2015 has seen lower prices for all fossil fuels

- Oil & gas could face second year of falling upstream investment in 2016
- Coal prices remain at rock-bottom as demand slows in China

Signals turn green ahead of key Paris climate summit

- Pledges of 150+ countries account for 90% of energy-related emissions
- Renewables capacity additions at a record-high of 130 GW in 2014
- Fossil-fuel subsidy reform, led by India & Indonesia, reduces the global subsidy bill below $500 billion in 2014

Multiple signs of change, but are they moving the energy system in the right direction?
Demand growth in Asia – the sequel

Change in energy demand in selected regions, 2014-2040

By 2040, India’s energy demand closes in on that of the United States, even though demand per capita remains 40% below the world average.
Policies spur innovation and tip the balance towards low-carbon

Costs in 2040 for different energy sources/technologies, relative to 2014

Innovation reduces the costs of low-carbon technologies & energy efficiency, but – for oil & gas – the gains are offset by the move to more complex fields.
A new balancing item in the oil market?

Change in production (2015-2020) of US tight oil for a range of 2020 oil prices

Tight oil has created more short-term supply flexibility, but there is no guarantee that the adjustment mechanism in oil markets will be smooth.
If oil prices stay lower for much longer: what would it take, what would it mean?

- Much more resilient non-OPEC supply & higher output from a stable Middle East could hold the oil price close to $50/bbl until the 2020s

- Oil importers gain, each $1/bbl reduction is $15 billion off import bills; major window of opportunity to press ahead with subsidy reform

- If lower prices persist for decades, reliance on Middle East oil gets back to 1970s levels; risk of a sharp market rebound if investment falls short

- Lower prices could undercut essential policy support for the energy transition: weaker incentives mean 15% of efficiency savings are lost

- Reduction in revenues to key producers & boost to global oil demand growth make a prolonged period of lower prices progressively less likely
Developing Asia accounts for almost half of the rise in global gas demand & 75% of the increase in imports, but gas faces strong competition from renewables & coal.
Global LNG Exports

LNG exports by region in the New Policies Scenario

- Rest of world
- Southeast Asia
- Russia
- North America
- Middle East
- Australia
- Africa

LNG share of inter-regional trade (right axis)
Shale gas production by play in the United States

In 5 years, Marcellus grows to global stature
A major source of uncertainty in regional, indeed global markets
A new chapter in China’s growth story

Along with energy efficiency, structural shifts in China’s economy favouring expansion of services, mean less energy is required to generate economic growth.
Coal Demand by Region in NPS

The Great China Coal Growth Story Ends
India moving to the centre of the world energy stage

Change in demand for selected fuels, 2014-2040

New infrastructure, an expanding middle class & 600 million new electricity consumers mean a large rise in the energy required to fuel India’s development
Indian Renewable Power Growth

Renewable sources of power generation capacity in India in the New Policies Scenario

Astonishing Growth, rapidly diversifying Indian power, but....
Power generation by source in India in the New Policies Scenario

India Diversifies Fast, but Coal still the Major Power Source
Coal imports by origin in India in the New Policies Scenario

- South Africa
- Australia
- Indonesia
- Other

Import share (right axis)
Major net exporters of coal by type in the New Policies Scenario

Coal trade growth slows from massive rises in last decade, meets about one fifth of global coal demand
Power is leading the transformation of the energy system

Global electricity generation by source

Driven by continued policy support, renewables account for half of additional global generation, overtaking coal around 2030 to become the largest power source
Renewables Dominate Power Growth

Electricity generation by source in the New Policies Scenario

But coal still important
Efficiency measures on the rise, but significant potential still exists

Share of global mandatory efficiency regulation of final energy consumption

Energy efficiency policies are introduced in more countries and sectors; they continue to slow demand growth but more can be done
Coal-fired power plant capacity by technology and average efficiency in India in the New Policies Scenario

- Ultra-supercritical and IGCC
- Supercritical
- Subcritical
- Average efficiency of coal fleet (right axis)

GW

2010 2015 2020 2025 2030 2035 2040

27% 30% 33% 36% 39%

© OECD/IEA 2015
The coverage of climate pledges is impressive

Climate pledges for COP21 are consistent with a temperature rise of 2.7 °C, with investment needs of $13.5 trillion in low-carbon technologies & efficiency to 2030
Climate pledges decouple power sector emissions from electricity demand

The share of low-carbon power generation grows to almost 45% in 2030 so that power emissions remain flat, while electricity demand grows by more than 40%
Coal Demand Dependent on Climate Action

World coal demand and share of coal in world primary energy demand by scenario
Cumulative world energy sector investment by sector and scenario, 2015-2040

Investment needed everywhere, but efficiency investment rises sharply in 450
Coal Mining Investment: Running Fast to Stand Still

- Greenfield mines
- Brownfield mines
- Existing mines
Conclusions

- Low prices bring gains to consumers, but can also sow the seeds of future risks to energy security: no room for complacency

- India’s energy needs are huge: there is a strong shared interest to support India’s push for clean & efficient technologies

- China’s transition to a more diversified & much less energy-intensive model for growth re-shapes energy markets

- The energy transition is underway, but needs strong, sustained signals from and post Paris

- With looming energy security & environmental challenges, international cooperation on energy has never been more vital
Electricity generation from existing and new coal-fired power plants in the OECD
Outlook for Coal-Fired Power Plants in China

Electricity generation from existing and new coal-fired power plants in China

- **Existing plant**
  - Advanced and CCS
  - Supercritical
  - Subcritical

- **New plant**
  - Advanced and CCS
  - Supercritical
  - Subcritical

![Graph](image)
Electricity generation from existing and new coal-fired power plants in India

- **Existing plant:**
  - Advanced and CCS
  - Supercritical
  - Subcritical

- **New plant:**
  - Advanced and CCS
  - Supercritical
  - Subcritical
Efficiencies of existing, new and average fleet of coal-fired power plants

- **OECD**
  - New coal plants
  - Average
  - Existing in 2014

- **China**
  - New coal plants
  - Average
  - Existing in 2014

- **India**
  - New coal plants
  - Average
  - Existing in 2014
And are one factor in reducing emissions

**CO₂ emissions from power generation by fuel in the New Policies Scenario**

Avoided CO₂ emissions from coal:
- If efficiency kept at 2014 level
- With 2012-2014 share of coal generation

Total CO₂ emissions from power

© OECD/IEA 2015