

Why are some options excluded?

Friends of the Earth Europe excluded high risk or false solutions which divert valuable resources from safer, less risky alternatives and do not address the root problem of soaring emissions and wasteful use of energy. Nuclear power is excluded for safety and costs concerns, and biofuels because they do not generally reduce emissions, especially when land-uses changes are taken into account. Carbon, capture and storage is excluded as it remains unproven and could lead to a new generation of coal-fired power plants locking society into carbon-intensive power generation.

This scenario also excludes offsetting through the Clean Development Mechanism, and any North-South emissions trading, which is an excuse for developed countries not to take the necessary action at home, delays the urgently needed shift to a green economy, is not guaranteed to deliver real emissions cuts, and in many cases harms people and the environment.

What methodology was used for the study?

The SEI study compares a baseline to a mitigation scenario. The baseline is built upon detailed historical energy statistics for the EU 27 published by the International Energy Agency and extrapolated into the future based on projections to 2030 from the European Commission.² Figures from the economic crisis and projections for greenhouse gas emissions from international air travel and non-energy sectors have also been included. Both scenarios have been developed using an energy modeling system to analyse the energy consumption and production, greenhouse gas emissions and costs and benefits of the scenarios.

What changes can be expected to energy in Europe?

Steep emission cuts can be achieved through radical changes in Europe's energy system combined with behavioural changes. Dramatic improvements in energy efficiency, the rapid phase out of fossil fuels and a major shift towards various types of renewable energy are required. By far the biggest potential for renewables comes from onshore and offshore wind with its share in the generation mix increasing from 3.3% in 2010 to 22% in 2020 and 55% in 2050. The study foresees electricity demand growing until 2020 due to the replacement of fossil fuels in many sectors. After 2020 gains in energy efficiency lead to an overall decrease in electricity demand. Those sectors that will contribute the largest emission cuts by 2050 are transport (32% of decreases), electricity generation (28%) and heat production (11%).

What changes can be expected to lifestyles in Europe?

Changes in Europe's energy system need to go hand in hand with a less materialistic society and lower levels of growth in GDP. Examples of lifestyle changes include a shift from individual to public transport with only 43% of trips being made by car in 2050 compared to 75% in 2005, and reduced flying with 80% of intra European flights under 1000km switching to rail by 2050. Some emission cuts are also achieved by more healthy but less meat intensive diets and a reversal of the trend for bigger homes. Lifestyle changes result in average per capita emissions of 1 metric tonneCO₂ equivalent per year in 2050 – around 8 times lower than today. It is clear that these kind of behavioural changes will not happen without political guidance.

² EC – DG TREN, 2008. *European Energy and Transport: Trends to 2030, Update 2007*.

How much will the 40% scenario cost?³

The total costs of implementation are estimated to be €1.94 trillion or 1.7% of Europe's discounted cumulative GDP between 2010 and 2020 (€111trillion). However, this is only a partial estimate not including the industry, non-energy and agriculture sectors and a more comprehensive calculation would result in about 2% of Europe's discounted cumulative GDP. This is small when compared to the costs of inaction which have been estimated to amount to at least 5%, but perhaps more than 20%, of global GDP. Broken down the costs are around €2 per person per day. It is worthwhile noting that the SEI mitigation scenario does not fully take into account economic benefits of early action, such as job creation, greater energy security and health benefits of reduced local air pollution.

How much must Europe pay to support developing countries?

The EU's fair share of finances for the developing world amounts to €150 billion to €450 billion per year by 2020 according to the SEI study, depending on the overall global costs of mitigation. Two plausible average cost levels for emission reductions in 2020 are €50 and €150 per tonne CO₂ equivalent. This corresponds to between approximately 1% and 3% of the EU's projected GDP of €13.6trillion in 2020. Between 2010 and 2020, steadily increasing amounts of financial and technological resources should be provided to support and enable the transition in developing countries, reaching the €150bn to €450billion range in 2020. Again, broken down to a daily expenditure this equals less than €3 per person per day.

What are the next steps for Europe to achieve climate justice?

Incentives to tackle the climate challenge must be a guiding principle in all EU policy making, from housing to transport, and agriculture to energy. The EU must design a holistic 'climate protection framework' including all the various – existing and additional – measures needed to deliver the necessary emission cuts. Such a framework should incorporate strong climate legislation in member states to regulate greenhouse gas emissions in all parts of the economy at the national level. These laws would ensure that emissions are brought down year-by-year with the speed that is needed.

National mechanisms are needed to place appropriate sanctions on government departments, regions and sectors that fail to meet their targets to reduce emissions. An EU-wide compliance mechanism is needed to penalise countries that fail to meet national targets.

Friends of the Earth Europe's climate campaign, the Big Ask (www.thebigask.eu), is actively calling for annual emission cuts and the introduction of climate laws in more than 15 countries. Since the start of the campaign the UK and Scotland have already passed climate change laws.

³ Please note that the SEI study is not intended as a detailed economic assessment of the costs of achieving 40% domestic cuts in the EU.

Overarching climate and energy policy recommendations

(non-comprehensive examples, for more details and sector-specific policy recommendations please see Friends of the Earth Europe's document 'The 40% Study – Mobilising Europe to achieve climate justice')

- a domestic greenhouse gas emission reduction target of at least 40% by 2020 with emissions declining more than 5% annually from 2012 onwards
- an ambitious binding target for renewable energy in line with the 40% target
- an ambitious overall target for energy savings across all sectors in line with the 40% target
- international financing obligations of between €150 billion and €450 billion per year in 2020
- the binding phase out of nuclear, coal and oil fired power generation as soon as possible
- earmarking significant amounts of funding for climate mitigation measures in the current EU structural and cohesion funds allocations, and the post 2013 EU budget and cohesion policy
- overall GHG or carbon tax to create a stable environment for investment in energy savings and renewable energy
- regulations to reduce consumption and subsidies to promote the reuse and recycling of materials
- support for public awareness and education activities on the need for changes in consumption and lifestyle

Is this scenario realistic?

This scenario shows a pathway which gives good chances to limit temperature increase to below 2°C, in line with what science says is necessary. The picture painted is an emergency pathway and is significantly steeper than even the most ambitious of current proposals. In this respect it could be described as 'politically unrealistic'.

But the study proves that these cuts ARE possible and affordable. 'Politically realistic' must be recalibrated to the scale of the challenge of rescuing the planet. A massive brave shift in policy and determination from EU politicians is needed. Governments and businesses were able to mobilise huge almost 'unrealistic' efforts to rescue bankrupt banks – now they must mobilise to rescue the planet.

How does this link to the UN climate talks in Copenhagen?

In December countries will meet at global climate talks in Copenhagen to reach an agreement on the action the world will take against climate change post 2012. To achieve climate justice in Copenhagen the European Union must set an example for other developed countries to follow and commit to reduce Europe's emissions by 40% by 2020 within Europe and to provide the finances needed for adaptation and mitigation in developing countries. This study shows that ambitious climate targets can be achieved but policy and societal shifts need to happen right now. The EU should have no excuse for not making the necessary commitments in Copenhagen.

Some facts and figures:

TRANSPORT

- 69% of journeys are made by car in 2020 and 43% in 2050, compared to 75% in 2005
- vehicles are progressively electrified so that by 2020 21% are hybrids, 2% electric and 77% internal combustion cars; by 2050 virtually all cars on road are electrified
- by 2050 80% of intra European flights under 1000km switch to rail
- by 2030 rail becomes fully electrified and by 2050 65% of buses are electrified
- electricity consumption increases by 219% in 2020 and by 606% in 2050 compared to 2010

HOUSING

- energy use in households decreases by 16% by 2020 and 63% by 2050 compared to 2010; this corresponds to an annual reduction rate of 2.5%
- 90% of existing houses are retrofitted to low energy houses (with an average heating consumption of 27 kWh/m²) at a rate of 5% per year; this would take 18 years
- new homes attain average passive house standards (15 kWh/m² of heating energy) beginning in 2011 and being completed in 2015
- a dramatic shift away from fossil fuel use (currently 75% for home heating) to increased use of heat (CHP) and electricity (heat pumps)
- by 2050 home sizes gradually return from an average peak surface of 100m² in 2020 to 2005 levels with an average of 87m²

INDUSTRY

- achieving deep cuts in industrial emissions will be challenging since the industrial sector will in some areas need to be expanded to provide the infrastructure upon which the mitigation scenario depends
- overall industrial energy demand decreases by 62% by 2050 compared to 2010; this corresponds to an annual average reduction of 2.4% per year between 2010 and 2050
- by 2050 40% of Europe's iron and steel production is biomass based DRI and another 50% is natural gas based DRI,⁴ the remaining 10% come from existing technologies
- in the cement industry improvements in energy intensity reduce energy use to 15% below baseline by 2020 and 55% by 2050

⁴ DRI is Direct Reduced Iron produced in Electric Arc Furnaces

ENERGY SYSTEM AND ELECTRIFICATION

- primary energy requirements are reduced from 71,000 Petajoules (PJ) in 2010 to 55,000PJ in 2020 and 21,000 PJ in 2050
- renewable energy increases its share of primary energy from 10% in 2010 to 22% in 2020, reaching 71% in 2050
- the share of wind in the generation mix increases from 3.3% in 2010 to 22% in 2020 and 55% in 2050; between 2020 and 2030 new wind power is built at a rate of 25 Gigawatt per year across Europe (by comparison, in the last decade China has been adding coal power plants at rates as high as 100 GW/year)
- overall electricity demand increases from by 6% in 2020 and by 24% in 2050 compared to 2010