
Philippe Benoit
Head, Energy Efficiency and Environment Division, IEA
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Portfolio of actions to reduce energy sector emissions

- **Emissions with 2DS**
- **Emissions with 6DS**

1. Nuclear: 7%
2. Renewables: 30%
3. End-use fuel switching: 9%
4. Power generation efficiency and fuel switching: 2%
5. End-use fuel and electricity efficiency: 38%
6. CCS: 14%

**Gt CO\(_2\)**

- 2011: 60 Gt CO\(_2\)
- 2020: 50 Gt CO\(_2\)
- 2030: 40 Gt CO\(_2\)
- 2040: 30 Gt CO\(_2\)
- 2050: 20 Gt CO\(_2\)**
Portfolio of actions to reduce energy sector emissions

EE provides largest contribution to abatement

- End-use fuel and electricity efficiency 38%
- Power generation efficiency and fuel switching 2%

Gt CO₂
0 10 20 30 40 50 60
2011 2020 2030 2040 2050

Emissions with 6DS
Emissions with 2DS

EE ‘traditional’ view:
“Doing more with less”
EE ‘traditional’ view: “Doing more with less”

Projection of primary energy use for the European Union to 2020

- Business as usual 2007 projection: 1,842 Mtoe
- Status in 2009: 1,678 Mtoe
- Most recent projections: 1,482 Mtoe
- 20% EU energy efficiency target

* Primary energy consumption refers to gross inland consumption minus non-energy uses.
EE: Decoupling GDP from Energy

![Graph showing decoupling GDP from energy over time. The x-axis represents years from 2001 to 2026, and the y-axis represents energy consumption in Mtoe.]
EE: Decoupling GDP from Energy

[Graph showing the decoupling of GDP from energy consumption from 2001 to 2026. The x-axis represents years from 2001 to 2026, and the y-axis represents Mtoe (thousand metric tons of oil equivalent) and USD billions 2005 PPP. The GDP (right axis) line shows an increasing trend.]
EE: Decoupling GDP from Energy

- Graph showing the trend of TPES (Total Primary Energy Supply) and GDP from 2001 to 2026.
- The x-axis represents years, from 2001 to 2026.
- The y-axis on the left represents Mtoe (Million Tonne of Oil Equivalent).
- The y-axis on the right represents USD Billions 2005 PPP.
- The graph indicates a consistent increase in TPES and GDP over the years, with GDP showing a more significant growth rate compared to TPES.
EE: Decoupling GDP from Energy
EE: Decoupling GDP from Energy

Graph showing the relationship between energy use (Mtoe) and GDP (USD Billions 2005 PPP) from 2001 to 2026.

Key lines:
- TPES
- BAU-Low EE
- High Productivity
- GDP (right axis)

The graph indicates that EE helps decouple GDP from energy use, with a significant reduction in energy demand compared to BAU-Low EE scenarios.
Over 95% of the projected growth in energy demand between now and 2035 happens outside the OECD (NPS).

Source: based on World Energy Outlook 2014
Energy efficiency for many emerging economies:

from “doing more with less” to . . .
Energy efficiency for many emerging economies: from “doing more with less” to ”doing even more with more” raising standards of living and promoting prosperity
Energy efficiency can help drive economic prosperity

GDP in Efficient World Scenario versus New Policies Scenario, 2035

Cumulative investments in energy efficiency of $12 trillion are more than offset by fuel savings & trigger economic growth of a cumulative $18 trillion
Dirty air prompts free public transport in Paris

Public transportation in the capital will be "gratuit" from Friday morning to Sunday night, as officials battle against a spike in "dangerously" poor air quality. Velib' rental bikes and the car-sharing Autolib' scheme are also on the house.

Shifting to more efficient transport to fight air pollution

March 11, 2014
Energy efficiency generates multiple benefits

- Asset savings
- GHG emissions
- Energy security
- Energy delivery
- Energy prices
- Macro-economic impacts
- Industrial productivity
- Poverty alleviation
- Health and well-being
- Employment
- Local air pollution
- Resource management
- Public budgets
- Disposable income
- Asset values

Energy efficiency is a means to enhance energy security, support economic and social development, and promote environmental goals.
Energy efficiency expands access to energy services

Household average electricity consumption of selected equipment in Ghana with and without energy efficiency standards, 2013 (IEA, 2015)
Energy efficiency raises standards of living

Residential lighting intensity

Residential energy intensity of water heating

Energy efficiency raises standards of living
EE is a fuel that keeps on producing

EE keeps producing:

- Energy Efficiency

1999

2004

2015
EE is saving households, businesses and government consumers hundreds of billions of dollars each year.

- IEA countries saved USD 550 billion in TFC in 2014 as a result of energy efficiency investments since 1990.

Avoided expenditure in IEA countries from energy efficiency investments made since 1990.

Cumulative savings = USD 5.7 trillion.

Annual savings are greater than the EU’s fuel import bill.
Efficiency’s domestic production substitutes for fuel imports

- In 2014, IEA countries avoided primary energy imports totalling 190 Mtoe, saving USD 80 billion in energy import bills and improving trade balances.

Avoided imports in 2014, as a result of energy efficiency investments in IEA countries since 1990

Domestically produced, efficiency supports energy security
EE strengthens trade balances (lowered fuel imports)

Crude Oil spot prices fell from approximately 95 USD/bbl to 60 USD/bbl

Import costs of fossil fuels in Thailand
Energy efficiency improves well being: indoor health impacts

Energy Efficiency Measures

- Weatherisation
- Heating & cooling systems
- Appliances
## Energy efficiency boosts industrial productivity

<table>
<thead>
<tr>
<th>Competitiveness</th>
<th>Ability to enter new markets; reduced production costs etc.</th>
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<td>Production</td>
<td>Capacity utilisation; improved product quality etc.</td>
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<tr>
<td>Operations and maintenance</td>
<td>Improved operation; reduced need for maintenance etc.</td>
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<tr>
<td>Working environment</td>
<td>Site environmental quality; worker health and safety etc.</td>
</tr>
<tr>
<td>Environment</td>
<td>Air pollution; solid waste; wastewater; reduced input materials etc.</td>
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</tbody>
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*From savings to 'value creation'*
EE strengthens productivity and competitiveness for SMEs

- SMEs provide 60% of global jobs; SMEs produce nearly 60% of GDP in China; SMEs deliver 45% of manufacturing output in India
- Consume about 74 EJ/year (about 13% of Global TFC)
- EE in SMEs could save 30% of consumption, about 22 EJ (equivalent to Japan & Korea’s combined annual energy use)
- Barriers to energy efficiency (information, capacity, access to finance)
- IEA Policy Pathway
Energy Efficiency is a strong and sound tool to promote economic and social objectives
Thank you for your attention

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