

ENERGY SECURITY AND THE ROLE OF FOSSIL FUELS REVISITED

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AGENDA

- The low carbon transition
- Investment trends
- System issues
- Conclusion

Britain heads for first day of power without old king coal

Emily Gooden Energy Editor

Britain was on course last night to generate electricity for a whole day without burning coal for the first time since the Victorian era.

The milestone indicates the decline of a polluting fuel that has been essential to the country's energy production since the first coal-powered generating plant opened in London in 1882.

Coal-fired power stations were Britain's biggest source of electricity as recently as 2011 but are now in their death throes under the impact of environmental measures and subsidised renewable plants.

Last year coal plants generated only 91 per cent of Britain's electricity and

compete with gas plants, which face lower taxes, and lock the subsidies which wind, solar and biomass plants enjoy.

Last year gas plants generated 42.4 per cent of the UK's electricity, nuclear 23.2 per cent and renewables 24.4 per cent.

National Grid recorded zero coal generation for the first time in May last year for a few hours. There have been other days with barely any coal generation since but yesterday was expected to be the first full day.

High output by turbines, thanks to strong winds, and lower demand due to businesses shutting for the weekend are thought to have contributed to the achievement.

Hannah Martin, head of energy at Greenpeace, said: "A decade ago, a day without coal would have been unimaginable, and in ten years' time our energy system will have radically transformed again."

At National Grid, Mrs O'Hara said it was "important to remember coal is still an important source of energy as we make the transition to a low carbon system".

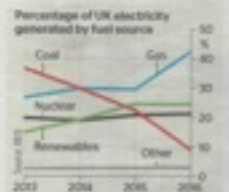
Although coal plants are now needed far less, they are still expected to be required to help keep the lights on in the depths of winter when demand is highest and solar panels will not be producing electricity.

In December several of the remaining coal plants won consumer-funded subsidy contracts worth almost £30 million through a government scheme to help maintain supply in the winter of 2016-17.

Critics have questioned the logic of UK consumers being made to pay to prolong the life of the plants at the same time as meeting higher energy bills because of the carbon tax that has pushed the coal-fired stations to the brink of closure.

Ben Caldecott, director of the sustainable finance programme at Oxford University, said: "The first country to use coal for electricity is now on the cusp of being the first major economy to completely phase it out."

"Doing so will improve air quality, reduce carbon emissions, and help attract investment into more reliable and secure alternatives."



the government plans to shut them all by 2025.

"Great Britain has never had a continuous 24-hour period without coal. Today is breaking that. It could be the first," National Grid's chief executive said yesterday. Candi O'Hara, director of UK system operator for National Grid, said that it was "a watershed moment in how our energy system is changing".

In 2012 Britain had 17 coal-fired power stations that were together capable of generating 25 gigawatts of power, close to half the UK's peak demand.

A number closed in 2011 under EU rules to curb acid rain and more have closed since, having been rendered uneconomic by the UK's carbon tax.

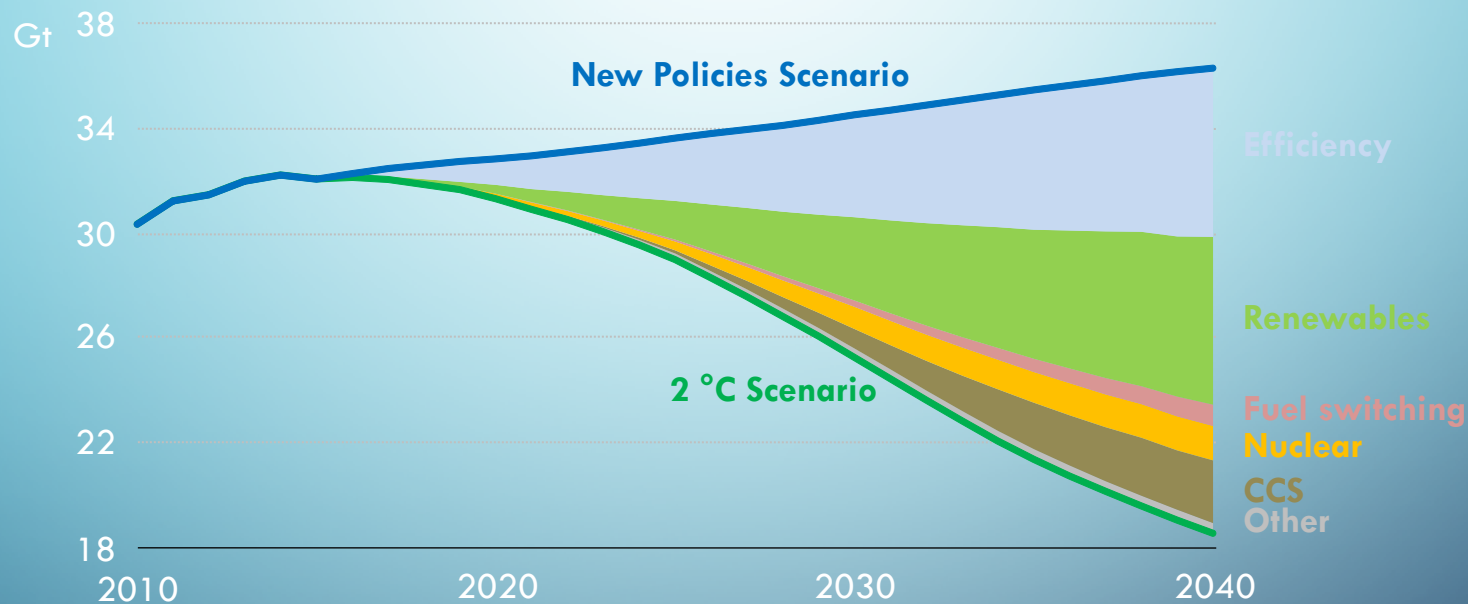
The eight remaining plants, almost 50 years old on average, are capable of generating just under 14 gigawatts. They are in decline as they struggle to

LOW CARBON TRANSITION

- THE PARIS AGREEMENT
 - Well below 2 degrees
 - Efforts towards 1.5 degrees
 - 'Net zero' emissions by mid-century

A 2 °C PATHWAY REQUIRES FURTHER EFFORTS

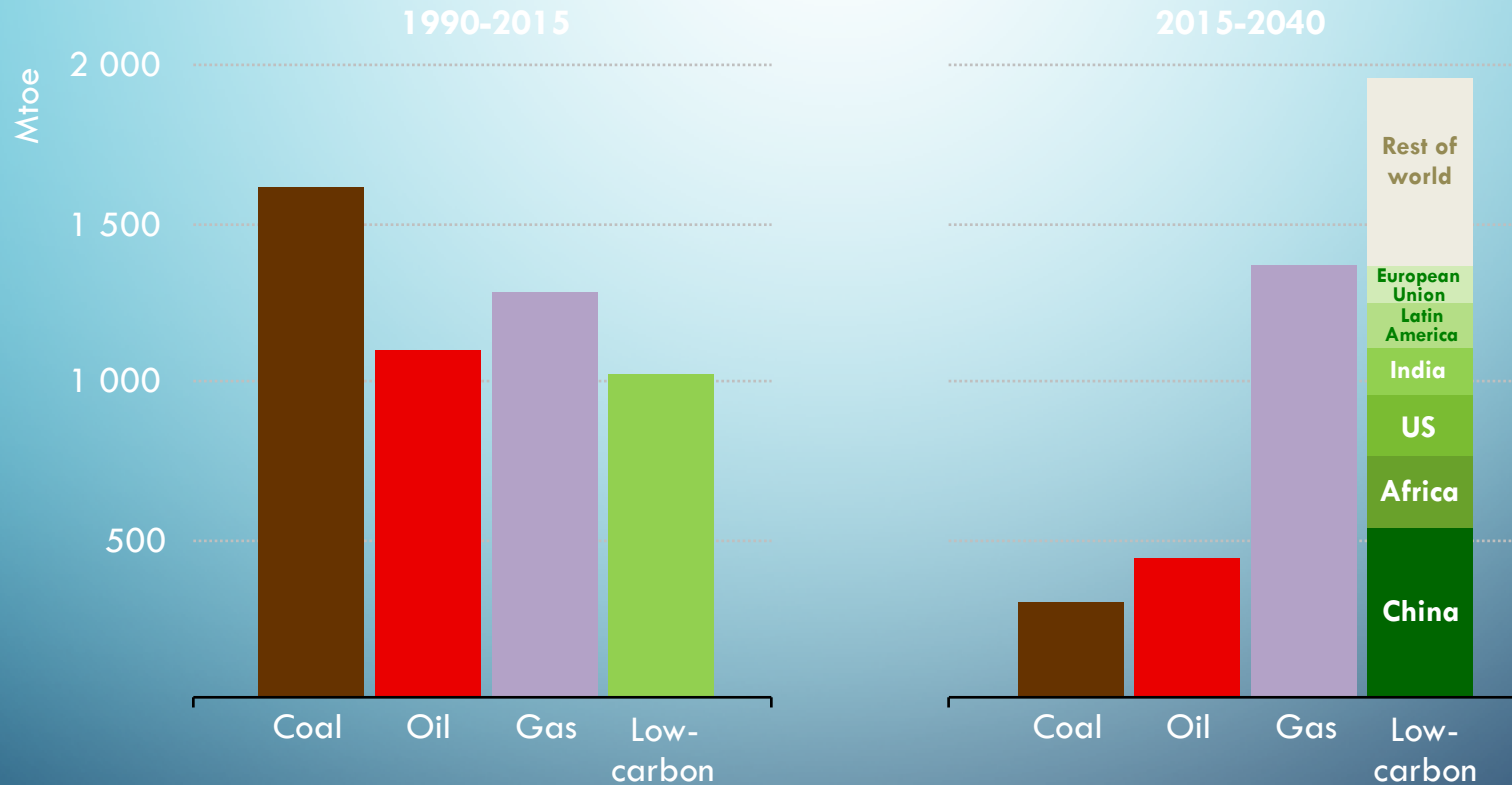
Global CO₂ emissions reductions in the New Policies & 2 °C Scenario by technology



Energy efficiency & renewables are central to achieve climate targets; required rate of decarbonisation in the 2 °C Scenario is highest in the power sector

A new 'fuel' in pole position

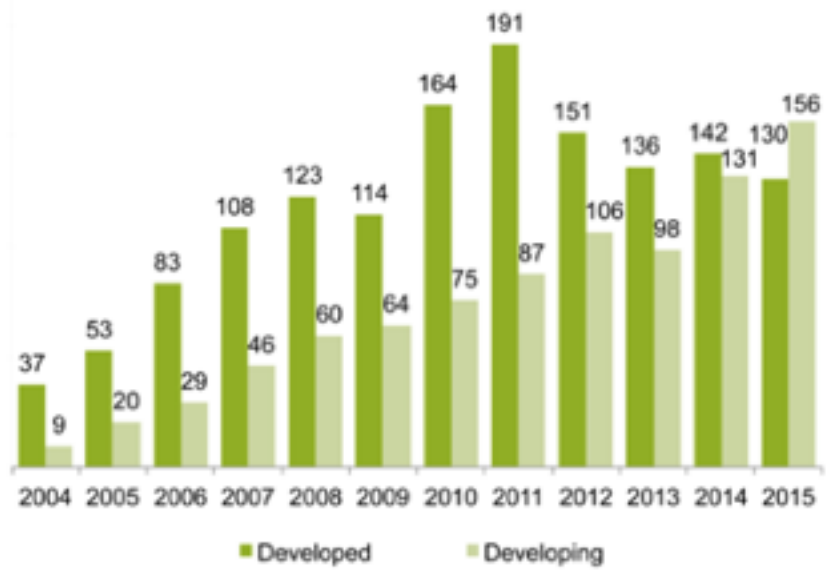
Change in total primary energy demand in the New Policies Scenario



Low-carbon fuels & technologies, mostly renewables, supply nearly half of the increase in energy demand to 2040

INVESTMENT TRENDS

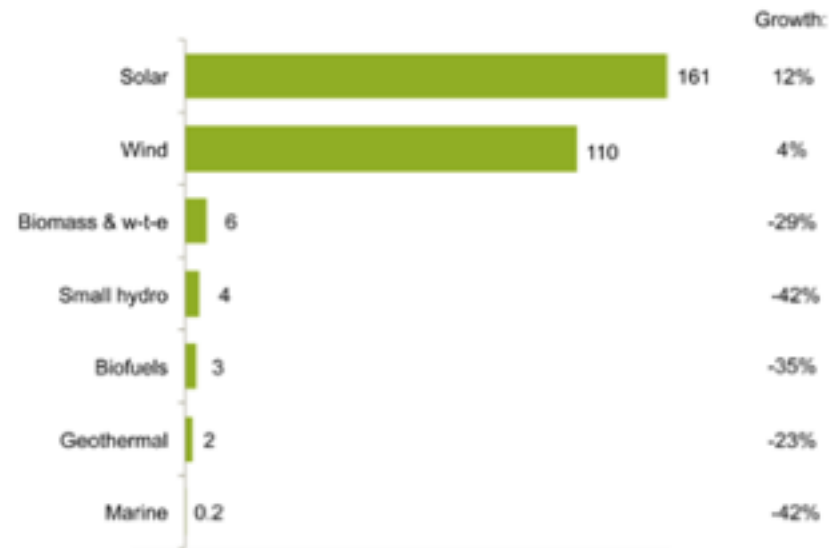
FIGURE 4. GLOBAL NEW INVESTMENT IN RENEWABLE ENERGY: DEVELOPED V DEVELOPING COUNTRIES, 2004-2015, \$BN



New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals. Developed volumes are based on OECD countries excluding Mexico, Chile, and Turkey.

Source: UNEP, Bloomberg New Energy Finance

FIGURE 5. GLOBAL NEW INVESTMENT IN RENEWABLE ENERGY BY SECTOR, 2015, AND GROWTH ON 2014, \$BN



New investment volume adjusts for re-invested equity. Total values include estimates for undisclosed deals.

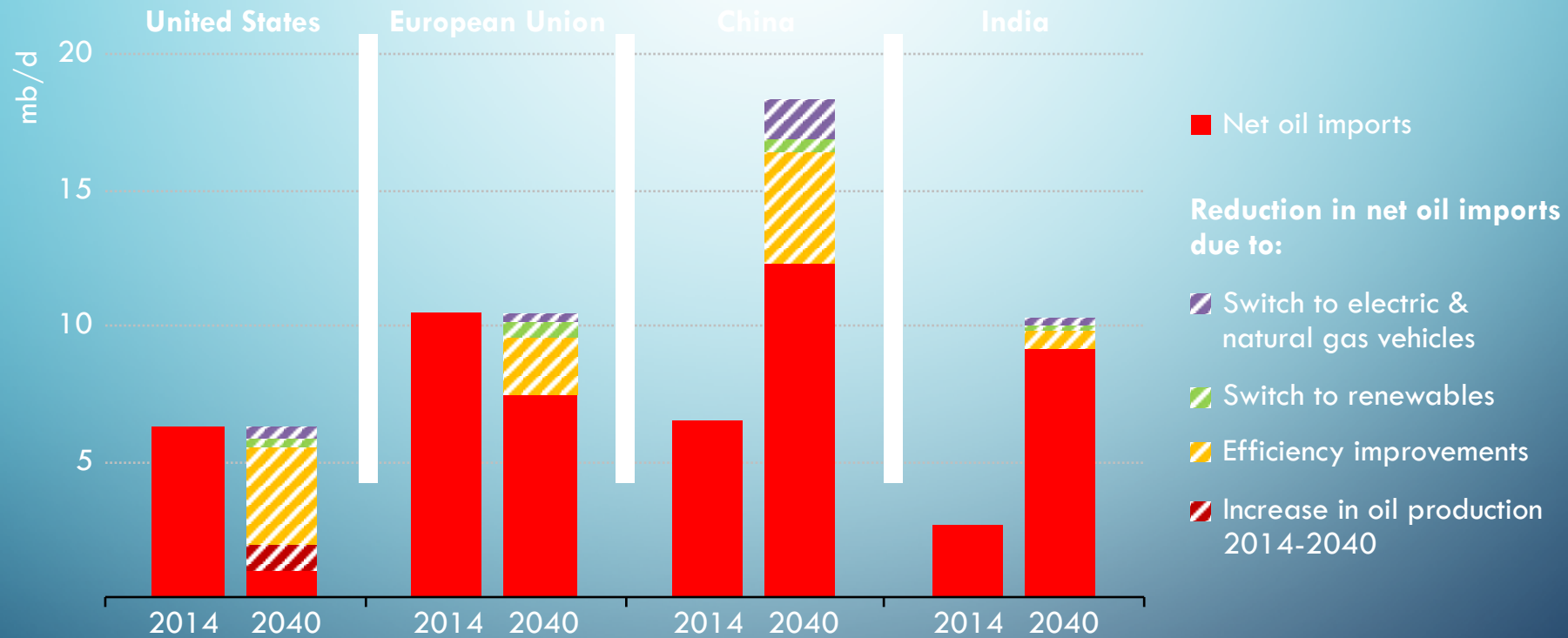
Source: UNEP, Bloomberg New Energy Finance

SYSTEM ISSUES

- Renewable penetration and power sector security of supply
- Heat and Transport

A suite of tools to address energy security

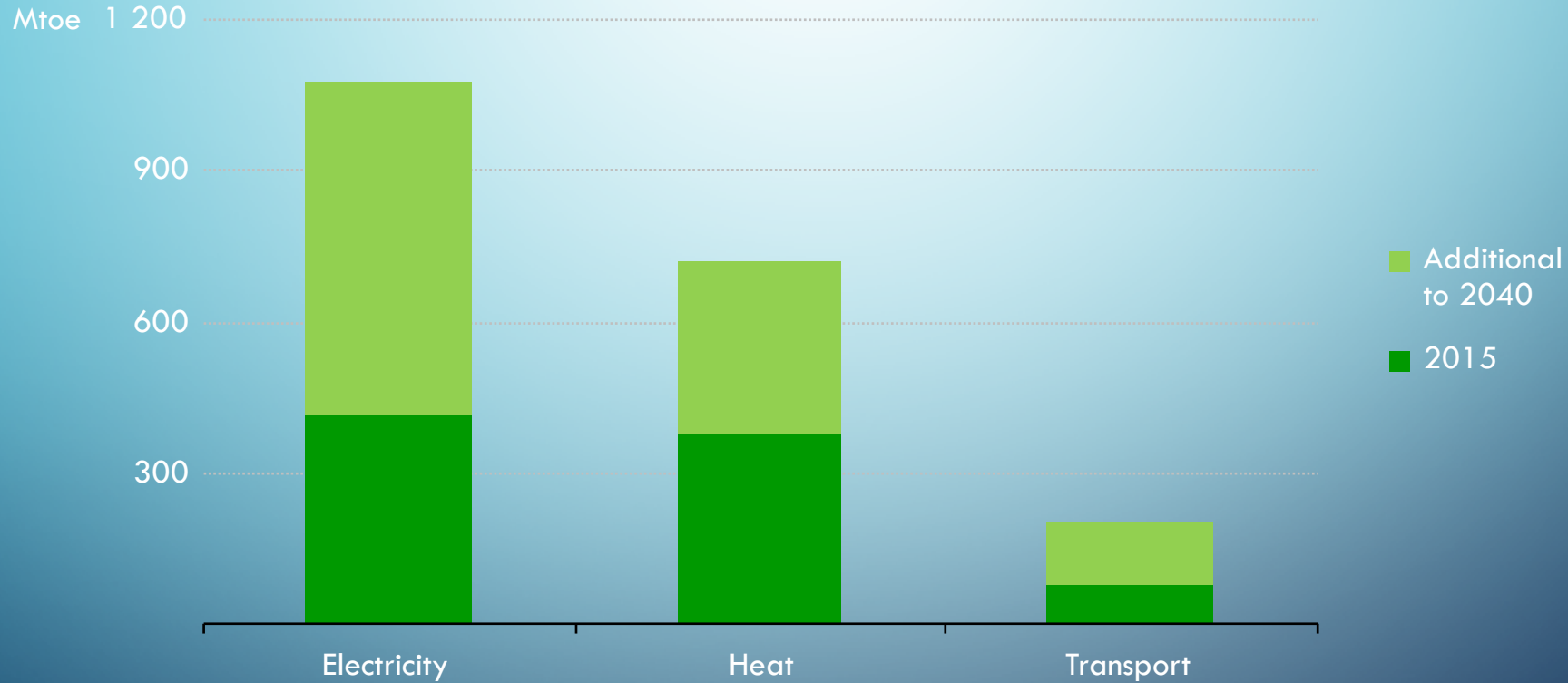
Net oil imports in the New Policies Scenario



The energy transition provides instruments to address traditional energy security concerns, while shifting attention to electricity supply

THE NEXT FRONTIERS FOR RENEWABLES ARE HEAT & TRANSPORT

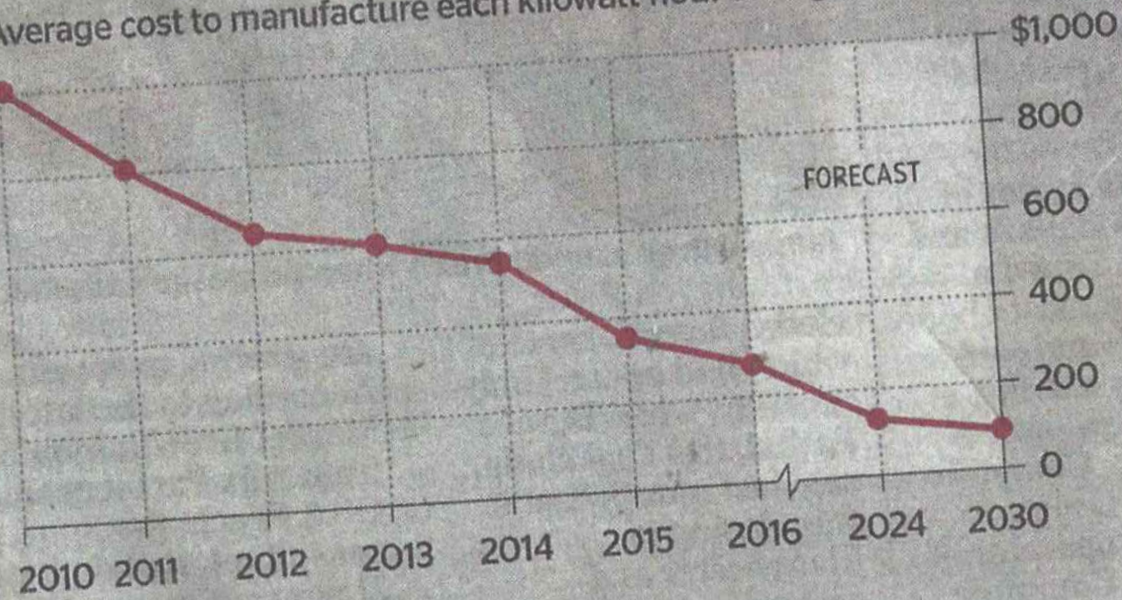
Renewable energy use by sector in the New Policies Scenario



Today renewables in electricity & heat use are nearly at par; by 2040, the largest untapped potential lies in heat & transport

Cost of battery packs

Average cost to manufacture each kilowatt-hour storage capacity



Source: Bloomberg New Energy Finance

CONCLUSIONS