FRIENDS OF THE EARTH EUROPE, STOCKHOLM ENVIRONMENT INSTITUTE
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Europe's share of the climate challenge – Domestic actions and international obligations to protect the planet

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A new study prepared by Stockholm Environment Institute in partnership with Friends of the Earth Europe shows that emission reductions of at least 40% below 1990 levels within Europe by 2020, and cuts of 90% by 2050, are possible.

This document presents key numbers from the study and gives practical examples of the kinds of changes which would occur across various sectors in the short and long term as Europe shifts from a high to a low carbon economy.

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%/year between 2010 and 2050

- by 2050 40%of Europe's iron and steel production is biomass based DRI[1] and another 50% is natural gas based DRI, 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

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
- overall electricity demand increases from by 6% in 2020 and by 24% in 2050 compared to 2010
- 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

COSTS

- 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); this is only a partial estimate not including the industry, non-energy and agriculture sectors and a more comprehensive calculation would result in approximately 2.5% - 3% of the Net Present Value of Europe's GDP
- 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; this corresponds to between approximately 1.1% and 3.3% of the EU's projected 2020 GDP of €13.6trillion

[1] DRI is Direct Reduced Iron produced in Electric Arc Furnaces