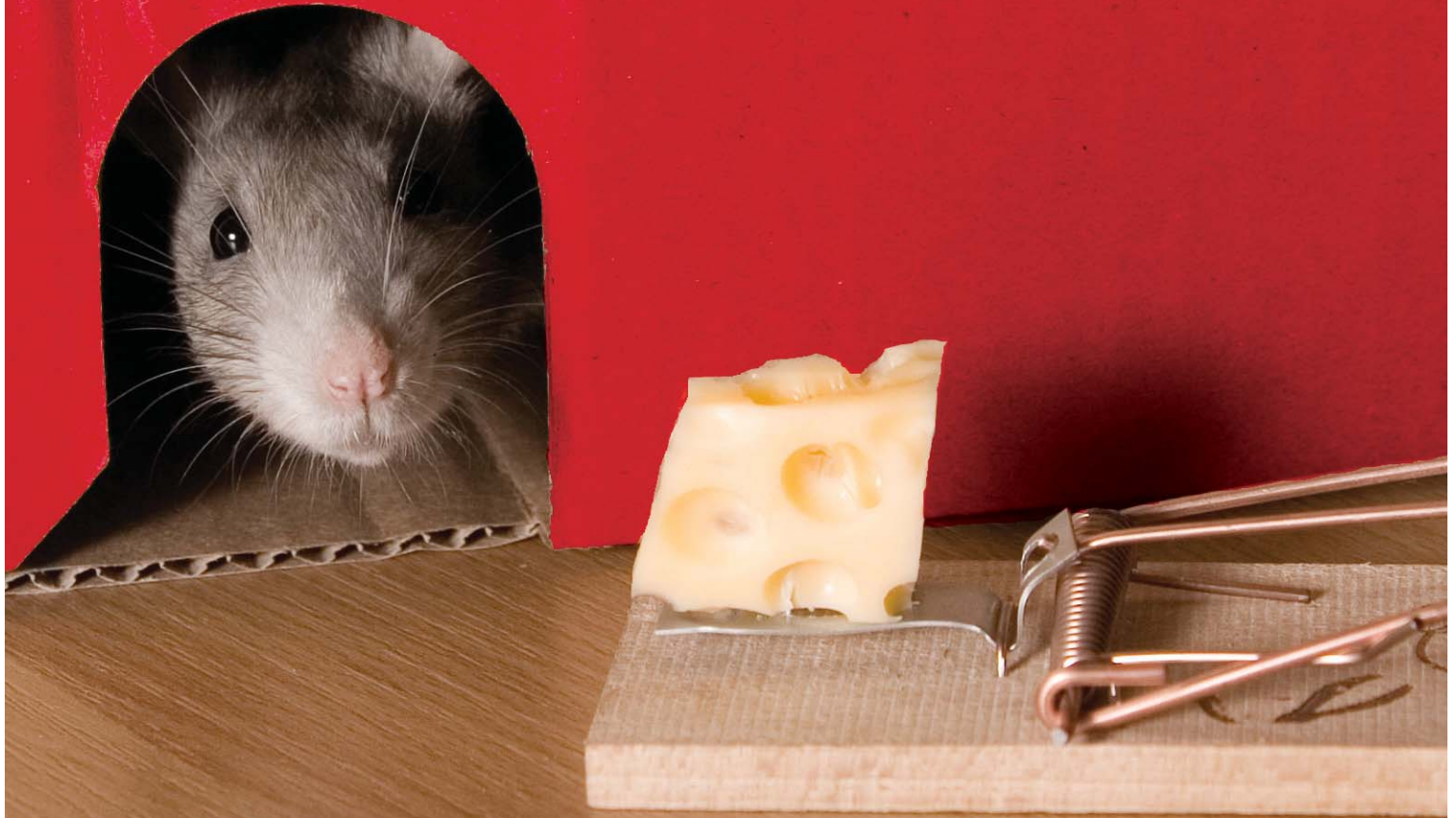


ENERGY REVOLUTION

A SUSTAINABLE PATHWAY TO A CLEAN ENERGY FUTURE



DON'T BE SEDUCED...
THERE ARE MANY FALSE SOLUTIONS
ON THE PATH TO SAFE ENERGY

GREENPEACE

EMBRACE THE ENERGY REVOLUTION

A blueprint developed by Greenpeace and the German Aerospace Centre (DLR) describes a revolution for energy safety, innovation and long-term security. It details the potential of a sustainable EU energy system, and demonstrates that by 2050 it will be possible to reduce carbon dioxide (CO₂) emissions from the energy sector by more than 70% compared to 1990 levels, and phase out nuclear power entirely.

A combination of renewable energy technologies and energy efficiency is a clean, cost-effective and secure solution. It has almost no impact on our climate system; it offers Europe independence from global market fluctuations in fossil and nuclear fuels, and it provides future generations with secure access to energy.

A summary of the report's main findings and recommendations is presented below.

BEWARE OF FALSE SOLUTIONS

Today's most polluting industries are trying to prolong the lifetime of outdated technologies by dressing them up in new, climate-friendly packaging.

The nuclear industry is promoting atomic power as the solution to our future energy needs and climate change. It would like to airbrush over history, but it will never change the facts: every stage of the nuclear cycle remains beset by hazards and risks. The threat of major accident has not gone away, and there is still no disposal solution for the highly radioactive waste by-products. In addition, nuclear power is one of the most expensive energy sources and wholly dependent on state support, before, during and after a reactor's working life. It is the opposite of a sustainable, competitive and secure energy source.

Nuclear fusion is no alternative. Given the urgency of the climate crisis and our energy challenges, Europe cannot afford to wait for decades for the results of research that could lead nowhere. Even should fusion technology one day prove viable, it would be neither clean nor sustainable, due to the risk of weapons proliferation, radiation and hazardous waste that it would produce.

Similarly, carbon capture and storage is presented as the panacea for the global warming impact of fossil fuel technologies, yet this ignores the questions surrounding the risks of burying carbon dioxide beneath land or sea. The technology is unproven, expensive and perpetuates our reliance on fossil fuels.

Instead of wasting time and money trying to clean up or make-over polluting and hazardous energy sources that prolong our dependence on fossil and nuclear fuel imports, the European Union should move towards a truly sustainable energy system. This is entirely possible. Renewable energy technologies and energy efficiency offer a clean, cost-effective and secure solution.

EFFICIENCY: THE WIN-WIN SOLUTION TO SAVE MONEY AND ENERGY

In a business as usual scenario, the European Union's total final energy demand - the energy available to the consumer after conversion and transmission losses - is expected to rise by more than 40% by 2050. By contrast, with a dedicated energy efficiency strategy, it can fall to 65% of what we consume today.

Simple tricks, such as added insulation in roofs, superinsulated glazing or high-efficiency washing machines already save money and energy. Many more savings are possible, and could reduce energy needs by four to ten times of the amount used for the same applications today.

Alongside the vast potential for energy efficiency at the point of consumption, huge savings can be made by preventing energy wastage during conversion and transmission. Decentralising electricity systems and extending the use of combined heat and power generation (CHP), in particular, will increase the efficiency of the supply system.

CHP technologies produce both electricity and heat simultaneously from a single fuel at a facility located near the consumer. The process minimises waste by recovering heat that would normally be lost in an electricity generator, and saves the fuel that would otherwise be used to produce heat or steam in a different unit.

Exploiting the large, existing, energy-efficiency potential could reduce primary energy demand to two-thirds of today's consumption by 2050.



LEFT: THERMOGRAPHIC PHOTO OF VIENNA AM SCHÖPFWERK RESIDENTIAL ESTATE. AS WELL AS LOSSES OF HEAT ENERGY THROUGH THE WINDOWS THERE ARE DIVERSE HEAT BRIDGES IN THE FABRIC OF THE BUILDING.



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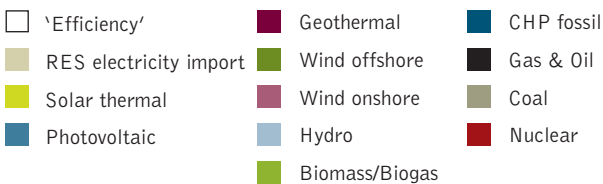
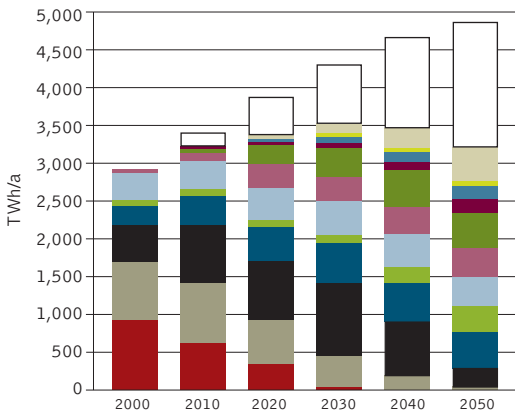
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ELECTRICITY: EMPOWERING RENEWABLE DIVERSITY

More than half of the operating power plants in the European Union are over 20 years old. Within the next 10 years, major investment decisions have to be taken. Europe must not repeat mistakes of the past by investing in new centralised power plants that rely on hazardous and dirty fuels; it must opt for the clean and secure solution.

In the Greenpeace/DLR Energy Revolution Scenario for 2050, the electricity supply sector is characterised by an increasing share of renewable energy sources. Nuclear energy is being phased out, while fossil-fired power plants are reduced to a minimum.

DEVELOPMENT OF THE ELECTRICITY SUPPLY STRUCTURE UNDER THE ENERGY REVOLUTION SCENARIO (RES = RENEWABLE ENERGY SOURCES)



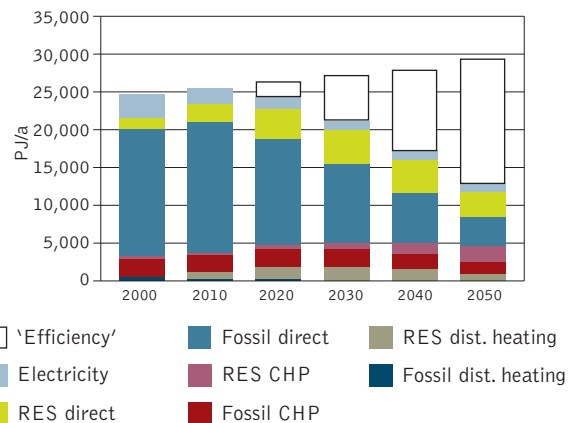
The growing capacity of wind turbines will play a major part in the power sector. On-shore wind could supply energy to some 100 million homes (around 160 gigawatts GW), while off-shore wind has even more potential. Additionally, photovoltaics, biomass, hydropower and geothermal electricity can make substantial contributions to power production and to a balanced and secure energy mix.

By 2050, 70% of the electricity consumed in the EU-25 Member States could come from renewable energy sources.

HEAT SUPPLY: MAGIC COMBINATION

In a market where the demand for heat would be reduced by 50% due to efficiency measures, an increasing contribution of decentralised combined heat and power production will cover nearly a third of the remaining heat demand in 2050. Solar collectors, biomass/biogas and geothermal energy must increasingly substitute for conventional fossil-fired heating and cooling systems. The availability of district heating networks is a precondition for achieving a high share of geothermal and solar thermal energy for heat supply and for CHP.

DEVELOPMENT OF PRIMARY HEAT SUPPLY STRUCTURE UNDER THE ENERGY REVOLUTION SCENARIO (RES = RENEWABLE ENERGY SOURCES)



In the heat supply sector, the contribution of renewable energy sources could grow to more than 50% in 2050. In particular, this applies to biomass, solar collectors and geothermal energy as substitutes for conventional systems for direct heating and cooling.

TRANSPORT: GETTING A MOVE ON

If produced sustainably, biofuels represent a suitable alternative to oil in the transport sector. Nevertheless, by 2050 the final energy demand for transportation in the EU has to be reduced by 40% compared to today's levels, before biofuels can be used efficiently on a large scale.

To bring down the energy demand, we need:

- extensive improvements in vehicle fuel-efficiency;
- a shift of the transport of goods from road to rail;
- changes in mobility-related behaviour patterns.

Biofuels are environmentally viable only if they are produced in a sustainable way.

KEY STEPS TO BRING ABOUT THE ENERGY REVOLUTION

Renewable energy technologies and energy efficiency offer a clean, cost-effective and secure solution. In order to let the energy revolution take off and achieve its potential, Greenpeace calls on the European Commission, EU Member States and the European Parliament to:

1 SET RENEWABLE ENERGY TARGETS:

Ambitious and legally binding targets for the share of renewable energy in the EU for 2015 and 2020 would demonstrate the EU's long-term commitment to renewable energy and would enhance investor confidence.

Greenpeace is calling for sectoral targets through:

- A review of the Renewable Electricity Directive to include mandatory national targets for renewable energy in the power sector that add up to a 35% share for the EU in 2020.
- The development of a Directive on Renewable Energy in the Heating & Cooling Sector, including mandatory national targets that lead to at least 25% by 2020.

2 PHASE OUT SUBSIDIES FOR FOSSIL ENERGY AND NUCLEAR POWER:

Subsidies to fossil fuel and nuclear power sources have propped up these technologies and fuels for decades, keeping renewable energy out of the marketplace. Greenpeace urges national governments and the EU to phase out direct and indirect subsidies to these polluting and dangerous technologies.

3 SET ENERGY EFFICIENCY TARGETS:

The reduction of primary energy demand is a crucial prerequisite for achieving a significant share of renewable energy sources and a sustainable energy supply system. Greenpeace is calling for the EU to set a target to reduce consumption in 2020 by 20% compared to the expected demand level under a business-as-usual scenario.

4 IMPROVE SCHEMES FOR RENEWABLE ENERGY:

Technological diversity within the renewable energy sector is fundamental for a sustainable energy system. Policies to support renewable energy have to strengthen this diversity, remove barriers like inadequate administrative procedures or grid access, and encourage the use of efficient decentralised technologies for power and heat production.

greenpeace european unit <http://www.greenpeace.eu>

199 rue Belliardstraat, 1040 Brussels, Belgium t +32 2274 1900 f +32 2274 1910

The full report, *Energy Revolution: a sustainable pathway to a clean energy future for Europe*, is online at <http://www.greenpeace.eu/downloads/energy/EU25scenario2050.pdf>

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