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Consumption by sector

Ten year increments by sector

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Decline in oil demand, increases for natural gas & renewables

Consumption by fuel

Bilion toe

Ten year increments by fuel

Bilion toe

*Includes biofuels

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North American output growth led by gas, oil & renewables

Production by region

New energy forms

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Energy decouples from economic growth and fuel shares shift

GDP and energy

Shares of primary energy

*Includes biofuels
The power sector takes an increasing share of energy use

Inputs to power as a share of total primary energy

- World
- North America

Primary inputs to North American power

- Coal
- Nuclear
- Oil
- Gas
- Renewable
North America switches from net importer to net exporter

Primary energy net balances

Regional fossil fuel balances

Energy Outlook 2035 – Focus on North America
Regional energy trends

Fuel by fuel

Carbon emissions and the fuel mix
Oil: Falling transport demand and rising unconventionals

Liquids demand by sector

Liquids supply by source

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Oil trade continues to shift from West to East

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**US**

- Net imports
- Tight oil
- Other supply

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**Regional imbalances**

- Middle East
- FSU
- Europe
- Asia Pacific
- S&C America
- Africa
- N America

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**China**

- Net imports
- Tight oil
- Other supply

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*Energy Outlook 2035 – Focus on North America*
Regional transport demand declines driven by fuel economy

Transport demand by fuel

Five year increments by fuel

Billion toe

Mtoe

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Policy and technology enable efficiency improvements

Fuel economy of new cars

Miles per gallon*

- EU
- US light vehicles
- China

Vehicles sales by type

- Plug-ins incl. BEVs
- Full hybrid
- Mild hybrid
- Conventional including stop-start

*New European Driving Cycle Basis

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US natural gas use rises in all sectors; shale dominates supply

Gas demand by sector

Gas supply by source

*Includes transport
The US shale revolution: An example of market adjustment

**US oil and gas supply**

- **Billion toe**
  - 1970: 0.4
  - 1983: 0.8
  - 1996: 1.2
  - 2009: 1.6
  - 2022: 1.2
  - 2035: 0.8

**Gas share of US sector demand**

- **1965**
  - Industry: 0%
  - Power: 15%
  - Transport: 45%

- **2000**
  - Industry: 30%
  - Power: 45%
  - Transport: 15%

- **2035**
  - Industry: 45%
  - Power: 30%
  - Transport: 15%
North American coal demand declines; renewables expand

Coal demand by sector

Non-fossil fuel demand

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Regional energy trends
Fuel by fuel
Carbon emissions and the fuel mix
CO₂: Emissions from energy rise globally, fall in North America

Emissions by region

Billion tonnes CO₂

Emissions per capita

Tonnes CO₂

Energy Outlook 2035 – Focus on North America
Efficiency, not fuel mix, restrains North American emissions

GDP, energy and emissions

Index: 1990 = 100

Emissions growth 2012 to 2035

Billion tonnes CO₂

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Power sector is the main driver of regional fuel mix changes

Share of power sector fuel consumption

North America  EU  China  Other non-OECD


Coal
Gas

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Conclusion

Meeting the global/North American energy challenge

- **Sufficient and available?**
  - Yes – new energy sources and efficiency improvements
  - North America leads the way

- **Secure and reliable?**
  - Mixed – improving for North America, a concern for others

- **Sustainable?**
  - Room for improvement, even with lower North American emissions