Energy Technology Perspectives 2012
Pathways to a Clean Energy System

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ETP 2012 – Choice of 3 Futures

2DS: a vision of a sustainable energy system of reduced Greenhouse Gas (GHG) and CO₂ emissions
- The 2°C Scenario

4DS: reflecting pledges by countries to cut emissions and boost energy efficiency
- The 4°C Scenario

6DS: where the world is now heading with potentially devastating results
- The 6°C Scenario

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Clean energy: slow lane to fast track

Progress is too slow in almost all technology areas

Significant action is required to get back on track
A sustainable energy system is a smarter, more unified and integrated energy system.
Renewables will generate more than half the world’s electricity in the 2DS
Renewables need to dominate EU electricity

Renewables cover two-thirds of the electricity mix in 2050 in the 2DS, with wind power alone reaching a share of 30% in the mix.
All flexibility sources will be needed

- Dispatchable power plants
- Demand side response (via smart grid)
- Energy storage facilities
- Interconnection with adjacent markets

- Biomass-fired power plant
- Industrial
- Residential
- Pumped hydro facility
- Scandinavian interconnections
Natural Gas: a transitional fuel

Around 2030, natural gas becomes ‘high carbon’
Natural gas is not a panacea

CCS must play a role if gas use should be high
The CCS infant must grow quickly

Note: Capture rates in MtCO₂/year

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Electric vehicles need to come of age

More than 90% of new light duty vehicles need to be propelled by an electric motor in 2050
Building sector challenges differ

75% of current buildings in OECD will still be standing in 2050
Heating and cooling account for 46% of global energy use. Their huge potential for cutting CO$_2$ emissions is often neglected.
Clean energy investment pays off

Every additional dollar invested in clean energy can generate 3 dollars in return.
Russia’s CO₂ emissions need to drop dramatically

The power and industry sectors account for over half of the reductions relative to the 2DS
Fossil-fuel based electricity generation drops by almost half in Russia by 2030

- Increased electricity generation from nuclear and renewables is the key for Russia to get on track.
Huge efficiency potential in industry

- Energy efficiency measures through BATs brings 50% of the CO₂ reductions
- A fuel mix dominated by natural gas is also key
Electrifying Russian transport

Hybrid, plug-in hybrid or battery electric vehicles will be key to increasing vehicle efficiency in Russia
Limiting buildings’ energy use

- Effective implementation of energy efficiency policies critical
- Large-scale refurbishment of ageing buildings to stringent code levels
Russia’s room to manoeuvre

- ETP 2012 projects a very different path for Russia
- High average age of infrastructure brings opportunity
- Creation of Russian Technology Platforms
- Presidential focus on innovation and modernisation
- Overall investment environment
- Regulatory framework needs to be completed
- IEA stands ready to work with Russia
Sustainable future still in reach

Are we on track to reach a clean energy future?
NO ✗

Can we get on track?
YES ✓

Is a clean energy transition urgent?
YES ✓
Recommendations to Governments

1. Create an investment climate of confidence in clean energy

2. Unlock the incredible potential of energy efficiency – “the hidden” fuel of the future

3. Accelerate innovation and public research, development and demonstration (RD&D)
Explore the data behind ETP

www.iea.org/etp