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DAILY BRIEF

Renewable energy capacity will rise with costs falling

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Fuelling spending on renewables, policymaking is addressing climate goals and the cost of renewable capacity is falling

Lazard Bank's latest annual Levelised Cost of Energy (LCOE) study shows the cost of renewable energy continues to fall. Governments are formulating their environmental policies in line with the Paris climate agreement and falling costs make renewables the cheapest option for new generating capacity. Solar and onshore wind are the cheapest forms of power generation and offshore wind is expected to be subsidy-free within five years.

What next

Ambitious near-term climate targets will accelerate the expansion of the wind and solar sectors. Governments will be keen to establish domestic supply chains for renewable energy technologies to boost employment. Fierce competition in the renewables sector will keep prices low but developers will remain attracted to the certainty that fixed-price long-term contracts provide. Policies to promote electrified transport and hydrogen production will support demand for clean electricity generation into the next decade.

Subsidiary Impacts

- The need to integrate rapid-response energy generation, and to meet new demand forms, will focus attention on boosting system flexibility.
- Fossil fuel demand for power generation is likely to peak early in countries seeking rapid energy transitions.
- Enhanced planning and staffing capabilities will be needed to encourage investment at the scale the renewable power sector will require.

Analysis

Renewable energy costs continue to tumble, although the rate of descent is levelling out as onshore wind and solar photovoltaic (PV) generation become increasingly mature. An auction in Portugal in August returned a record low bid of EUR11.14/megawatt hour (MWh) (USD13.23/MWh) for utility-scale solar PV capacity. Six winners provided a total of 670 MW from the 700 MW capacity on offer. Last year, Portugal auctioned 1,150 MW of capacity and received a then record low bid of EUR14.6/MWh.

Investment bank Lazard's latest report [https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2020/] on the LCOE, released in October, put the mid-point for utility-scale solar PV (crystalline) at USD37/MWh, a 90% reduction since 2009. The mid-point for onshore wind was USD40/MWh, 70% below 2009 levels.

Solar PV and onshore wind energy generation costs have fallen by 90% and 70% since 2009

Both technologies are substantially cheaper than Combined Cycle Gas Turbines (CCGT). Lazard put the CCGT range at USD44-USD73/MWh and coal-fired generation at USD65-USD159/MWh. The latter has seen costs rise by 1% since 2009, while CCGT costs have been fairly flat for the last five years.

A number of factors in addition to the low cost of electricity generation make renewable energy investment increasingly attractive:

- Renewable energy investments have high capital costs compared with operating costs, making them sensitive to interest rates which are currently very low and likely to remain so as central banks seek to support the global recovery.
- While some jurisdictions have reduced or removed subsidies for mature renewable energy technologies, most new projects continue to benefit from long-term fixed-price contracts for the power they generate. This provides investors with a reliable revenue stream, removing market risk.
- The adoption of net-zero carbon targets by 2050, or 2060 in the case of China, means that governments are highly likely to maintain constant long-term support for renewable energy capacity.
- Sustainable finance markets are growing, with global issuance of green, social and sustainability bonds rising to a record USD127.3bn in July-September 2020, a 30% increase quarter-on-quarter. Moody's ratings agency expects environmental, social and governance (ESG) bond issuance to approach USD425bn in 2020, from around USD300bn in 2019. Several governments, most recently Sweden, Germany and the United Kingdom, have issued or intend to issue green bonds (see INTERNATIONAL: Sustainable bond issuance will increase - August 27, 2020).

USD425bn

Moody's forecast for ESG bond issuance in 2020, sharply up from 2019

Manufacturing versus abatement

The achievement of net-zero carbon targets will require increased electrification in multiple sectors, particularly transport, industry and heating (see INT: Electricity use will redefine energy security - November 18, 2020). They also require the near total closure of all unabated fossil fuel generation.

Carbon Capture and Storage (CCS) technologies have not been tested on a sufficient scale and significant barriers remain for the next generation of projects being considered, for example, sharing long-term risks between the private and public sectors and other issues such as inconsistent international law on the cross-border movement of carbon dioxide.

Against the uncertainty of CCS, the decline in cost of solar and wind power support the belief that similar cost trajectories, based on scaled-up manufacturing capacity as much as improved efficiencies, can be achieved for electrolysers and other hydrogen technologies.

The reduction in costs for lithium-ion battery cells also supports this. According to IHS Markit, the average cost of Li-ion battery cell will fall below USD100 per kilowatt hour (kWh) in the next three years and to as low as USD73/kWh by 2030, having fallen by 82% from 2012 to 2020.

82%

Fall in cost of Li-ion battery cell, 2012-20

Nuclear

Nonetheless, most net-zero carbon scenarios, for example those developed by the International Energy Agency, assume that CCS will be required alongside renewables, hydrogen, nuclear power and negative or zero-emission technologies.

Abated gas use is seen at least as a necessary transition option, particularly to scale up hydrogen production.

This is renewing interest in nuclear power as a way of providing more bulk electricity generation as a counterweight to increased natural gas use for hydrogen. However, a nuclear revival in marketised electricity sectors looks problematic unless substantial government support is forthcoming.

This looks unlikely as the gap between nuclear and renewable energy costs is growing. According to Lazard's LCOE analysis, nuclear is the most expensive of the forms of electricity generation considered, with costs having risen by one-third from 2009 to 2020.

Almost alone amongst European countries, the United Kingdom made a commitment to new nuclear in its ten-point Green Package announced on November 17.

Biomass

Amid the renewable energy options, biomass is falling from favour. Although analyses differ, the Netherlands government's decision to phase out biomass from its generation mix reflects concern that the technology does not deliver significant greenhouse gas reductions over the required time-scale.

These concerns are likely to curtail new projects and curb the expansion of the wood pellet sector, although other biomass generation, for example from bagasse (the residue from sugar cane production) is likely to continue to expand.

This will pressure governments to ensure growth in the wind and solar sectors. In 2019, electricity generated from biomass accounted for one-third of renewable electricity generation in the United Kingdom and Italy and more than 20% in Germany.

Offshore wind

Offshore wind generation is increasingly seen as the answer to bulk electricity production. Costs remain higher than for onshore wind and solar but demonstrate a significant downward trajectory. Larger turbines, floating offshore wind concepts and cheaper installation and maintenance technologies offer further cost reductions.

High capacity factors for offshore wind power, a large technical resource and the increased variable baseload capacity provided by the geographic spread of installations make the technology an attractive option.

Lazard put the mid-point cost of offshore wind at USD86/MWh, down from USD113/MWh in its 2017 study. A July 2020 study by Imperial College London researchers found that, by 2025, offshore wind farms will, on average, be subsidy-free.

Almost all north European countries have ambitious offshore wind targets, notably the United Kingdom's 40 gigawatts (GW) by 2030 target. Rapid expansion appears certain, particularly following the US presidential election. Although the United States has only one small offshore wind farm in operation, its project pipeline is close to 30 GW.

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