23 November 2015

COP21: 10 THINGS THE NEGOTIATORS NEED TO KNOW

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WHAT THE COP21 NEGOTIATORS NEED TO KNOW…

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When UNFCCC delegates meet at COP21 in Paris, **it is crucial that the negotiations are well informed** with independent opinion and analysis.

This report is not intended to be a comprehensive guide to the COP21 talks, nor does it try to touch on all of the issues that will be on the agenda in Paris. Instead it **takes aim at a select number of issues that are often the subject of misinformation and contention** within the climate negotiations. Each section of this report presents objective data and charts that we hope will serve to better inform the negotiations towards a new global climate deal.

Bloomberg New Energy Finance is a leading independent provider of news, research and analysis on clean energy and the low-carbon transition. For more information visit about.bnef.com

1. **THE INTENDED NATIONALLY DETERMINED CONTRIBUTIONS (INDCS) SUBMITTED DON'T GET YOU TO 2°C**
2. **SOME TARGETS ARE MORE AMBITIOUS THAN OTHERS**
3. **INDIA AND SOUTHEAST ASIA ARE KEY TO CURBING FUTURE GLOBAL EMISSIONS GROWTH**
4. **RENEWABLE ENERGY IS GETTING CHEAPER**
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10. **ECONOMICS ALONE WILL TRANSFORM THE ENERGY SECTOR, BUT MUCH GREATER ACTION WILL BE NEEDED TO REACH 2°C**

1. THE INTENDED NATIONALLY DETERMINED CONTRIBUTIONS (INDCS) DON'T GET YOU TO 2°C

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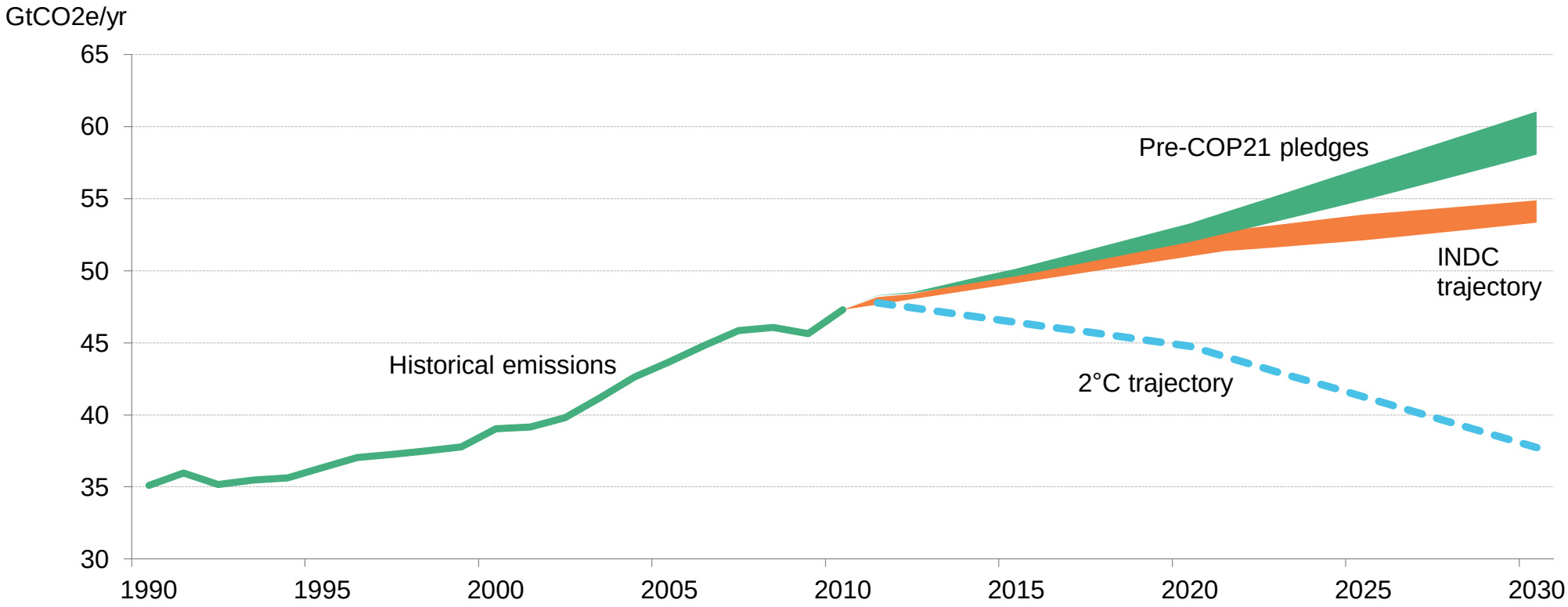
- Over 160 countries that together account for 95% of global emissions have submitted their INDCs to the UN ahead of Paris.
- The estimated impact of the pledges made so far is a net reduction of around 5.5GtCO2e/yr by 2030, or a cumulative reduction of 37Gt over 2016-30.
- This is not enough to put the world on a 2°C trajectory, which would require further reductions of 15-20Gt/yr by 2030.
- According to the IPCC, the world's remaining 'carbon budget' is around 1,000GtCO2e. Even if the INDCs are implemented, the budget is likely to be exhausted by mid-century.



Note: 'INDC' refers to intended nationally determined contributions submitted by countries to the UNFCCC as part of the Durban Platform negotiations – INDCs represent a country's post-2020 low carbon and emission reduction targets

Source: Bloomberg New Energy Finance, UNFCCC, UNEP

2. SOME TARGETS ARE MORE AMBITIOUS THAN OTHERS

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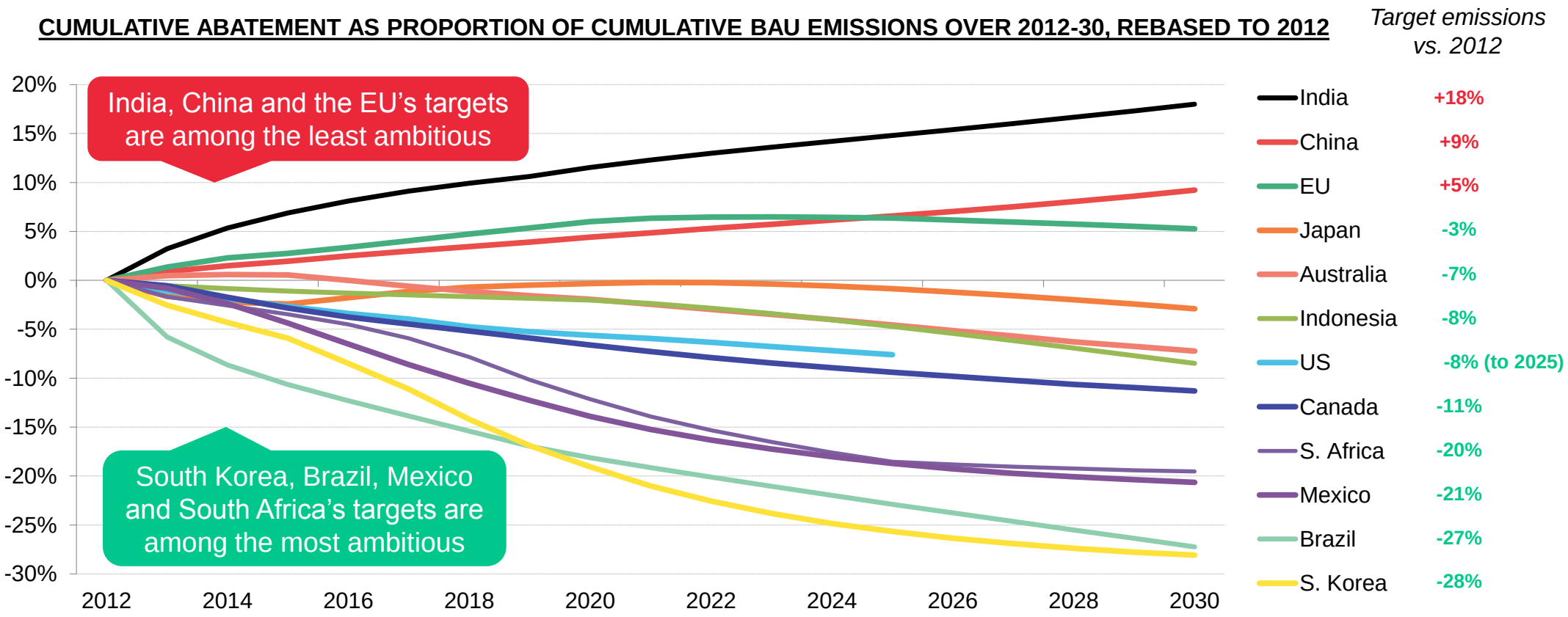
- BNEF has conducted in-depth long-term modelling of the energy sector via our New Energy Outlook. Under the Outlook, our business-as-usual (BAU) estimates suggest strong uptake of renewables over the next 2.5 decades in many nations.
- The INDC targets vary widely. One way to gauge their ambition is by comparing them against the BNEF BAU baseline. How much action (abatement) would be required above and beyond what we forecast via our Outlook?
- On this basis, country INDCs fall into three categories: those that require no abatement above what will happen anyway to be achieved (above the 0% line below), those where our BAU emissions estimate is in line with the country's target, and those that do require abatement.

CUMULATIVE ABATEMENT AS PROPORTION OF CUMULATIVE BAU EMISSIONS OVER 2012-30, REBASED TO 2012



For more information on our power sector modelling, visit http://www.bloomberg.com/company/new-energy-outlook/
For a comprehensive analysis of the INDCs, download the report: How ambitious are the post-2020 targets?

Source: Bloomberg New Energy Finance

3. INDIA AND SOUTHEAST ASIA ARE KEY TO CURBING FUTURE GLOBAL EMISSIONS GROWTH

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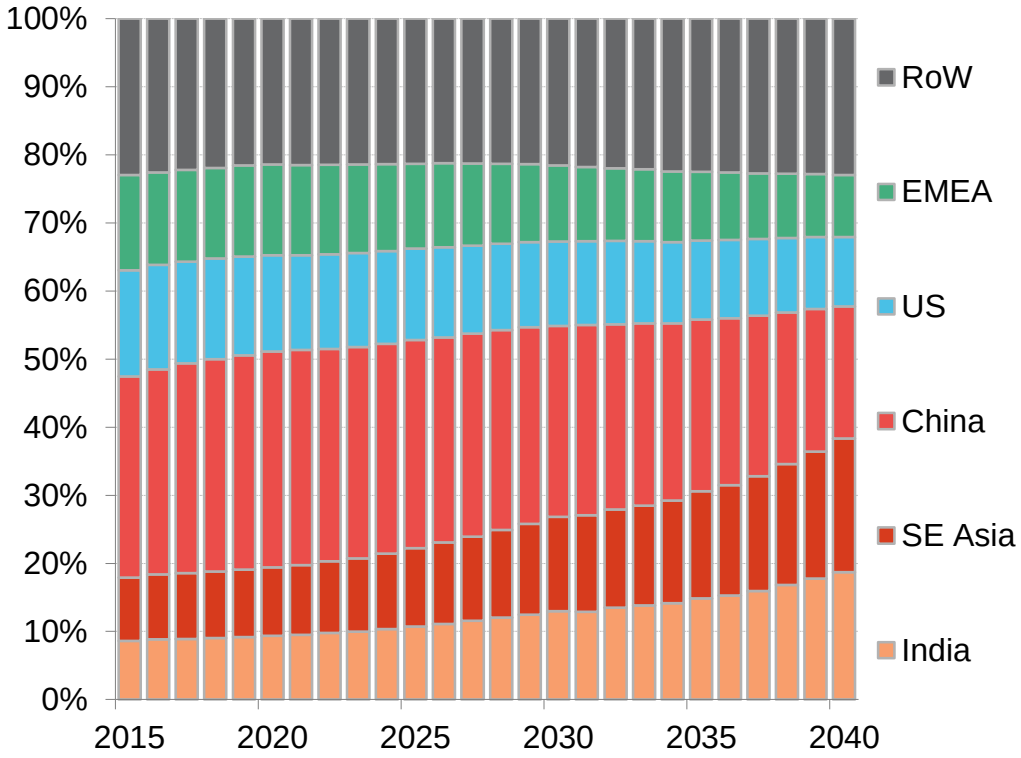
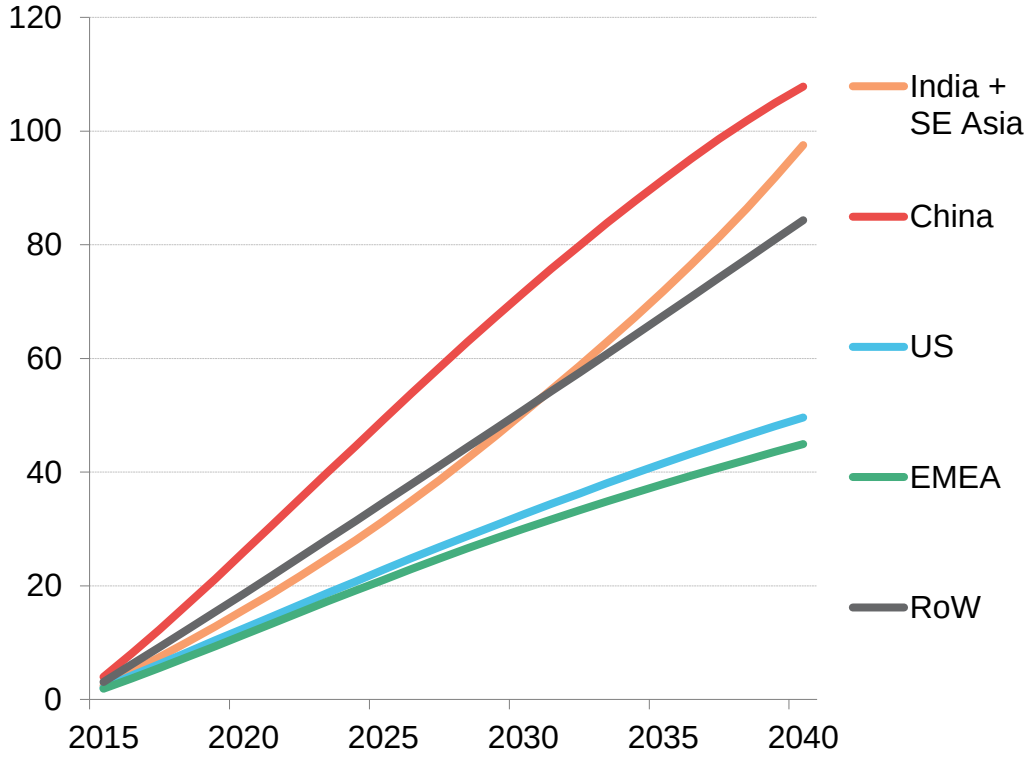
- India and Southeast Asia currently account for less than 20% of global emissions from the power sector. But this is set to dramatically change over the next 25 years as over 200GW of coal-fired power plants are built in the region.
- We forecast India and Southeast Asia to account for almost 40% of global emissions from the power sector by 2040. Over the next 25 years, cumulative power sector emissions in India and Southeast Asia will almost equal that of China.
- We expect China's emissions to peak before 2030, but for India and Southeast Asia's emissions to continue to rise through 2040. If global emissions growth is to be brought under control, it is crucial to address growth in India and Southeast Asia.

POWER SECTOR EMISSIONS BY REGION, 2015-40



CUMULATIVE POWER SECTOR EMISSIONS BY REGION, 2015-40 (GTCO2E)

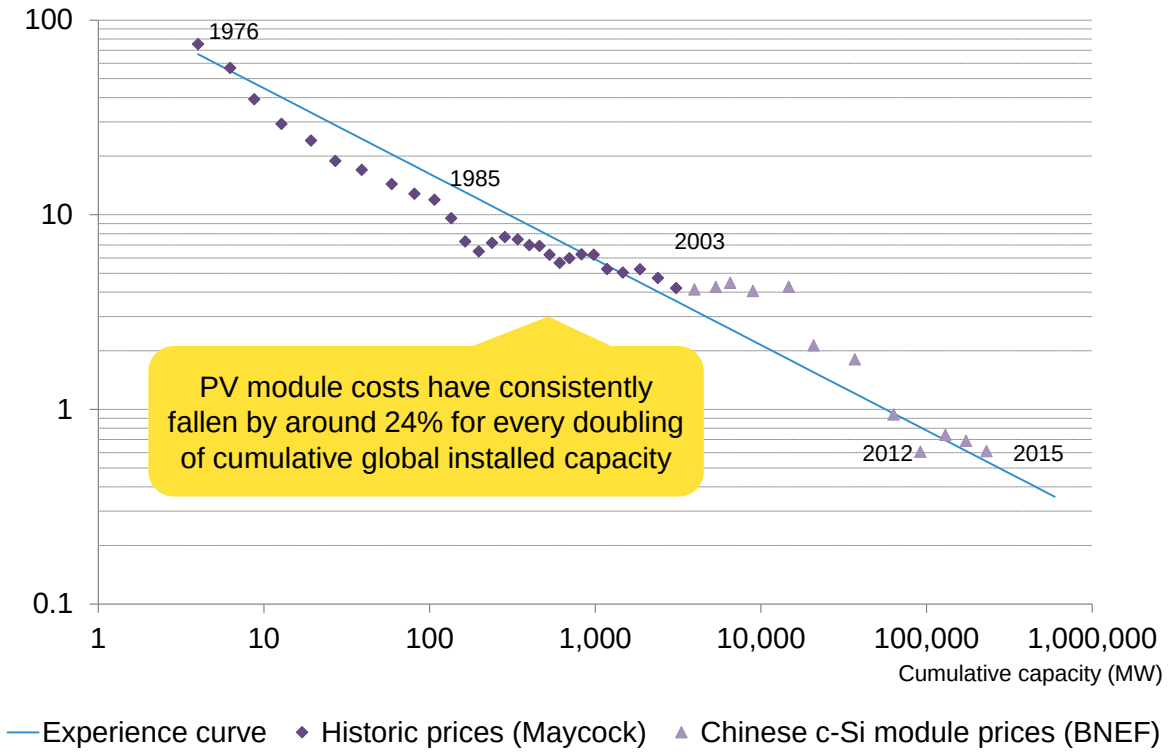


Source: Bloomberg New Energy Finance

4. RENEWABLE ENERGY IS GETTING CHEAPER

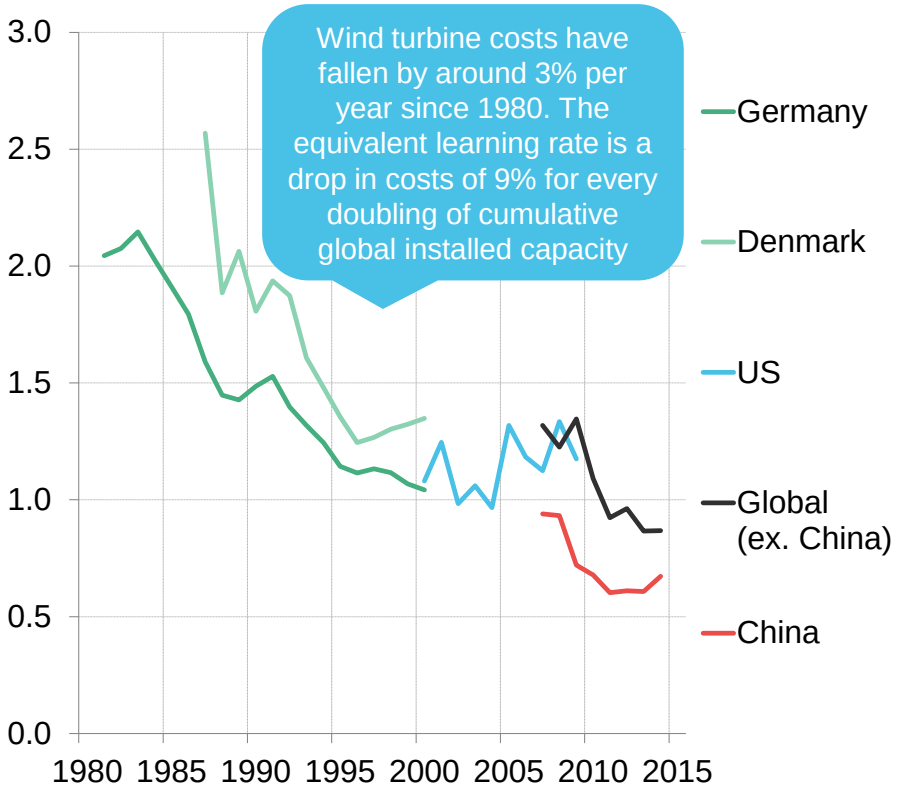
- Renewable energy technologies, in particular Solar PV and wind, are getting cheaper. Costs have now fallen to such an extent that solar and wind are competitive with fossil fuel power plants in many parts of the world (see next slide).
- We expect cost reductions to continue and for wind and PV to viably compete with coal and gas without the need for government subsidies in an expanding number of places around the globe over the next 10 years.

LEARNING CURVE FOR PV MODULES ($/W)



Source: Bloomberg New Energy Finance, Paul Maycock

WIND TURBINE PRICES, 1984-2015 (€M/MW)



Source: Bloomberg New Energy Finance, Lawrence Berkeley National Laboratory, ExTool study (Neij et al, 2003), Vestas annual reports
Note: data is inflation corrected to 2014 prices

5. WIND AND SOLAR ARE ALREADY CHEAPER THAN COAL- AND GAS-FIRED POWER PLANTS IN MANY COUNTRIES

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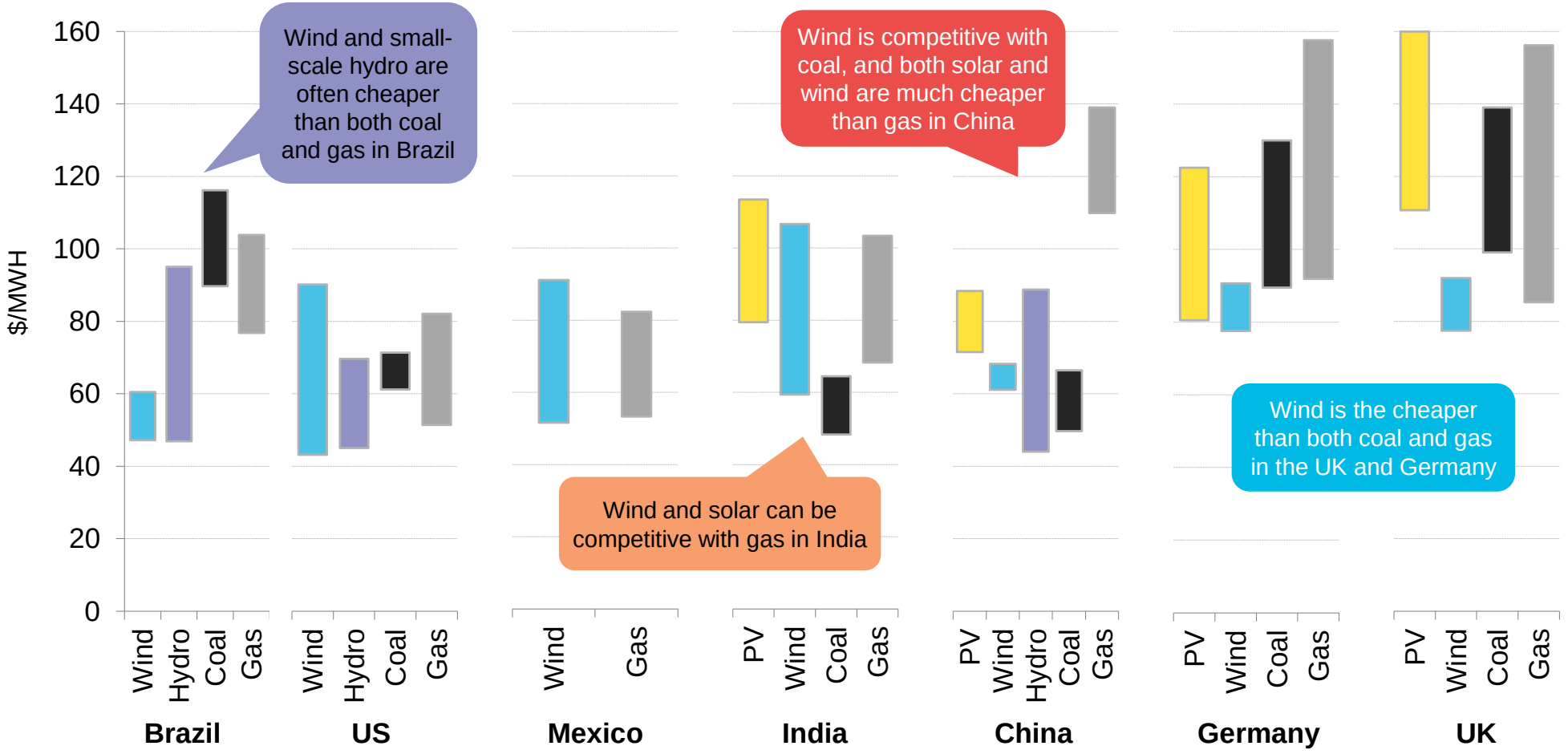
- On a levelised cost of electricity (LCOE) basis*, renewable energy technologies are currently cheaper than coal- and/or gas-fired power plants in several of the world's major markets.
- Brazil and the UK stand out, with wind power much cheaper than both coal and gas. Solar, wind and small-scale hydro power are also competitive in other markets, however, such as US, China, Mexico, India and Germany.



*LCOE is the average unit of power generation from each technology taking into account upfront investment, cost of financing and operating/fuel costs. Note: Fossil fuel prices are assumed to remain approximately flat in real terms; Carbon prices (nominal) are assumed to be $10-90/t in Europe, $15-60/t in the US, and $0-20/t in China over 2015-35.

Source: Bloomberg New Energy Finance

6. CLEAN ENERGY INVESTMENT HAS LEVELLED AT APPROXIMATELY ~$300BN/YR SINCE 2011

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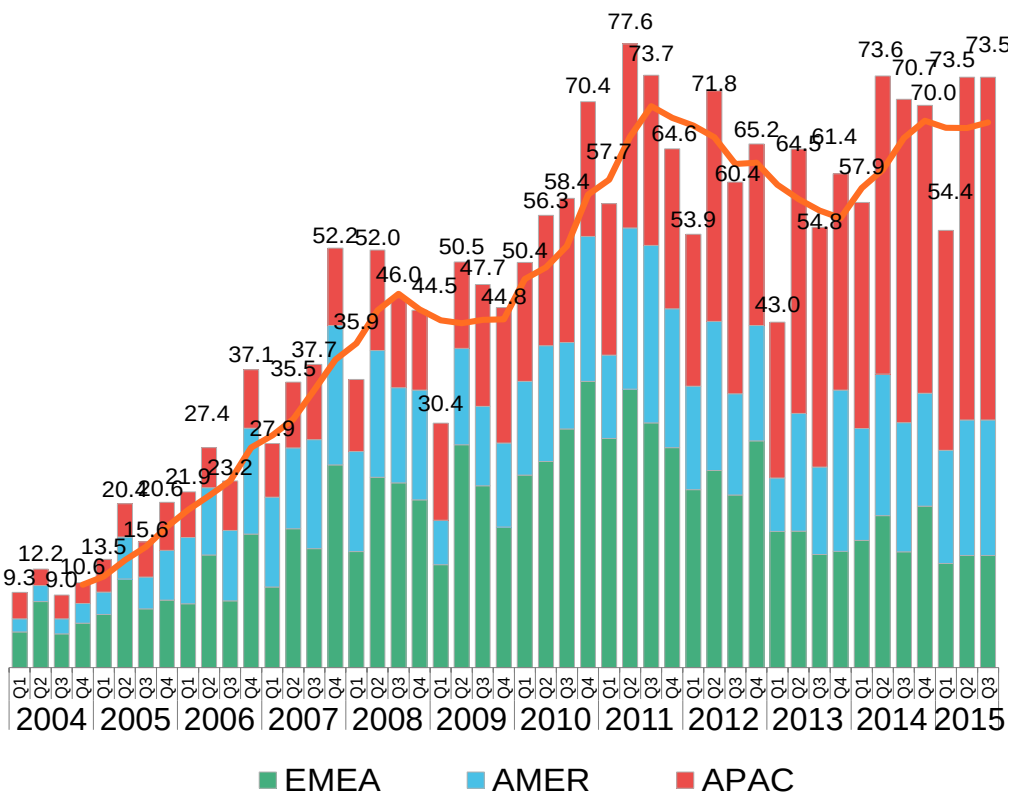
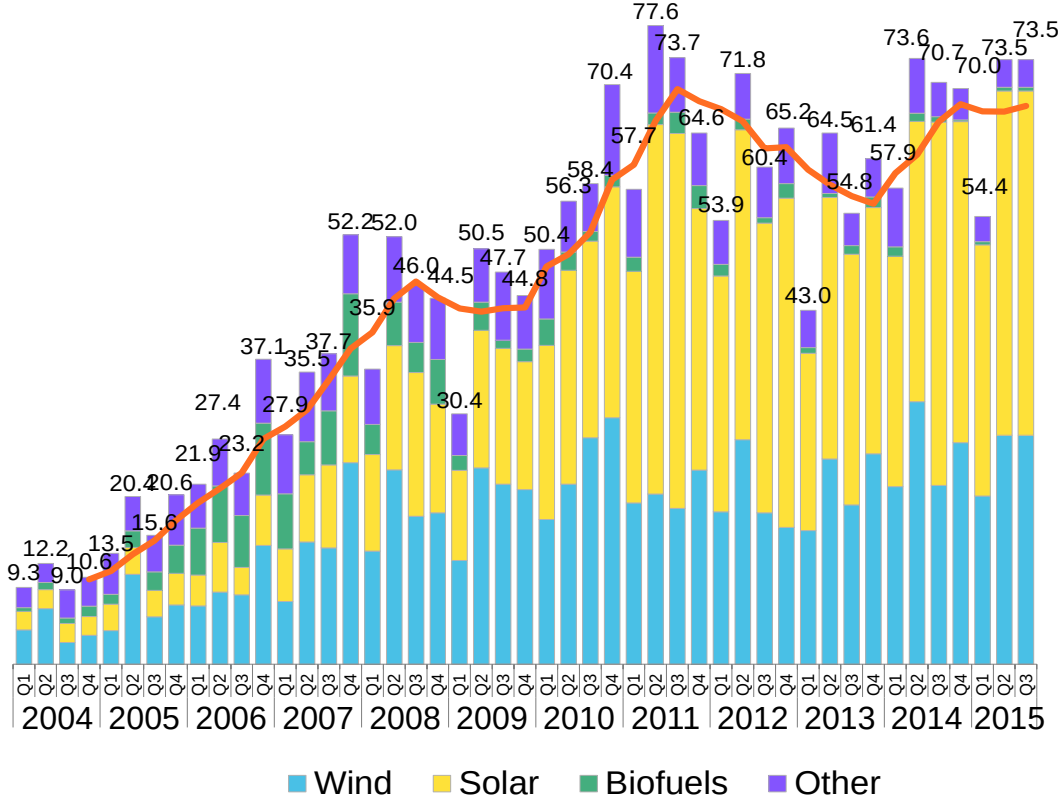
- Investment into clean energy accelerated sharply in the years preceding the 2008 global financial crisis. Investment grew once again over 2009-11 but has been relatively stable over the past four years as growth in Asia has been offset by sharp declines in Europe
- New investment into wind has been largely flat since 2009. The lion's share of investment growth over the past five years has been into solar

NEW INVESTMENT INTO CLEAN ENERGY BY REGION ($BN/QUARTER)



NEW INVESTMENT INTO CLEAN ENERGY BY TECHNOLOGY ($BN/QUARTER)



Source: Bloomberg New Energy Finance

7. THE MAJORITY OF CLEAN ENERGY INVESTMENT IS NOW OUTSIDE OF THE OECD – BUT LEAST DEVELOPED NATIONS LAG FAR BEHIND CHINA, SOUTH AFRICA, BRAZIL AND INDIA.

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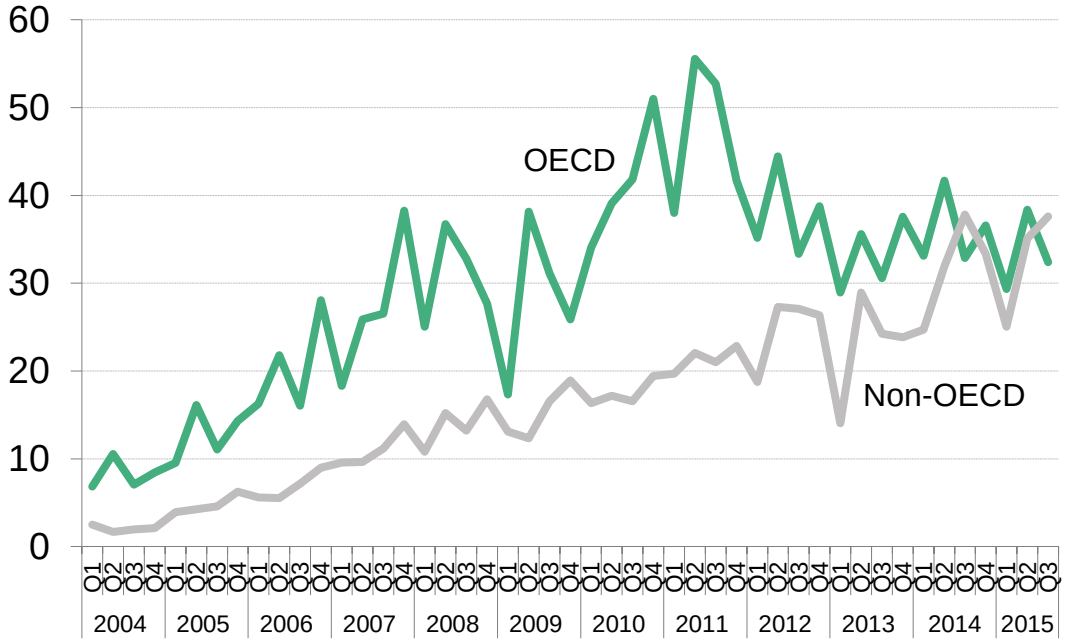
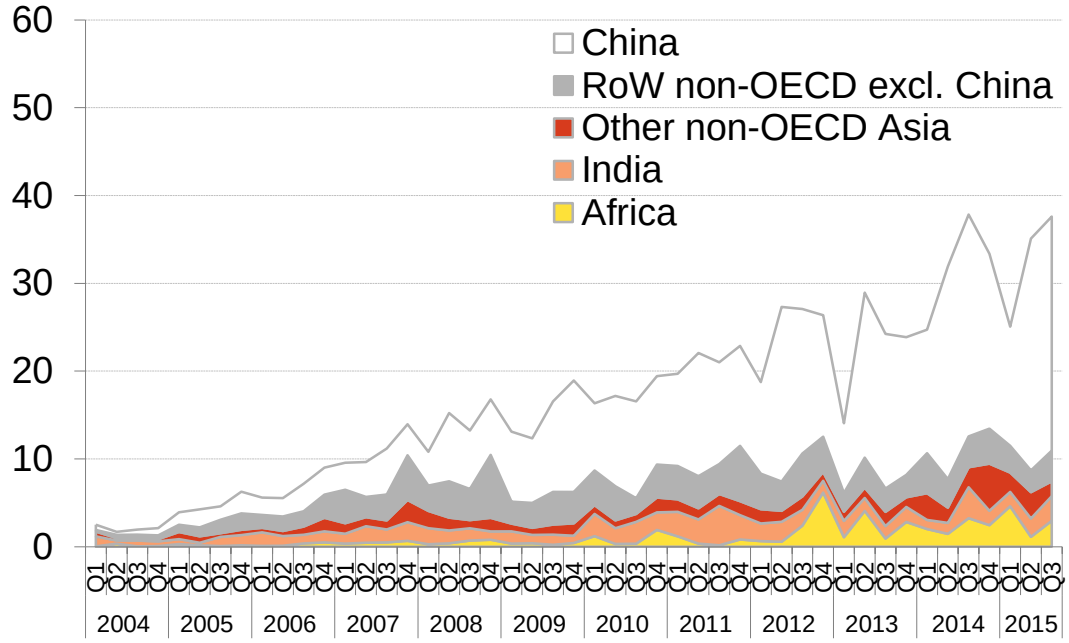
- Investment into large-scale clean energy projects in non-OECD countries has risen faster than total investment in OECD countries since 2012, and over the past year non-OECD investment has overtaken OECD investment for the first time.
- The biggest driver of this trend has been China – which accounts for over two thirds of total non-OECD investment and almost three quarters of the overall growth in investment in non-OECD countries over the past five years.
- Excluding China, non-OECD investment growth has been less spectacular. Investment in Africa remains at $10bn/yr despite growing significantly in recent years. The majority of African investment has been in South Africa and the remainder can be attributed to wind farms in Ethiopia in 2013 and Kenya in 2014.
- For more information, see Climatescope, a country-by-country assessment, interactive report and index tracking the conditions for clean energy investment in 55 developing countries and emerging markets.

INVESTMENT INTO CLEAN ENERGY OECD VS NON-OECD COUNTRIES ($BN/QUARTER)



NON-OECD INVESTMENT INTO CLEAN ENERGY BY COUNTRY/REGION ($BN/QUARTER)



Source: Bloomberg New Energy Finance

8. CLEAN ENERGY INVESTMENT FROM WEALTHY TO LOWER INCOME NATIONS HAS GROWN BUT IS ONLY ~$10-15BN/YR

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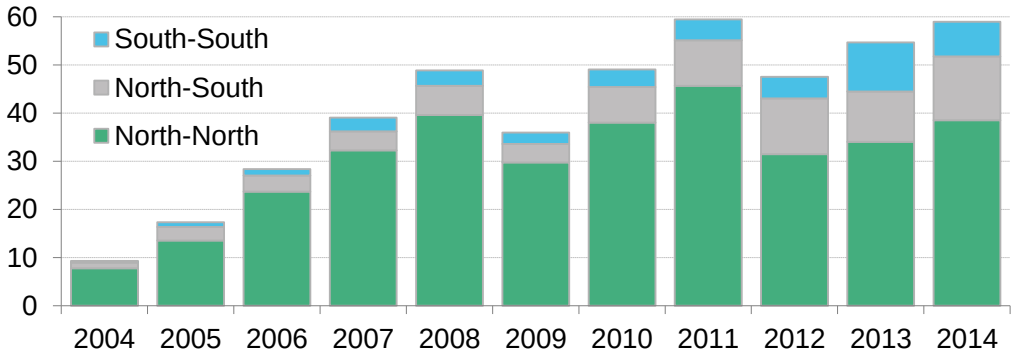
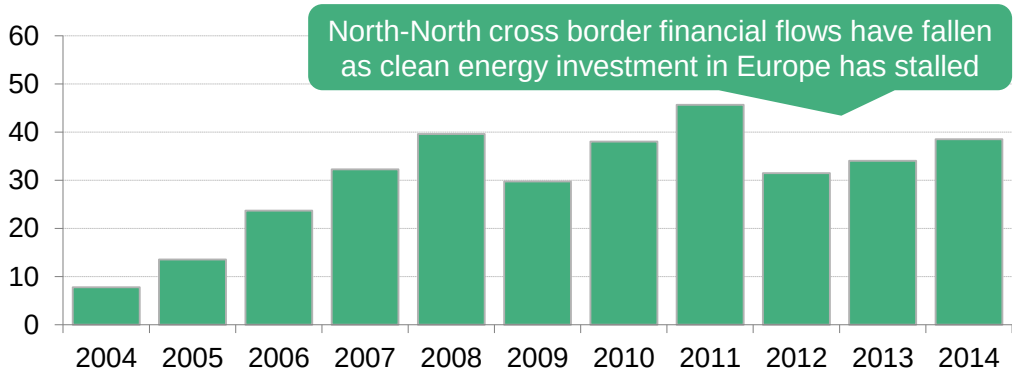
- Developed countries have pledged to 'mobilise' $100bn/yr in climate finance by 2020 to assist developing countries to mitigate their emissions and adapt to the impacts of climate change. The $100bn pledge is highly political and progress towards it is difficult to assess due to disagreements regarding exactly what constitutes climate finance.
- Investment into clean energy is fairly unambiguously classified as climate finance. Global cross-border funding for large-scale clean energy projects hit approximately $60bn in 2014. Investment between rich countries ('North-North') makes up about two thirds of the total.
- North-South climate finance flowing to clean energy projects has grown only modestly to around $10-15bn/yr. Much of this has come via traditional development finance institutions, which are supported by wealthier countries.

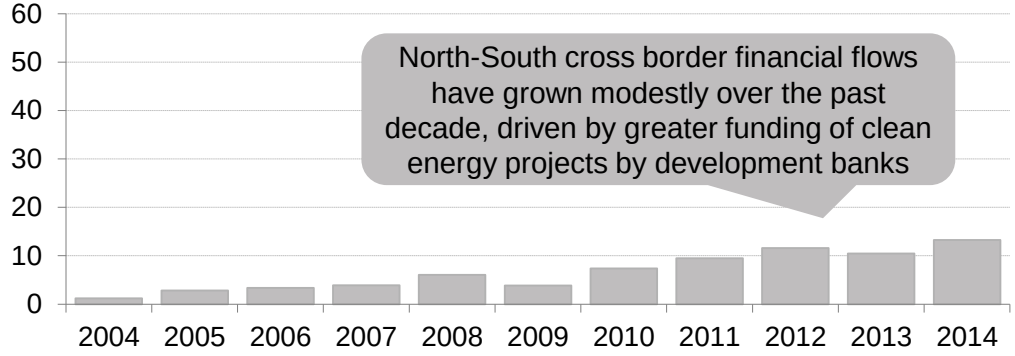
CROSS BORDER CLEAN ENERGY ASSET FINANCE BY SOURCE/RECIPIENT ($BN/YR)



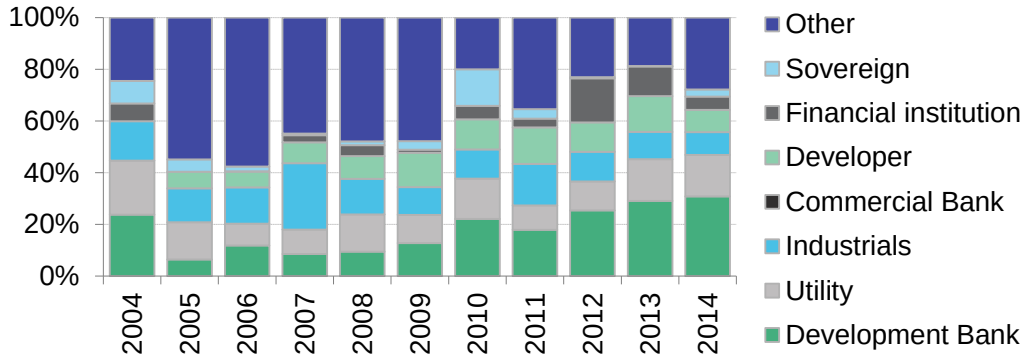
NORTH-NORTH FINANCE ($BN/YR)



NORTH-SOUTH FINANCE ($BN/YR)



NORTH-SOUTH FINANCE (SPLIT BY INVESTOR TYPE)



Note: Includes only cross border asset finance transactions – ie, excluding new investment into companies such as venture capital and IPOs, etc

Source: Bloomberg New Energy Finance

9. FOSSIL FUELS WILL BE A CASUALTY OF THE LOW-CARBON EVOLUTION, REGARDLESS OF PARIS

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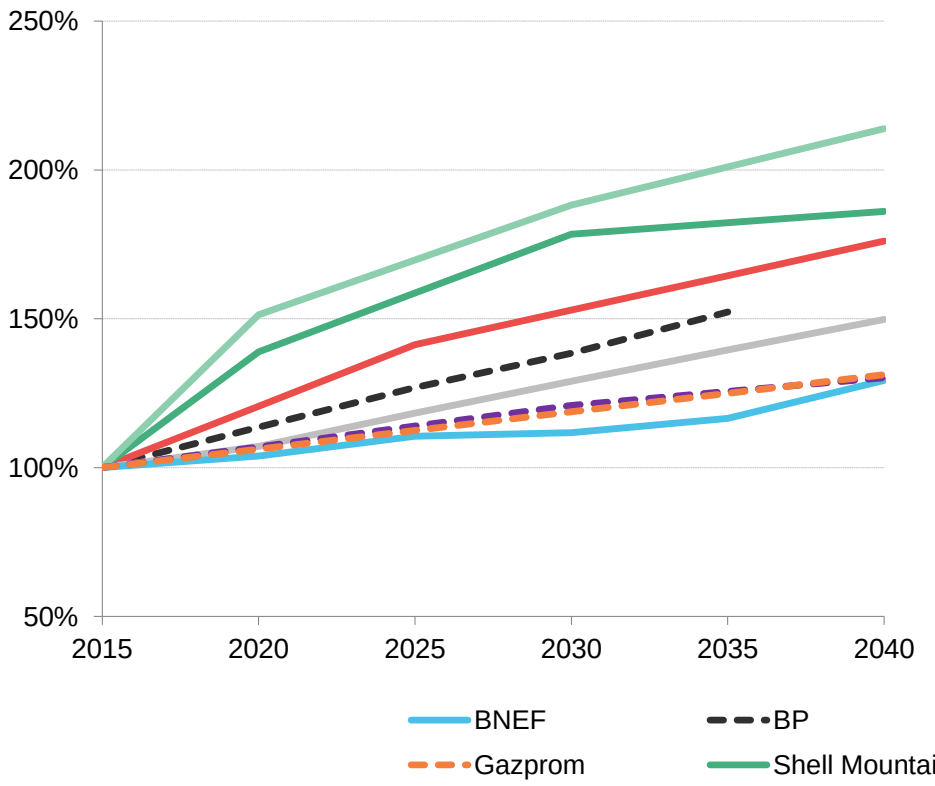
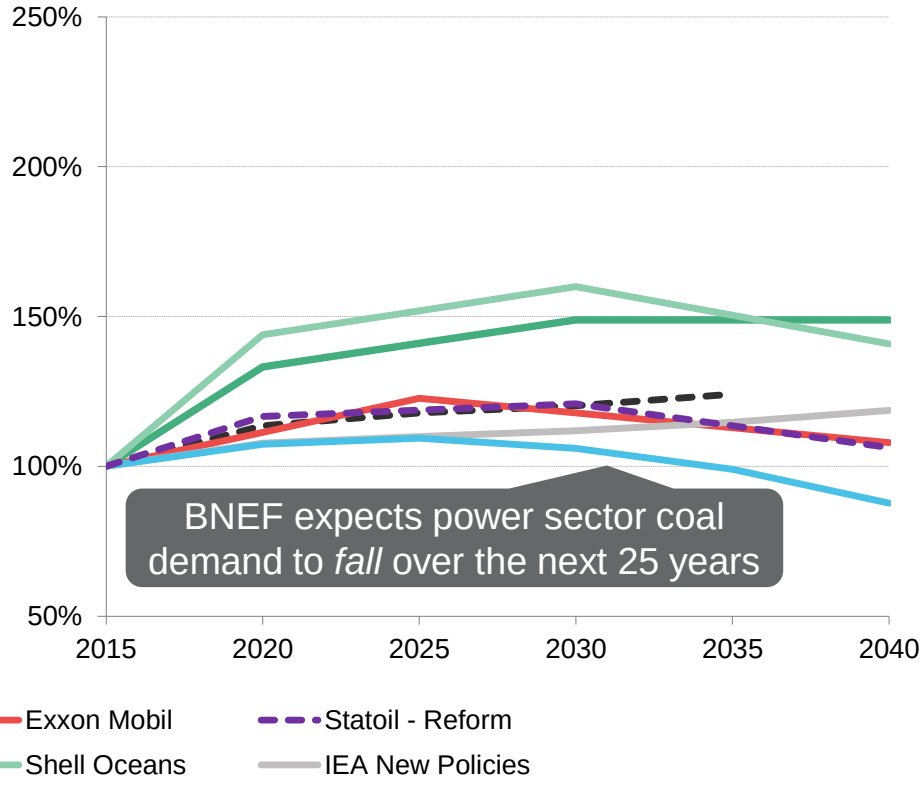
- Energy efficiency gains and greater penetration of wind and solar will eat into demand for coal and natural gas in the power sector.
- This impact is not being adequately recognised by the fossil fuel industry or by the International Energy Agency (IEA). BNEF expects power sector coal and gas demand to be below the forecasts made by BP, Exxon, Statoil, Shell, Gazprom and the IEA.

FORECAST ANNUAL POWER SECTOR DEMAND FOR GAS



FORECAST GROWTH IN POWER SECTOR COAL DEMAND



Note: BNEF forecasts are based on our New Energy Outlook analysis – see point 2.

Source: Bloomberg New Energy Finance

10. ECONOMICS ALONE WILL TRANSFORM THE ENERGY SECTOR, BUT MUCH GREATER ACTION WILL BE NEEDED TO REACH 2°C

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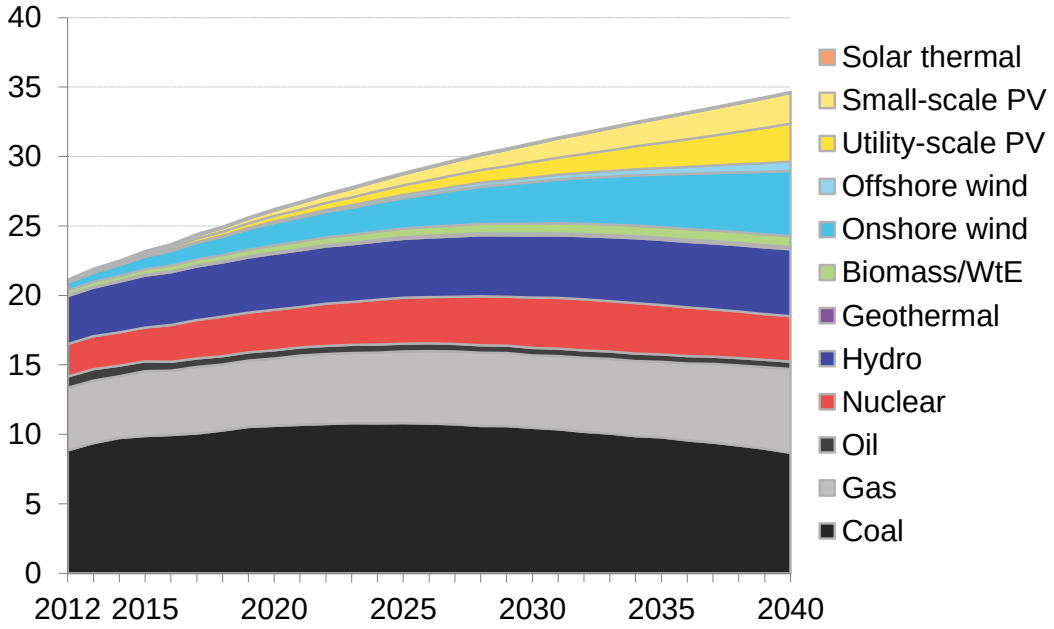
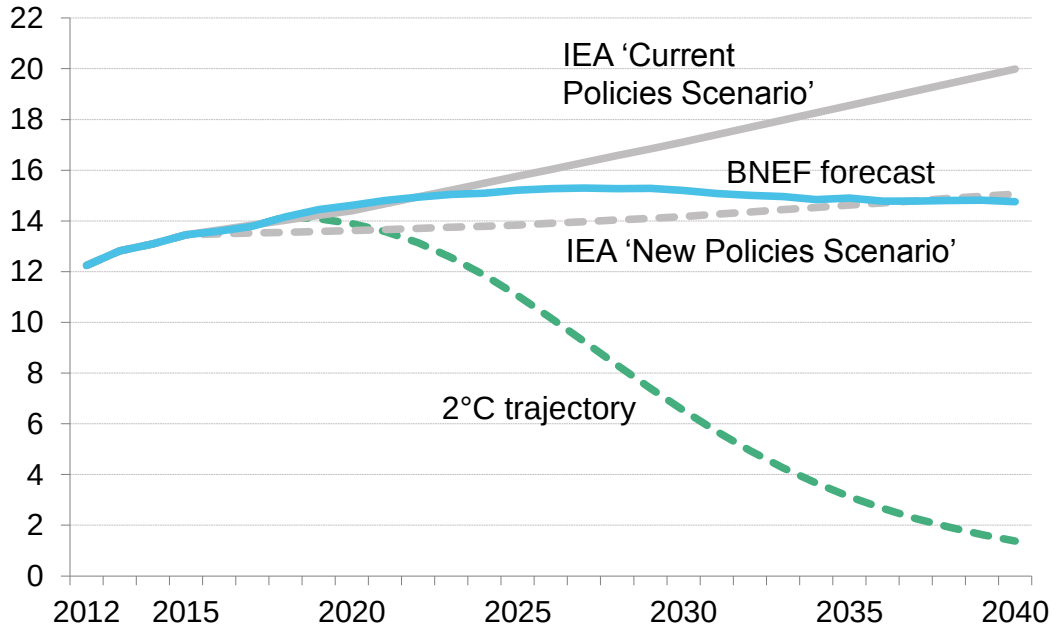
- Based purely on economic trends, we expect that the global power system will be transformed over the coming decades.
- We expect that the share of fossil fuels in power generation will peak around 2025 and begin to slowly decline thereafter.
- Renewables will dominate capacity additions as falling technology costs drive investment into wind and solar even without additional low-carbon policy support. We expect fossil generation to fall from 66% to 44% by 2040.
- Such a high level renewables growth will cause global power sector emissions to decline – our forecast for power sector emissions is close to that modelled by the IEA in its 'New Policies Scenario'. This will be far from enough to keep the world on a 2°C pathway, however.
- The IPCC's carbon budget implies that power sector emissions will need to fall to below 2Gt/yr by 2040 –equivalent to the current emissions from coal and gas power plants in the US alone. Such a sharp drop appears unfeasible without widespread deployment of CCS technology.

BNEF GLOBAL POWER GENERATION FORECAST BY TECHNOLOGY, 2015-40 (TWH/YR)



BNEF EMISSIONS FORECAST FOR THE GLOBAL POWER SECTOR VS IEA SCENARIOS AND 2°C TRAJECTORY, 2015-40 (GTCO2E/YR)



Note: 2°C trajectory for the power sector is based on the IEA's interpretation of the remaining IPCC carbon budget for energy. The total budget attributable to power is estimated to be 211GtCO2e, which is mapped as an s-curve on the chart
BNEF forecasts are based on our New Energy Outlook analysis – see point 2.

Source: Bloomberg New Energy Finance

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