

# WORLD ENERGY OUTLOOK:

## Europe's options in a volatile world

Official Brussels launch of the International Energy Agency's World Energy Outlook 2015

REPORT

Autumn 2015



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Businesses and governments will need to make sweeping changes in their energy plans in coming years, as prices and supply are transformed by new technologies, regulations and market conditions.

Senior energy policymakers and experts presented these conclusions at Friends of Europe's high-level conference hosting the official Brussels launch of the IEA World Energy Outlook 2015. The biggest impacts are expected to come from the current low energy prices and from a new global climate deal that the UN Climate Change Conference will aim for in Paris starting on 30 November.

## UNCERTAIN FUTURE OF OIL

The current oil price is under \$50 a barrel, which is at first sight good for oil importers, such as the European Union and China. But this low price could result in the second straight year of falling upstream oil and gas investment in 2016, the concentration of production in a politically unstable region, and cuts in the essential policies and incentives to support low-carbon technologies.

"If prices stay low many years, the only area in the world which can produce oil and make money is the Middle East, because it is very cheap to produce oil there," said **Fatih Birol**, Executive Director of the IEA.

The IEA forecasts that the market will only rebalance at \$80 a barrel in 2020, until then much more resilient non-OPEC supply and higher output from a stable Middle East could hold the oil price close to \$50 a barrel.

Large-scale investment in gas and oil production is still needed, said **Eirik Wærness**, Chief Economist of Statoil. The consensus is that a rise in global temperatures of more than 2°C would be still dangerous, and even if this is achieved through improved efficiency and greater use of renewables, total oil and gas consumption in 2040 would be only 6% below today's levels, he said.

"That means there is a huge need for investment oil and gas, even if the world goes in the right direction," said Wærness. "So our challenge is clear and it is difficult. **We must deliver a lot of new oil and gas, while investing huge amounts of money and capital resources in new sorts of low-carbon energy. It's not either-or. The world needs both.**"

## CAUTIOUS OPTIMISM AHEAD OF PARIS

An agreement in Paris could provide an extra driving force for low-carbon technologies, as well as forcing users to cut back on fossil fuels. Hopes for an accord are rising now that countries accounting for 90% of energy-related emissions have put forward emission reduction plans. However, the current pledges are consistent with a temperature rise of 2.7°C and there is a need of additional \$13.5tn investment in low-carbon technologies and efficiency by 2030, says the IEA's World Energy Outlook.

"For Paris, we are getting some green lights and strong political momentum," said Birol. "**If there is any single energy company in the world which believes that climate policies will not affect their business policies, then they are making a business mistake.**"

That means that the summit will be closely watched by people with business interests, as well as those who are concerned for the environment. "The climate summit will have to give a signal to investors, so that they can plan ahead and try to cut CO<sub>2</sub>," said **Chris Burns**, Strategic Adviser at Friends of Europe, who moderated the conference.

The upcoming Paris climate conference can only be called a success, added **Maroš Šefčovič**, European Commission Vice-President for Energy Union, if it is “not the end but a new beginning of global responsible approach to climate change, which would include ambitious long-term directions, with robust tools, clear monitoring, verification mechanisms and adequate financial support.”

### WHAT EUROPE IS DOING

Europe has ambitious climate policies, said Šefčovič, and is a living proof that the economy can grow (45% since 1990) while the CO2 emissions are being cut (a 19% decline over the same period).

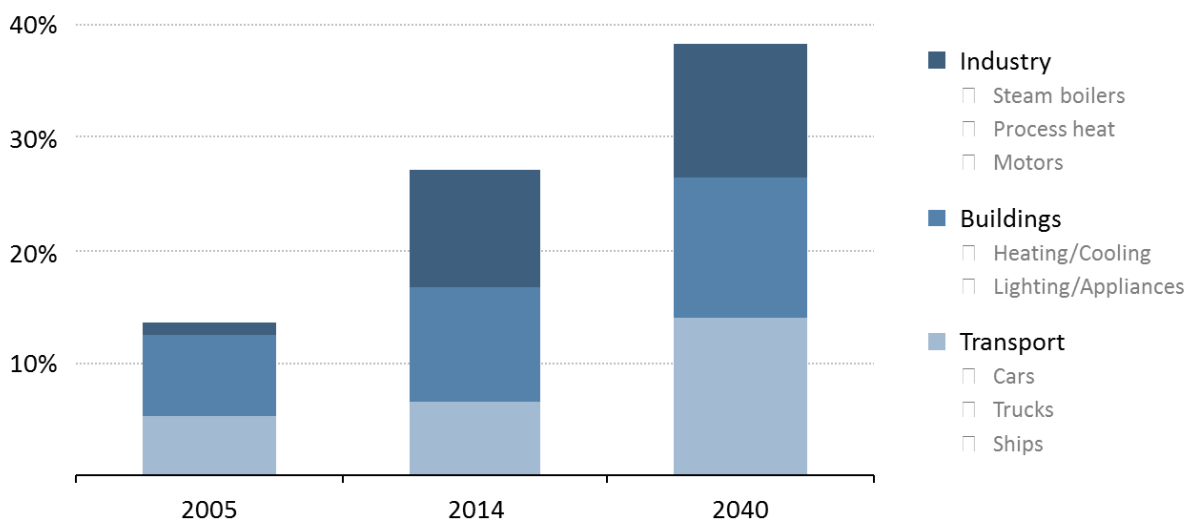
The EU has adopted targets for long-term emissions reductions, but so far just four member states have presented plans that go beyond 2020. The European Commission was planning a new template in its “State of the Energy Union” on 18 November, showing how the long-term national energy and climate plans should be developed in the member states to include all five dimensions of the Energy Union.

“We believe that this will give the member states ownership of the process,” said Šefčovič. “It will also give the European Commission the possibility to compare efforts – to see if the trends are good and to really set the long-term framework. The number one request I’m getting from the business community is for regulatory stability – clear signals and not changing the rules every two or three years.”

### NEED FOR EFFICIENCY

One of the biggest contributors to reducing use of fossil fuels is expected to be improved efficiency. Japan was the first country to introduce mandatory targets for energy efficiency, and now China and India have done this too, more than a third of global industry is covered by efficiency regulation, up from 3% in 2005. Efficiency measures are projected to reduce demand growth in OECD countries up to 2040 to 60% of what would otherwise be expected. World energy demand is expected to grow by just one-third by 2040, even as the economy expands by 150%.

Share of global mandatory efficiency regulation of final energy consumption



Source: IEA, 2015

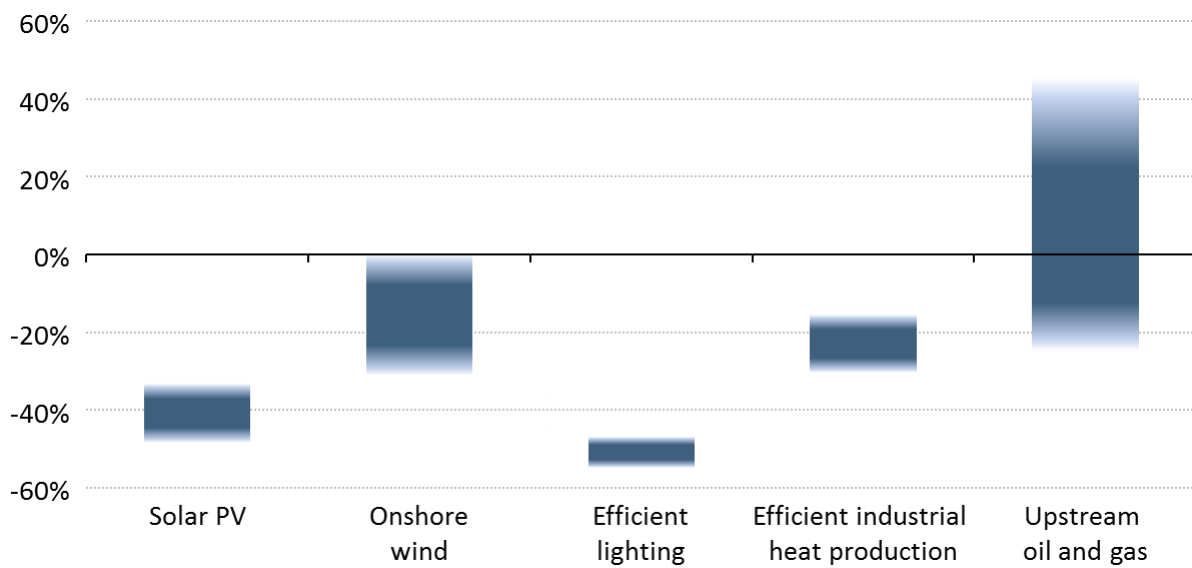
More could be done though. Energy consumption in trucks is currently regulated only in the United States, Canada, Japan and China, though it is also planned for the European Union. Wider coverage and tougher standards could have cut oil demand from new trucks by 2030 by 15%.

The current low price of oil could be a drag on energy efficiency measures, said Birol. “One of drivers of efficiency was saving money,” he said. “If prices remain low, then pressure on efficiency may be weaker.”

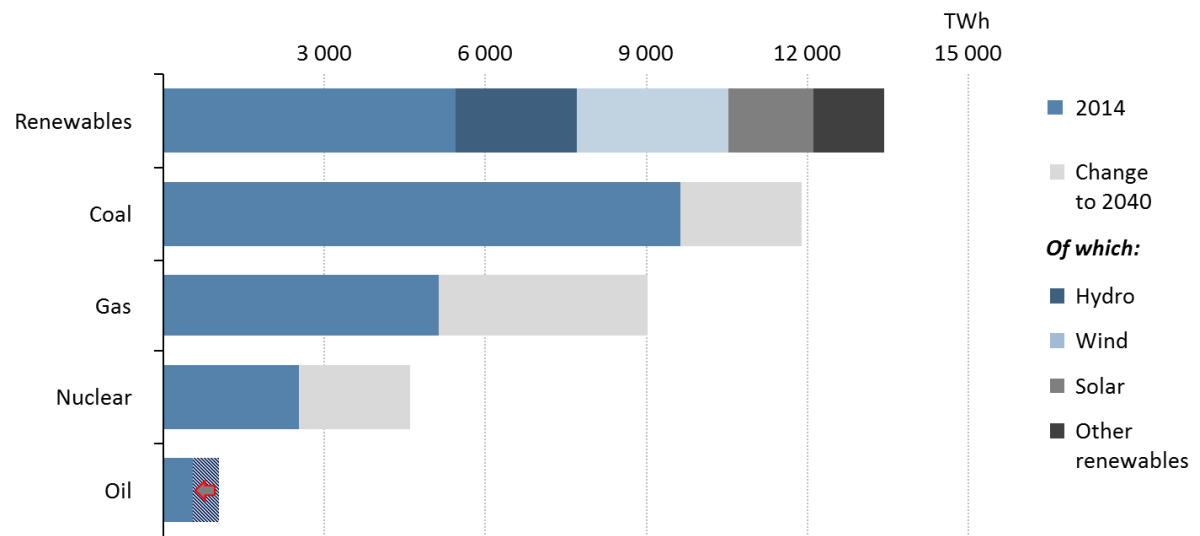
### BRIGHT OUTLOOK FOR RENEWABLES

Renewables are, meanwhile, the biggest success story, with the cost of technology falling fast and capacity additions at a record-high of 130 GW in 2014.

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



Global electricity generation by source



Source: IEA, 2015

Renewables are becoming a big business for Europe, employing some 1.1m people and generating €129bn in turnover, said Šefčovič. More widely defined green industries provide 4.2m jobs. “When I visit labs in Member States, I am often overwhelmed by the creativity, the innovation and the new patents,” he said. “We just need a regulatory framework to make it to the global stage.”

Wind now generates a tenth of the electricity in Europe, said **Giles Dickson**, Chief Executive Officer of the European Wind Energy Association (EWEA). This expansion has pushed down the cost of wind power by 30% over the past five years, he said, and cited an IEA forecast that costs will continue to fall until 2040.

The total cost of a new onshore wind farm in Europe today is \$83 per megawatt-hour, compared with \$105 for a new coal-based facility and \$118 for gas, Dickson said. “Onshore wind is the cheapest form of new power generation in Europe today,” he said. **“Renewables are no longer niche. They are mainstream.”**

Wind’s economic benefits to Europe include jobs for 262,000 people and exports worth \$35bn a year, Dickson said. Moreover, for every euro invested in wind, the steel and cement sectors each earn 12 eurocents. Worldwide, it’s expected that \$160bn a year will be invested in wind, and Europe currently has about half the global market, he said.

But Europe’s economic lead in wind could be at risk from member states’ lack of clarity over their post-2020 policies. Other countries such as India, China or Brazil are pushing wind investment hard, and their industries could benefit as a result.

“Europe has established a strong wind industry on the scale of the market thanks to the ambition we have had so far,” said Dickson. “That scale has given us a competitive advantage. If the level of policy ambition and clarity shifts to other countries we will lose that competitive advantage. That will hurt us in economic performance and in how we meet climate security and competitiveness targets. We call on the EU to deliver strong, ambitious policies.”

## TIME TO CHANGE BUSINESS MODELS

The surge in renewables is already disrupting big power companies, said **Susana Quintana-Plaza**, Senior Vice President for Technology & Innovation at E.ON. Until recently, electricity was nearly all produced by conventional power plants, she said. These are highly complicated and require teams of engineers, which puts their cost in the billions of euros, and limits to around 10 the number of entities in Europe who can participate.

But wind turbines are cheaper, so the wind market entry cost is just several million euros, and has made the electric power market accessible to thousands of potential participants. Solar power takes the evolution a step further, as anyone with a few thousand euros can produce energy. And new forms of credit open it up to those without even this amount of money on hand. **“Now, all you need is a credit history and a rooftop to become an energy producer,”** said Quintana-Plaza. **“So we have gone from a market of 10 participants with billions to have now billions of people who can be energy producers. Renewables are changing large parts of the energy industry into a consumer goods industry.”**



That means that traditional power companies could face sharp falls in demand in areas where individuals or small companies invest heavily in renewables. As a result, E.ON spun off its conventional generation business into a new company in December 2014, so that the remaining company can focus on renewables, distribution networks and customer solutions. “I don’t believe consumers can become independent from the grid,” said Quintana-Plaza. “But if they are 80% independent, it is a huge opportunity for whoever captures that market.”

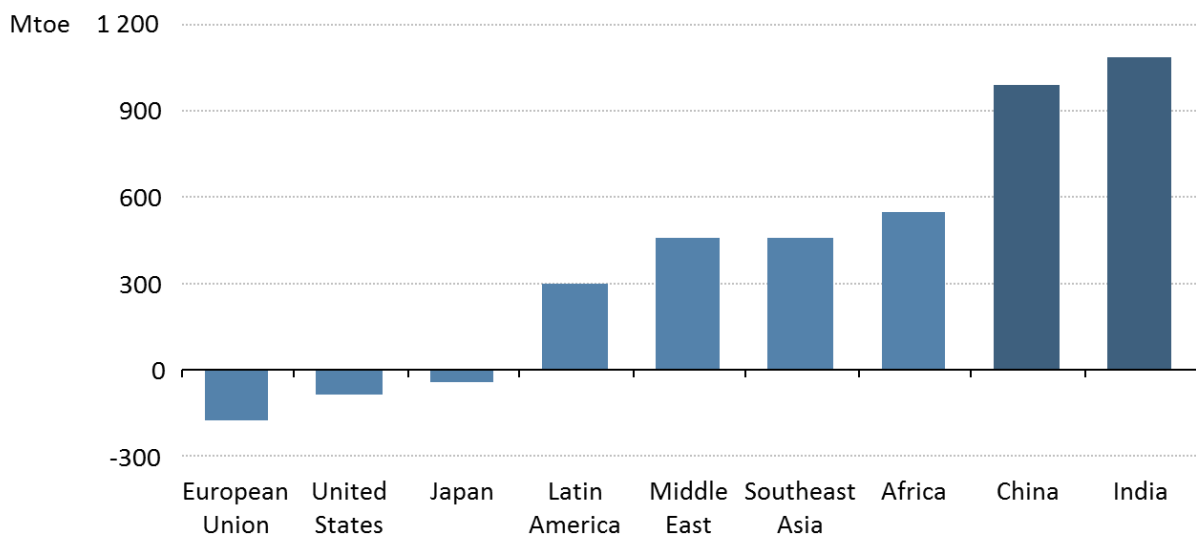
E.ON has invested in a company that can create a map of a city, showing which rooftops are most suitable for photovoltaic cells, depending on their inclination, location and the amount of sunlight that reaches them. An energy company like E.ON can then combine this information with consumption data to work out how much a household could save by installing solar panels.

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## MAJOR SHIFTS IN ASIA

In emerging economies, meanwhile, major shifts in demand are occurring. India will contribute around a quarter of the growth in global energy demand up to 2040, according to the IEA. Today, despite having one sixth of the world’s population, it uses only 6% of its energy. A fifth of Indians still do not have access to electricity.

Change in energy demand in selected regions, 2014-2040

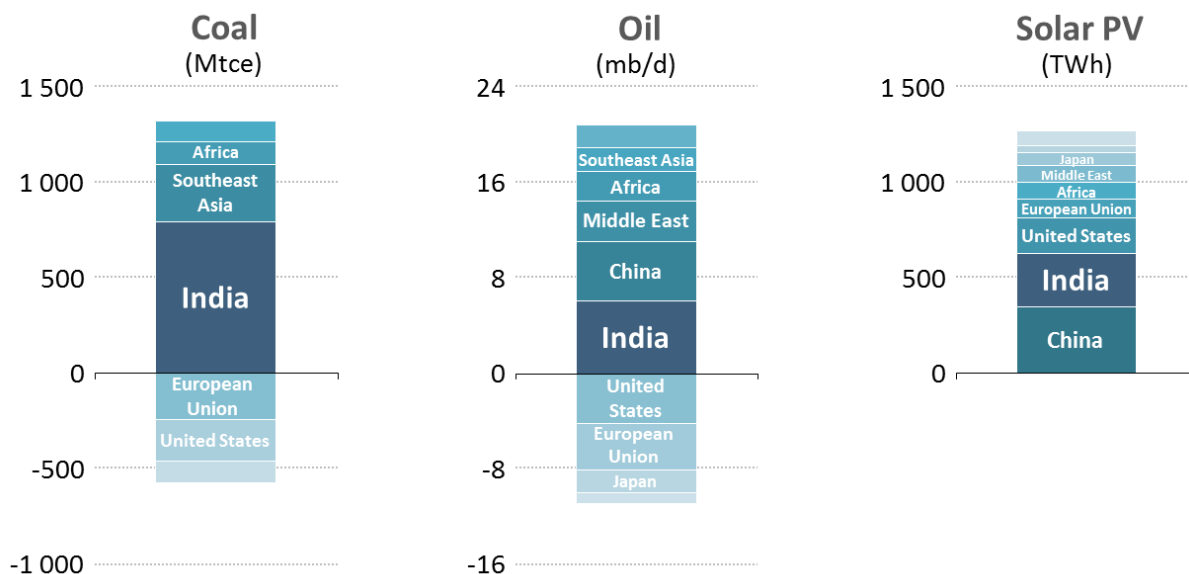


Source: IEA, 2015



But the government wants to develop a manufacturing base, and Indian energy consumption is likely to grow fast for a sustained period. Much of this will come from coal, while Indian demand for oil is expected to rise more than anywhere else in the world. There is therefore a need to support India’s ambitions to produce more energy from hydro, solar and wind sources, the IEA said.

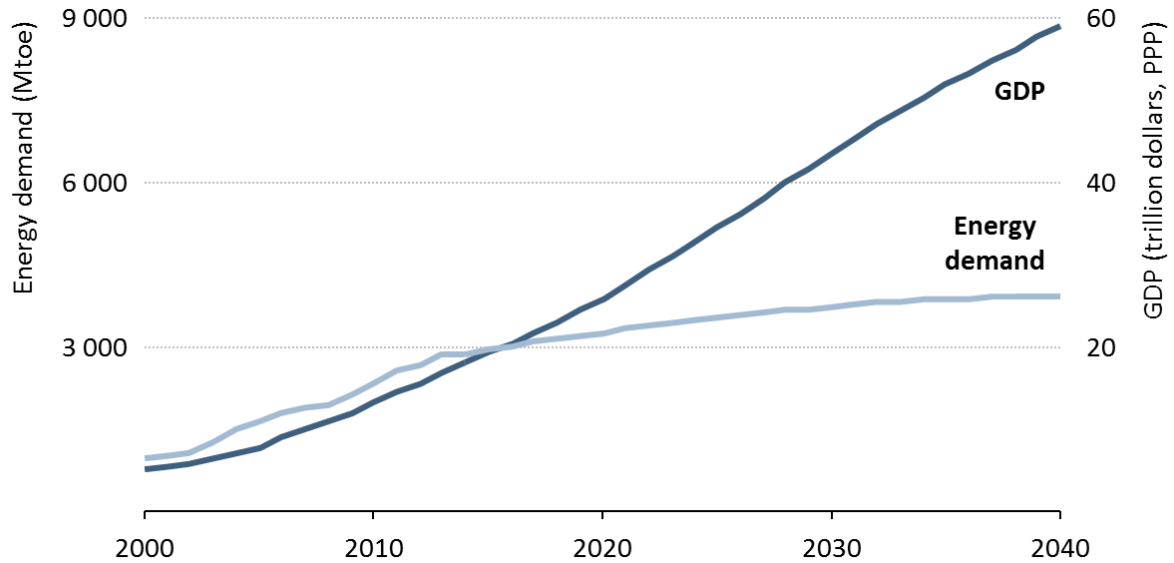
Change in demand for selected fuels, 2014-2040



Source: IEA, 2015

China is by far the world’s largest producer and consumer of coal. But structural shifts in the economy, favouring expansion of the services sector rather than heavy industry, mean that both steel and cement production could have peaked in 2014. Consequently, 85% less energy will be needed to generate each unit of future economic growth than over the past 25 years. Moreover, China is planning to introduce an emissions trading scheme in 2017 covering the power sector and heavy industry. And half of China’s energy use today is subject to mandatory efficiency standards, up from 3% in 2005.

The IEA thinks China’s carbon dioxide emissions will peak around 2030. **“We are approaching the end of the single largest energy demand growth story in history,”** said Birol. **“This is a major story and has implications for the entire world”**. What’s more, “China is providing new diversification in the energy mix.” The country’s transition to a more diversified and much less energy-intensive model for growth will certainly re-shape global energy markets.



Source: IEA, 2015

## WAY FORWARD

The changing world energy landscape and policies offer many reasons for optimism over the future. “We need electricity and modernisation,” said Biorl. “The problem was the strong correlation between electricity generation and emissions. But if the pledges are implemented, this close relationship will end up with a divorce between generation and emissions, which is good news for all of us.”

A question nevertheless remains over the pace of the low-carbon shift and its degree. While electricity is being steadily decarbonised, this is not matched in sectors that use oil, such as transportation and certain industries.

The result is that while current energy policies will lead to a slower increase in energy-related CO<sub>2</sub> emissions, they will not bring about the absolute decline in emissions needed to meet the 2°C target. What’s required in Paris is a climate action framework that will secure progressively stronger climate commitments over time.

Europe needs to make further progress in delivering its EU Energy Union strategy. **“We cannot think that we can build the Energy Union in a vacuum”**, concluded Šefčovič. **“We need to take into account global energy trends. And we need to build it in our member states, cities and factories”**.



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