14	2.06	1.96	1.91	1.79	1.62	1.31	0.88	0.64	-0.7	-0.9	-0.9	-5.0
Import Dependency %	46.7	52.5	52.7	53.8	52.9	53.6	54.4	52.1	47.0	42.8	39.1				
Total energy-rel. and other mitigation costs (in 000 M	1092.1	1338.5	1569.4	1864.4	2035.0	2164.6	2728.5	2774.1	3011.5	3311.1	3517.6	3.7	2.6	3.0	1.3
as % of GDP	10.2	11.4	12.8	14.1	14.3	14.0	16.4	15.5	15.7	16.1	16.0				
Energy intensity indicators															
Industry (Energy on Value added, index 2000=100)			100.0	97.0	90.2	77.9	67.7	60.2	54.0	49.9	47.6		-1.0	-2.8	-1.7
Residential (Energy on Private Income, index 2000=100)	105.6	104.3	100.0	94.2	82.4	65.3	43.4	37.9	33.5	28.7	23.8	-0.5	-1.9	-6.2	-3.0
Tertiary (Energy on Value added, index 2000=100)	0.0	0.0	100.0	90.0	76.6	61.4	33.4	30.9	29.0	26.3	24.2	0.0	-2.6	-8.0	-1.6
Passenger transport (toe/Mpkm)	40.0	39.2	37.8	35.9	32.0	28.5	25.7	23.3	20.7	18.7	17.5	-0.6	-1.6	-2.2	-1.9
Freight transport (toe/Mtkm)	47.1	47.5	48.4	46.9	43.8	40.9	39.0	37.3	35.3	33.8	32.4	0.3	-1.0	-1.1	-0.9
Carbon Intensity indicators															
Electricity and Steam production (t of CO_2/MWh)	0.39	0.37	0.33	0.29	0.25	0.23	0.17	0.15	0.10	0.03	0.01	-1.6	-2.9	-3.4	-13.7
Final energy demand (t of CO_2/toe)	2.14	2.08	1.97	1.91	1.83	1.79	1.79	1.60	1.33	1.09	0.89	-0.8	-0.7	-0.3	-3.4
Industry	2.09	1.94	1.79	1.77	1.66	1.60	1.50	1.37	1.10	0.90	0.77	-1.5	-0.7	-1.0	-3.3
Residential	1.61	1.58	1.47	1.38	1.31	1.19	1.01	0.86	0.70	0.53	0.36	-0.9	-1.1	-2.6	-5.1
Tertiary	1.54	1.48	1.33	1.21	1.13	1.02	0.83	0.72	0.62	0.51	0.39	-1.5	-1.6	-3.0	-3.7
Transport	2.92	2.94	2.86	2.82	2.74	2.71	2.66	2.39	2.05	1.70	1.39	-0.2	-0.4	-0.3	-3.2
Indicators for renewables															
Share of RES in Gross Final Energy Consumption ((	7.5	8.4	12.4	16.2	21.1	23.3	27.4	32.6	40.5	48.0	52.4				
RES in transport (%)	0.6	1.2	4.7	6.5	10.3	11.7	14.4	26.3	42.3	57.5	68.9				
Gross Electricity generation by source (in GWh_e	**3007267**	**3287285**	**3328110**	**3415599**	**3363144**	**3255927**	**2804308**	**3004366**	**3423242**	**3703855**	**3968984**	**1.0**	**0.1**	**-1.8**	**1.8**
Nuclear energy	945027	997733	916685	887185	735874	673556	536430	570593	608066	658356	759401	-0.3	-2.2	-3.1	1.8
Solids	933660	974939	830048	802733	676404	666387	433376	368393	312489	244337	355684	-1.2	-2.0	-4.4	-1.0
Oil (including refinery gas)	181203	141358	86851	45969	26009	19984	14419	14214	11321	8686	5273	-7.1	-11.4	-5.7	-4.9
Gas (including derived gases)	514392	699743	795653	752003	685820	487963	290207	364085	405726	463517	434346	4.5	-1.5	-8.2	2.0
Biomass-waste	46848	83787	145901	190884	217533	234409	232058	271052	349523	422133	424394	12.0	4.1	0.6	3.1
Hydro (pumping excluded)	358408	311883	374576	368453	374186	383210	389910	398682	416298	421554	429275	0.4	0.0	0.4	0.5
Wind	22253	70453	149202	263516	491540	608172	705437	764556	947168	1046811	1093895	21.0	12.7	3.7	2.2
Solar	118	1459	22363	96144	143662	166878	186689	227932	307285	356600	373788	68.9	20.4	2.7	3.5
Geothermal and other renewables	5358	5930	6831	8712	12116	15368	15783	24859	39611	48636	52932	2.5	5.9	2.7	6.2
Other fuels (hydrogen, methanol)	0	0	0	0	0	0	0	0	25755	33225	39996	0.0	0.0	0.0	0.0
Net Generation Capacity in MW_e	**650058**	**711660**	**838114**	**930117**	**1017665**	**1025340**	**1040514**	**1041376**	**1159956**	**1208177**	**1231823**	**2.6**	**2.0**	**0.2**	**0.8**
Nuclear energy	136924	134494	131323	123150	111162	91595	85077	81388	81611	87645	100457	-0.4	-1.7	-2.6	0.8
Renewable energy	114281	147780	226757	318900	439349	498334	548216	592728	708714	776055	806035	7.1	6.8	2.2	1.9
Hydro (pumping excluded)	101207	105529	112159	118306	120598	122346	124018	126767	131195	133426	136486	1.0	0.7	0.3	0.5
Wind	12893	40510	84512	123698	206259	246614	283136	303191	367918	402833	418949	20.7	9.3	3.2	2.0
Solar	180	1740	29846	76309	110837	126407	137873	158087	204541	233861	244110	66.7	14.0	2.2	2.9
Other renewables (tidal etc.)	0	0	240	586	1655	2967	3188	4683	5061	5936	6491	0.0	21.3	6.8	3.6
Thermal power	398853	429386	480034	488068	467155	435411	407222	367261	369631	344477	325331	1.9	-0.3	-1.4	-1.1
of which cogeneration units	92439	98998	101203	102224	110690	106163	101682	99932	110710	115158	115917	0.9	0.9	-0.8	0.7
of which CCS units	0	0	0	0	904	904	904	904	11046	84221	127005	0.0	0.0	0.0	28.0
Solids fired	186470	180630	175756	163212	141085	120710	101239	83482	80448	76328	77196	-0.6	-2.2	-3.3	-1.3
Gas fired	129190	169054	224922	253066	257793	250302	240038	216231	209465	183114	157776	5.7	1.4	-0.7	-2.1
Oil fired	67499	59434	54039	42252	32647	25926	21875	17342	14391	10933	8611	-2.2	-4.9	-3.9	-4.6
Biomass-waste fired	15128	19615	24590	28745	34727	37564	43154	48690	62243	70237	77547	5.0	3.5	2.2	3.0
Hydrogen plants	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
Geothermal heat	567	652	726	794	903	910	915	1515	3084	3864	4199	2.5	2.2	0.1	7.9
Avg. Load factor of net power capacity (%)	50.0	50.0	43.1	40.0	36.2	34.8	29.7	31.8	32.6	33.7	35.1				
Efficiency of gross thermal power generation (%)	37.5	38.4	38.4	40.4	40.5	39.0	37.7	39.0	39.4	37.6	38.4				
% of gross electricity from CHP	11.5	11.8	12.6	14.3	15.6	15.5	16.2	16.2	17.4	16.6	15.3				
% of electricity from CCS	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.3	1.3	4.6	10.2				
Carbon free gross electricity generation (%)	45.8	44.8	48.5	53.1	58.7	63.9	73.7	75.1	78.5	80.5	79.8				
- nuclear	31.4	30.4	27.5	26.0	21.9	20.7	19.1	19.0	17.9	17.9	19.3				
- renewable energy forms	14.4	14.4	21.0	27.2	36.8	43.2	54.6	56.2	60.6	62.5	60.4				
Transport sector															
Passenger transport activity (Gpkm)	**5894.2**	**6251.6**	**6466.4**	**6757.2**	**7050.3**	**7454.4**	**7853.0**	**8116.4**	**8331.3**	**8502.4**	**8734.5**	**0.9**	**0.9**	**1.1**	**0.5**
Public road transport	519.6	527.2	512.8	531.3	549.8	575.0	603.0	623.9	653.4	671.9	691.1	-0.1	0.7	0.9	0.7
Private cars and motorcycles	4425.4	4694.5	4893.4	5054.2	5197.7	5411.0	5587.4	5689.2	5730.0	5775.2	5879.3	1.0	0.6	0.7	0.3
Rail	447.8	459.7	496.4	536.5	583.1	647.4	722.9	781.4	845.4	892.1	935.7	1.0	1.6	2.2	1.3
Aviation	459.7	530.7	525.6	595.8	678.8	778.0	894.9	975.3	1054.1	1113.0	1176.9	1.4	2.6	2.8	1.4
Inland navigation	41.7	39.5	38.1	39.5	41.0	42.9	44.8	46.6	48.5	50.1	51.6	-0.9	0.7	0.9	0.7
Freight transport activity (Gtkm)	**2227.6**	**2545.3**	**2493.4**	**2712.5**	**2938.4**	**3147.4**	**3385.7**	**3511.9**	**3635.6**	**3712.7**	**3801.2**	**1.1**	**1.7**	**1.4**	**0.6**
Trucks	1522.0	1803.3	1764.4	1920.8	2076.5	2197.2	2346.6	2426.5	2501.7	2545.0	2600.0	1.5	1.6	1.2	0.5
Rail	405.5	416.0	392.5	435.7	486.2	545.1	607.9	641.6	674.9	698.2	719.7	-0.3	2.2	2.3	0.8
Inland navigation	300.1	325.9	336.6	355.9	375.8	405.1	431.2	443.8	459.0	469.4	481.5	1.2	1.1	1.4	0.6
Energy demand in transport (ktoe)	**340814**	**366066**	**364944**	**369396**	**354546**	**341541**	**333642**	**319752**	**300729**	**284965**	**276309**	**0.7**	**-0.3**	**-0.6**	**-0.9**
Public road transport	7580	7663	7522	7714	7770	7803	7826	7395	7136	6791	6513	-0.1	0.3	0.1	-0.9
Private cars and motorcycles	178015	181818	182270	175746	156777	141081	129027	117154	100042	86814	80247	0.2	-1.5	-1.9	-2.3
Trucks	95660	111643	112043	117988	118899	118275	120887	119476	116805	114271	111965	1.6	0.6	0.2	-0.4
Rail	8093	7855	7399	7951	8552	9230	9895	10075	10170	10074	9915	-0.9	1.5	1.5	0.0
Aviation	45492	50512	49820	53853	56163	58408	58933	58431	59201	59549	60118	0.9	1.2	0.5	0.1
Inland navigation	5973	6575	5892	6143	6386	6745	7074	7220	7375	7467	7550	-0.1	0.8	1.0	0.3

Source: PRIMES