

Solar, storage and wind can keep us on track as far as 2030



With solar and wind power already the cheapest source of new power generation across two-thirds of the globe, analysts at Bloomberg New Energy Finance (BNEF) have predicted Europe will lead the race to decarbonize its grid.

The authors of this year's *New Energy Outlook* report, published today, expect Europe to generate 92% of its electricity from renewables by 2050 thanks to carbon pricing and other supportive policies. The U.K. last week voiced a net zero carbon 2050 ambition and it is expected Ireland and the EU will follow suit in due course.

Power sector emissions in China, however, are not set to peak until 2026 – thanks to an extensive modern coal power fleet – although they are expected to decline by more than half in the subsequent 20 years. That is in part because of an anticipated

rise in demand for electricity of more than 50% by 2050, with Asia due to present a \$5.8 trillion power demand market – more than half the global figure during that period – and India and China alone a \$4.3 trillion opportunity.

The U.S. will also lag behind Europe when it comes to decarbonization, according to the annual study, which is based on analysis of the costs of competing energy technologies. Renewables will more than double their contribution to the U.S. energy mix, to 43% in 2050, but will have to compete with abundant natural gas in a \$1.1 trillion new energy capacity market.

Renewables are the big winner

Despite the prevalence of natural gas in the U.S., the *New Energy Outlook 2019* study predicts that as an energy source, gas will occupy roughly the same share of the market in 2050 as it does today, as will hydropower and nuclear. Oil will have disappeared as a source of energy by mid century, added the BNEF report, and coal – which supplies 37% of power generation today – will have been reduced to a 12% slice of the pie.

Renewables, helped by lithium-ion battery storage will fill the void, according to BNEF, with a rise from 7% of power generation today to 48% by 2050.

That is down to an estimation price reductions in solar, energy storage and wind technologies will continue at rates of 28%, 18% and 14%, respectively, for every doubling in installed capacity. If those predictions are borne out, renewables will supply and store more energy than coal and gas “almost everywhere” by 2030, stated the report.

The good news is that would ensure the world stays on track for global heating of less than two degrees Celsius by 2050 up to the year 2030, without the need for any new public money incentives for renewables in the next 15 years. Beyond that

point, however, new technologies would be required as renewables could top out at contributing 80% of energy generation in many countries by 2050.

New solutions needed

That would mean innovations and alternative solutions such as nuclear, biogas-to-power, green hydrogen-to-power and carbon capture and storage would need to be rolled out after 2030, which in turn would require significant spending on R&D before that point.

One other requirement needed to keep us on track as far as 2030 would be for power markets to be reformed to correctly acknowledge, and reward, the role played by renewables and storage in helping the grid.

In a press release issued to publicize today's BNEF report – which also considers the potential carbon savings to be made in a world with fully electrified transport and building heating – the organization's head of energy economics Elena Giannakopoulou stated: “[The] NEO [*New Energy Outlook*] is fundamentally policy agnostic but it does assume that markets operate rationally and fairly to allow lowest cost providers to win.”

Therein lies the rub, perhaps.

Renewable Power Generation Costs in 2018



Renewable energy has become an increasingly competitive way to meet new power generation needs. This comprehensive cost study from the International Renewable Energy Agency (IRENA) highlights the latest trends for each of the main renewable power technologies.

Released ahead of high-profile United Nations energy and climate discussions, Renewable Power Generation Costs in 2018 draws on cost and auction price data from projects around the world.

[Download the chart data](#)

Costs from all commercially available renewable power generation technologies declined in 2018. The global weighted-average cost of electricity declined 26% year-on-year for concentrated solar power (CSP), followed by bioenergy (-14%), solar photovoltaic (PV) and onshore wind (both -13%), hydropower (-12%), geothermal and offshore wind (both -1%), the report finds.

Continuing cost declines, meanwhile, underline renewable power as a low-cost climate and decarbonisation solution. Within IRENA's global database, over three-quarters of the onshore wind and four-fifths of the utility-scale solar PV project

capacity due to be commissioned in 2020 should provide lower-priced electricity than the cheapest new coal-fired, oil or natural gas option, the report notes.

Among other findings:

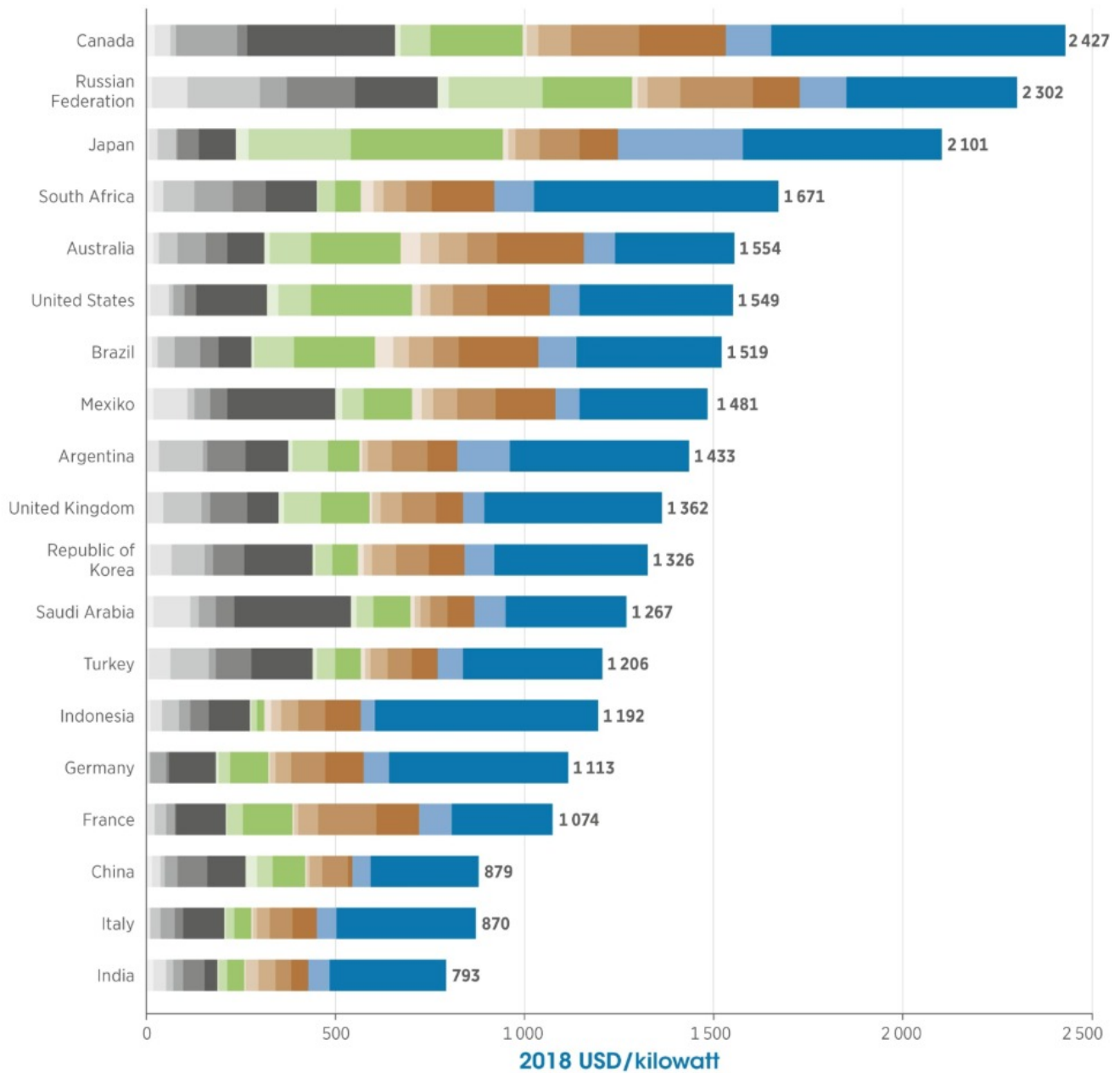
- Onshore wind and solar PV power are now, frequently, less expensive than any fossil-fuel option, without financial assistance.
- New solar and wind installations will increasingly undercut even the operating-only costs of existing coal-fired plants.
- Low and falling technology costs make renewables the competitive backbone of energy decarbonisation – a crucial climate goal.
- Cost forecasts for solar PV and onshore wind continue to be revised as new data emerges, with renewables consistently beating earlier expectations.

Along with reviewing cost trends, the report analyses cost components in detail. The report draws on IRENA's cost database of around 17 000 renewable power generation projects and 9 000 auction and power purchase agreements for renewable power.

Sample figure

Utility-scale solar PV:

Total installed costs in 2018 by component and country



Soft costs

- Margin
- Financing costs
- System design
- Permitting
- Incentive application
- Customer acquisition

Installation

- Mechanical installation
- Electrical installation
- Inspection

Hardware

- Modules
- Inverters
- Racking and mounting
- Grid connection
- Cabling/wiring
- Safety and security
- Monitoring and control

IEEFA report: Advances in electricity storage suggest rapid disruption of U.S. electricity sector



Institute for Energy Economics
and Financial Analysis
IEEFA.org

June 14, 2019 (IEEFA) – Momentum is gaining around an industry shift toward utility-scale battery storage systems nationally, finds a report published today by the Institute for Energy Economics and Financial Analysis (IEEFA).

The report – Advances in Electricity Storage Suggest Rapid Disruption of U.S. Electricity Sector –details upstart storage and storage-expansion projects in Arizona, California, Hawaii, Florida, Massachusetts, New Hampshire, Nevada, Texas, and Vermont.

Dennis Wamsted, an IEEFA editor/analyst and lead author of the report, said recent evidence of utility-scale storage adoption is most likely the beginning of a trend that will take hold broadly across the industry, benefitting renewables at the expense of gas- and coal-fired plants.

“Bigger changes loom,” Wamsted said. “In the many examples we researched, each project, by and large was driven by one of several value streams—cutting transmission charges, providing grid resilience, offering peak power, allowing for early plant closures and the like—even if other benefits were accrued too.”

The report details dozens of examples of electric companies large and small finding an assortment of cost savings in electricity-storage technology and portability.

“Installation is still tiny in terms of absolute numbers, but power storage is now ubiquitous and energy storage is no longer a pie-in-the sky proposition,” Wamsted said. “These changes are taking place today.”

Excerpts from the report:

- Battery storage in combination with solar can be used to facilitate closure of coal and natural gas plants currently being used largely for peaking or seasonal needs, as shown by the NV Energy decision to close the North Valmy coal plant in Nevada, and by Florida Power and Light’s’s plan to shut two aging natural gas units in Florida.
- Battery storage can be used to meet system peak needs, as SCE is doing in California in replacing the two-unit Mandalay natural gas peaker plant.
- Battery storage can be used to provide firm renewable power, as both Arizona Public Service and Hawaiian Electric are demonstrating with projects they have named, respectively, “Solar after Sunset” and “Renewable Dispatchable Generation.”
- Battery storage offers utilities significant opportunities to boost system resilience and cut costs at the same time, as is being demonstrated in a number of other projects highlighted in the report.
- Battery storage can be used to enable more residential

solar systems to be installed on local distribution lines without requiring potentially costly and time-consuming system upgrades, as can be seen in an existing program in Vermont and in one being proposed in New Hampshire.

- Battery storage can be used to improve the economics of existing utility-scale solar generation, as can be seen in the discussion about Vistra's battery storage retrofit at a Texas PV plant.

Wamsted said economies of scale will help drive the expansion of utility-scale battery storage, as will a growing recognition by utility companies of the business case for embracing the shift: "It is likely that developers and utilities will be able to stack these benefits, making storage even more economically competitive."

Full report: Advances in Electricity Storage Suggest Rapid Disruption of U.S. Electricity Sector

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About IEEFA

The Institute for Energy Economics and Financial Analysis (IEEFA) conducts global research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy.