

Global Trends in Renewable Energy

Australian Clean Energy Summit, 2018

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31 July 2018

Analysis to help you understand the future of energy and industry

Clean energy



Solar Wind Storage Decentralized energy Frontier power Impact on power & utilities

Commodities



LNG & gas Oil & products Power Carbon

Advanced transport



Electrified transport Autonomous driving Shared mobility Impact on transport Impact on oil & power

Digital industry



Internet of things Automation & advanced analytics Advanced materials Impact on industrials and energy

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Global trends in (renewable) energy

Declining costs

Digitalization

Decentralization

Decarbonization

Maintaining
reliability

Electrification of
mobility

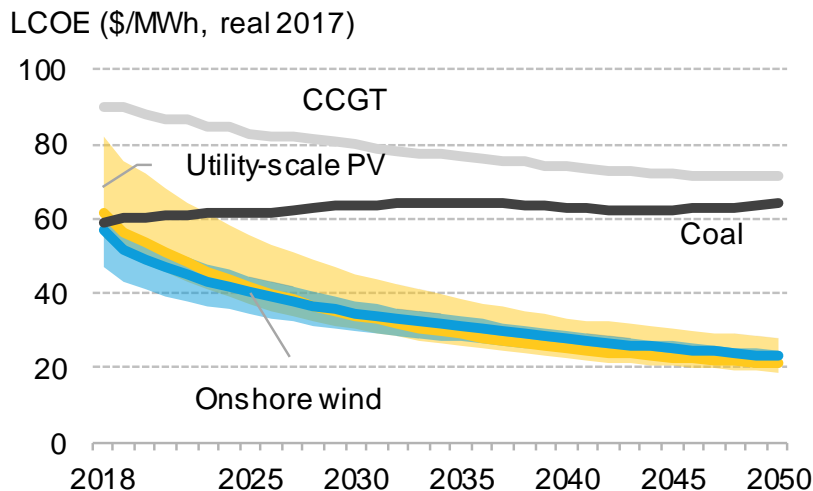
Corporate
procurement

Investor risk
management

Source: BloombergNEF

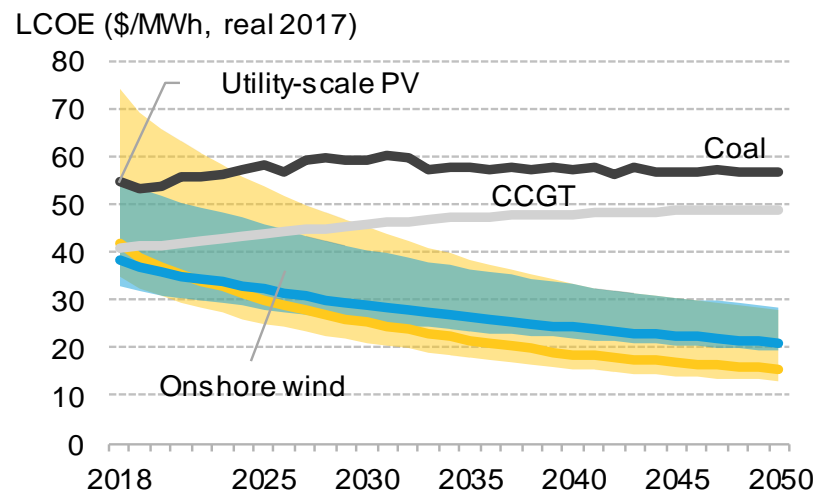
Declining costs: wind and solar are the cheapest forms of bulk generation

China



Source: BloombergNEF Note: PV capacity factors in China: 12%-18% in 2018, onshore wind 23%-32%. Coal and gas plants LCOEs include a carbon price.

U.S.

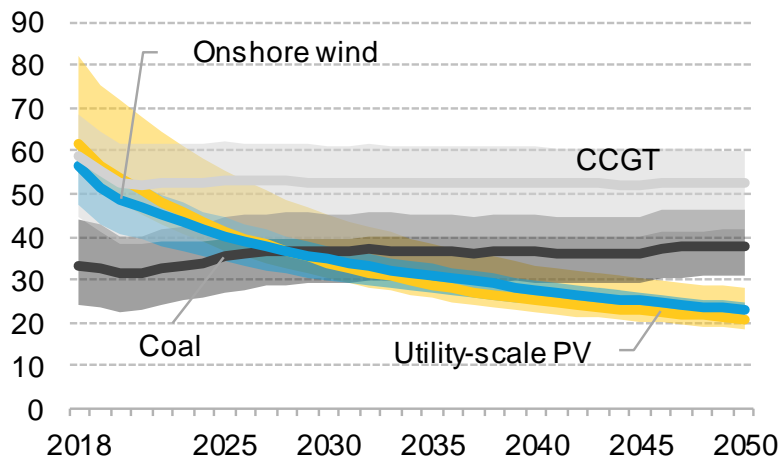


Source: BloombergNEF Note: the PV LCOE is for a tracking PV system. PV tracking capacity factors in the US: 14%-30% in 2018 and onshore wind: 29%-49% in 2018.

...and will become cheaper than operating existing coal or gas

China

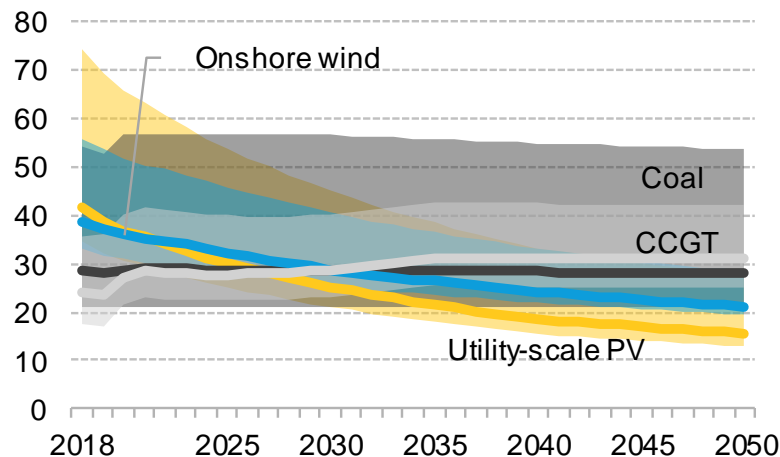
LCOE vs running costs (\$/MWh, 2017 real)



Source: BloombergNEF Note: PV capacity factors in China: 12%-18% in 2018, onshore wind 23%-32%.

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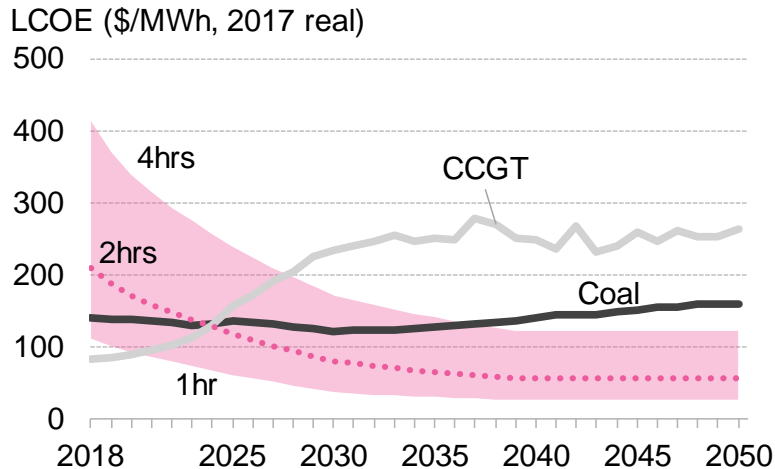
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Batteries are also becoming the cheapest source of flexibility

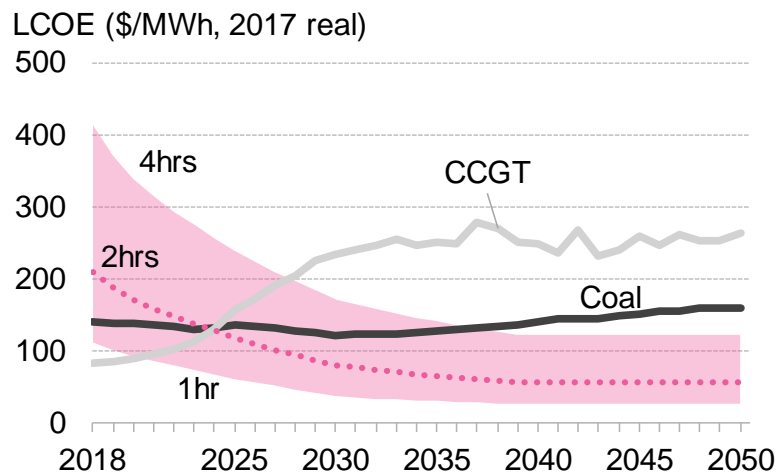
Utility-scale battery LCOE charging from existing plants vs new CCGT and coal plants: Australia



Source: BloombergNEF Note: Charging costs are assuming drop from 60% of the wholesale price today to zero in 2030.

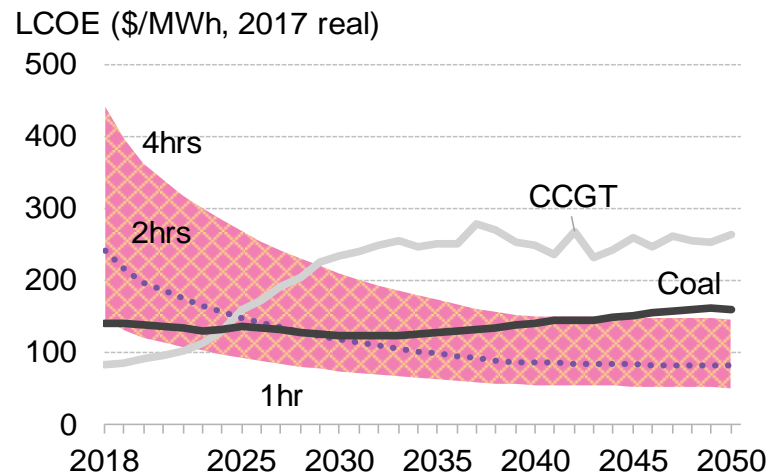
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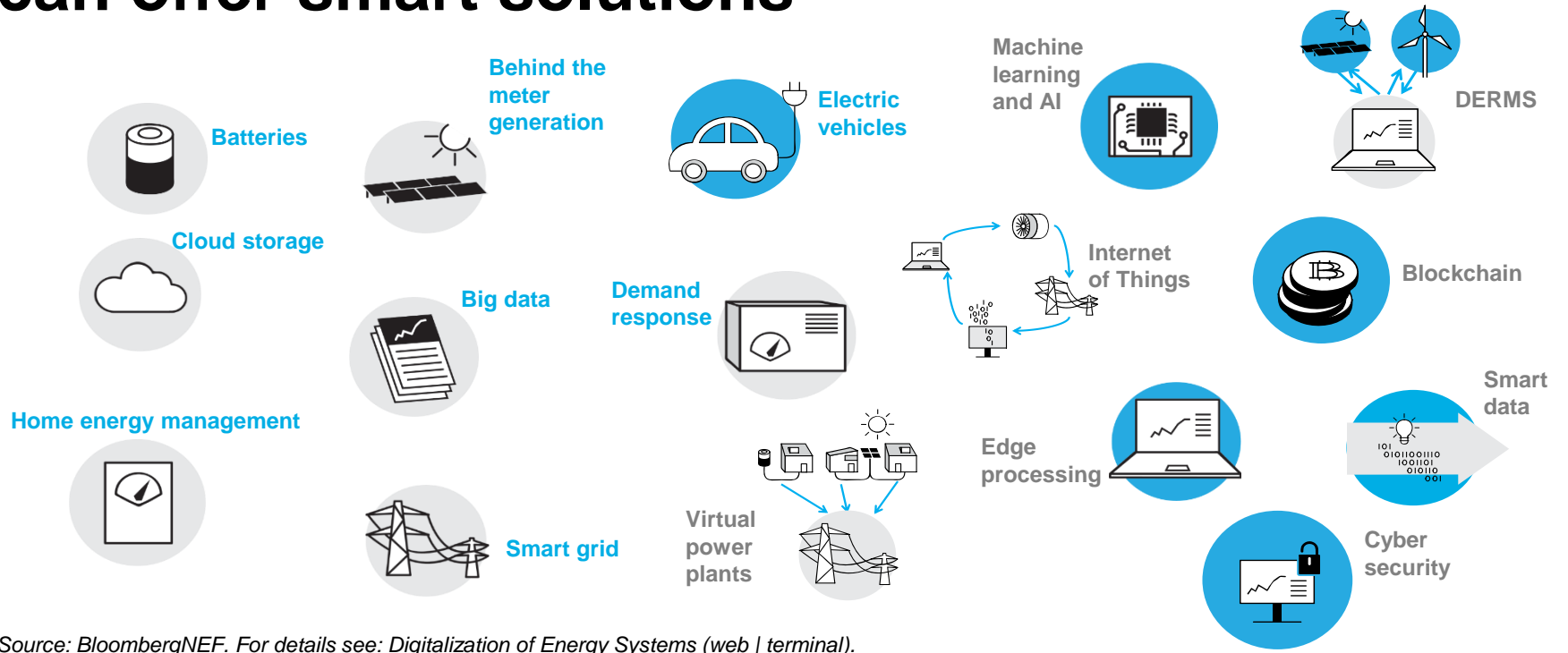
Source: BloombergNEF Note: Charging costs are assuming drop from 60% of the wholesale price today to zero in 2030.

Utility-scale battery LCOE charging from a new PV plant vs. new CCGT and coal plants: Australia



Source: BloombergNEF. For details see: [New Energy Outlook 2018 \(web / terminal\)](#).

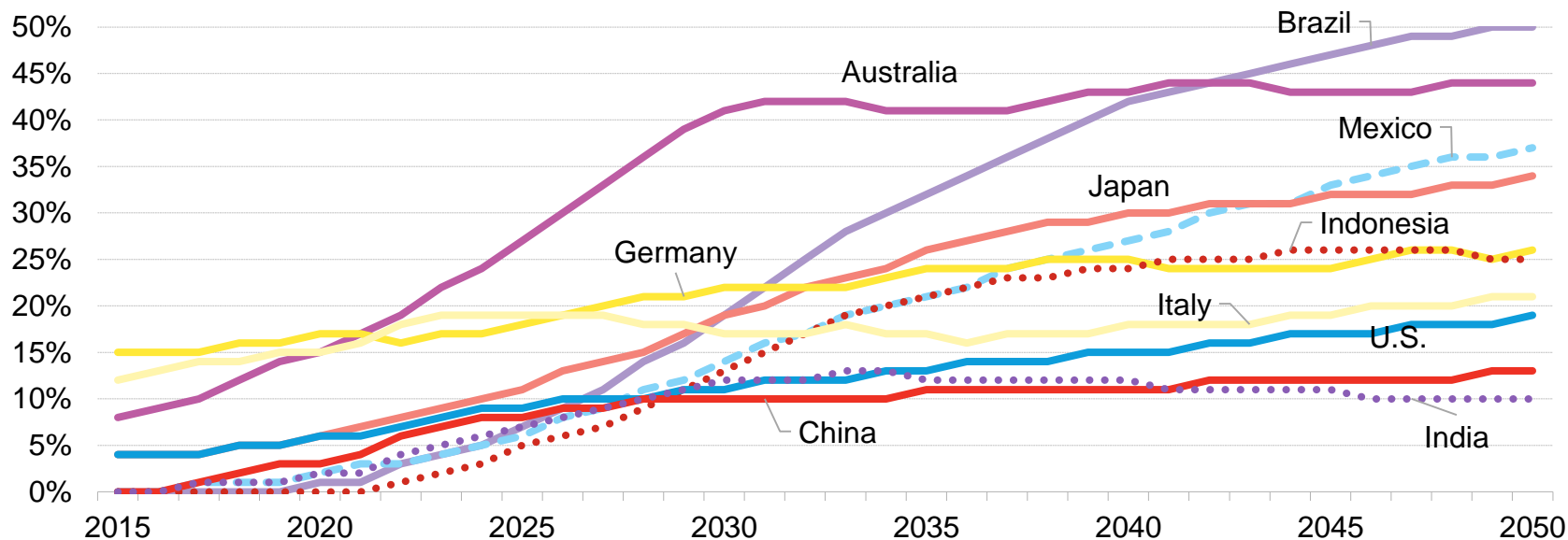
Digitalization: new technology can offer smart solutions



Source: BloombergNEF. For details see: *Digitalization of Energy Systems* ([web](#) | [terminal](#)).

Decentralization: is coming to a country near you

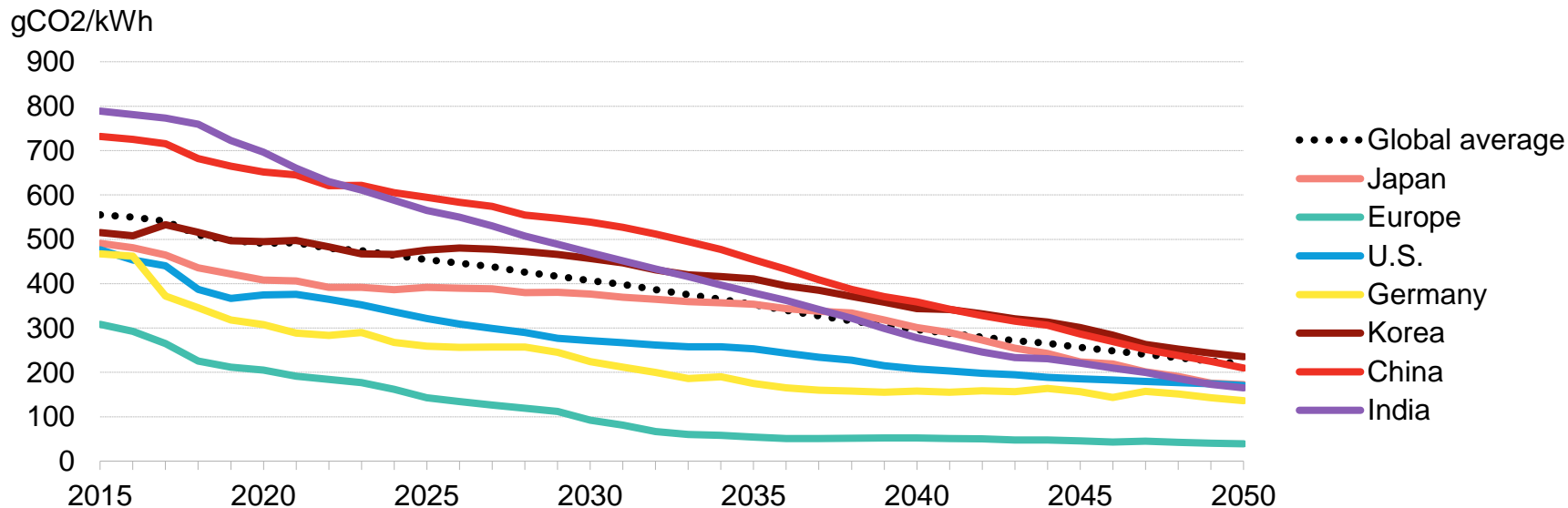
Decentralization ratio of selected countries



Source: BloombergNEF. For details see: *New Energy Outlook 2018* ([web](#) | [terminal](#)).

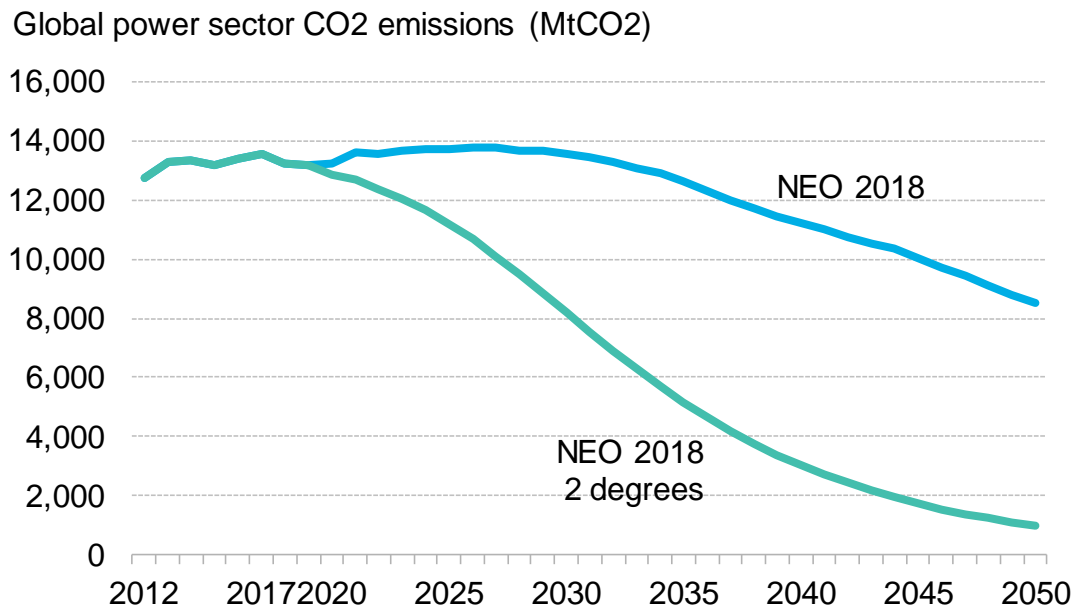
Decarbonization: is happening slowly but surely

Emissions intensity of electricity generation, by country



Source: BloombergNEF. For details see: *New Energy Outlook 2018* ([web](#) | [terminal](#)).

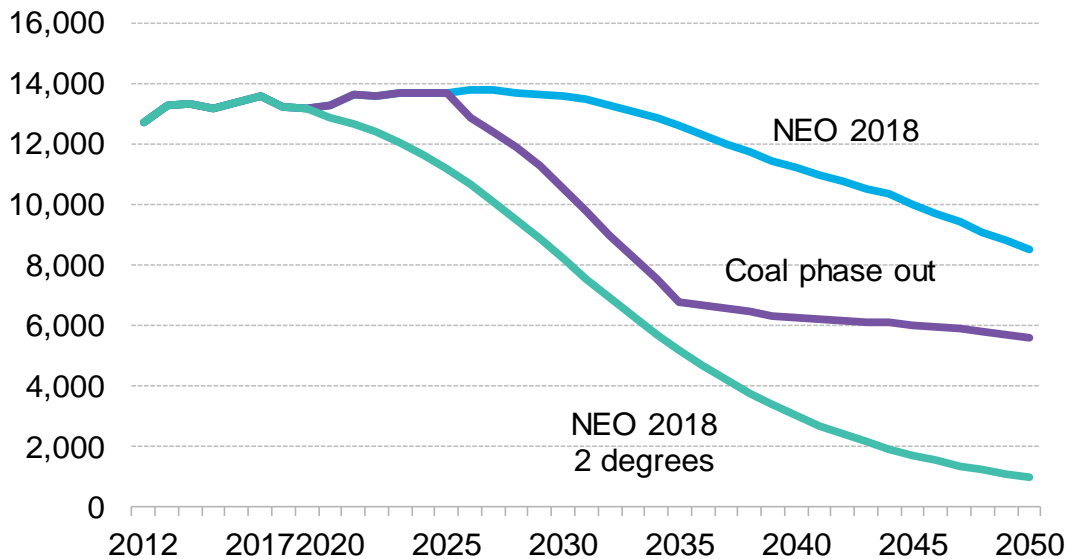
...but needs to happen faster



Source: BloombergNEF. For details see: *New Energy Outlook 2018* ([web](#) | [terminal](#)).

...phasing out coal alone won't get us there

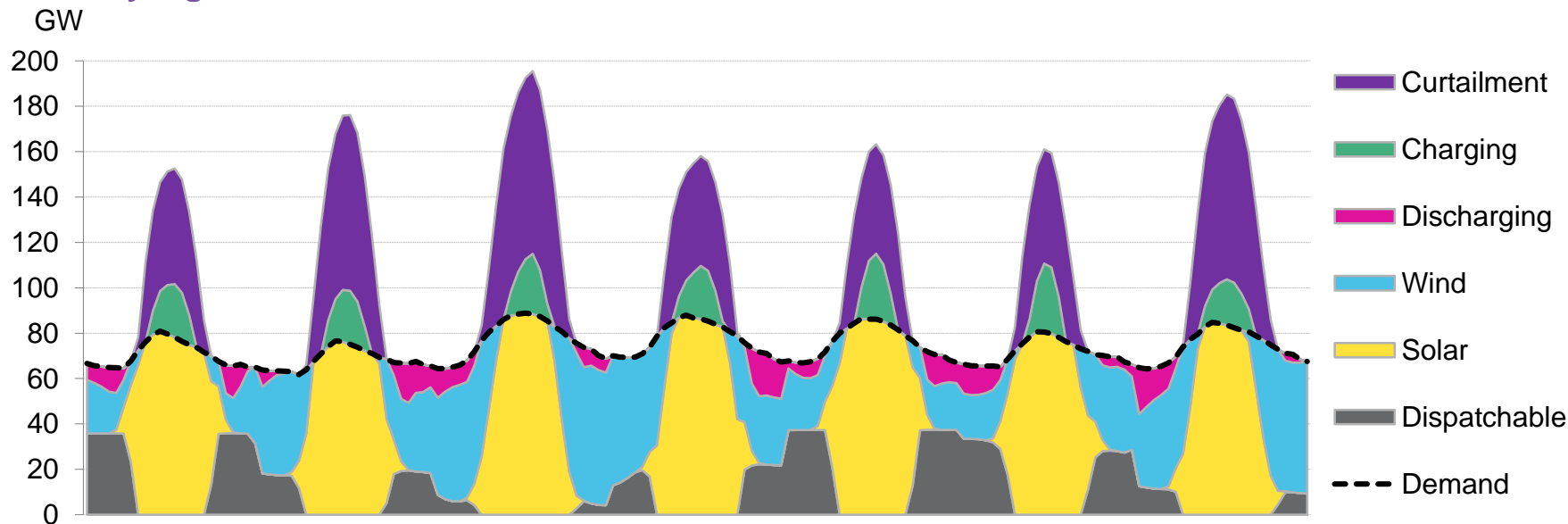
Global power sector CO2 emissions (MtCO2)



Source: BloombergNEF. For details see: *New Energy Outlook 2018* ([web](#) | [terminal](#)).

Maintaining reliability: is a key global challenge

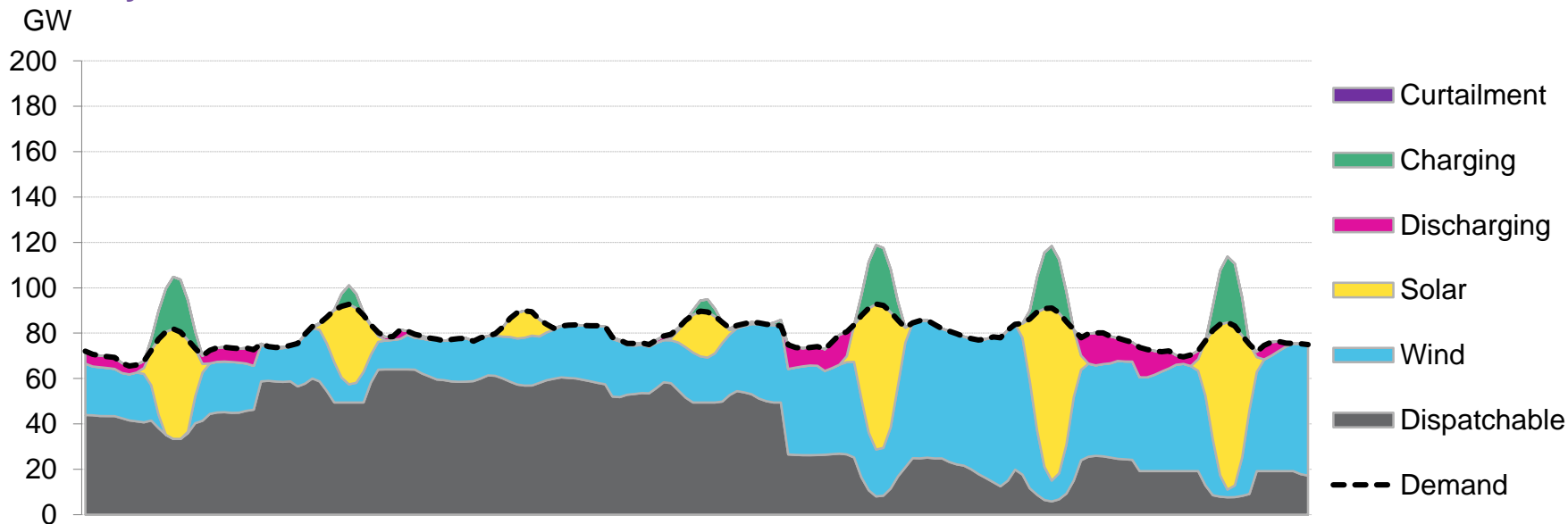
Germany high renewables week: 2035



Source: BloombergNEF. For details see: [New Energy Outlook 2018 \(web | terminal\)](#).

...which batteries alone cannot solve

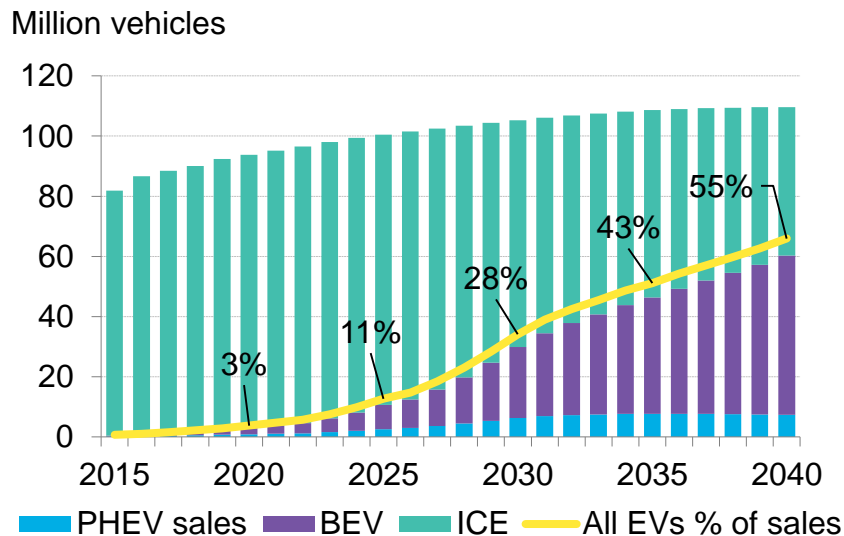
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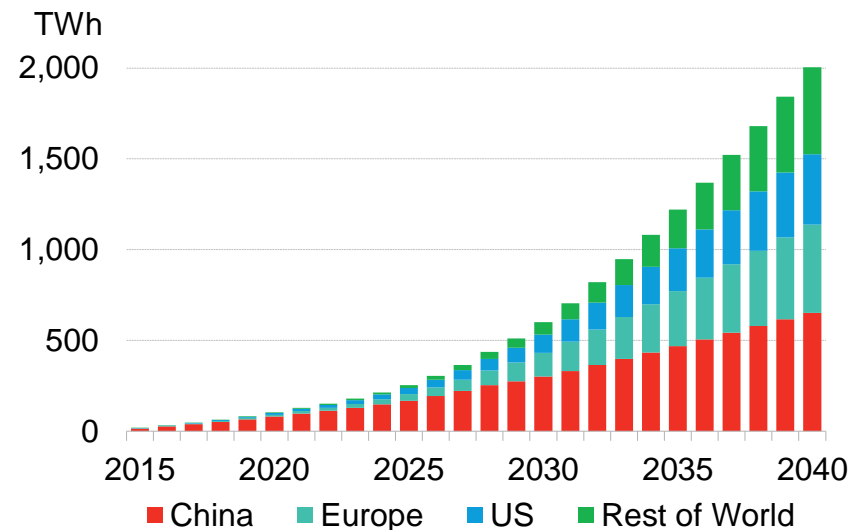
Source: BloombergNEF. For details see: *New Energy Outlook 2018* ([web](#) | [terminal](#)).

Electrification of mobility: is the clear direction of travel

Global light duty vehicles sales



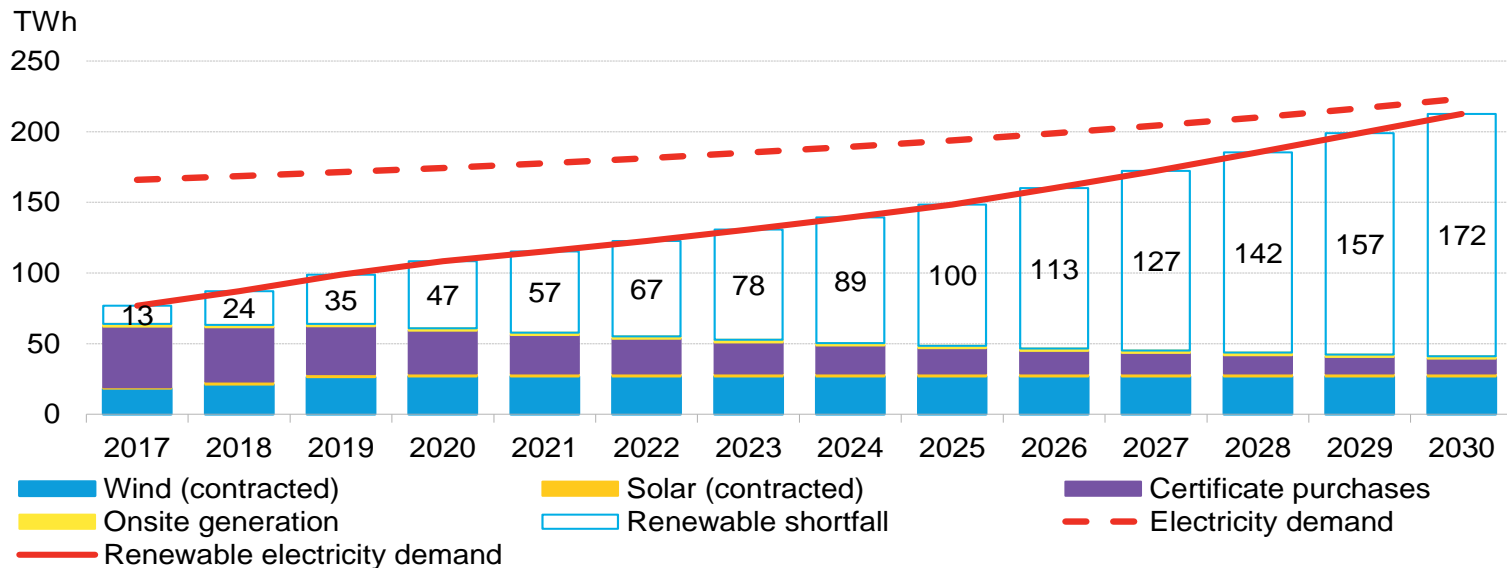
Electricity consumption from light-duty EVs and e-buses



Source: BloombergNEF. For details see: *Long-Term Electric Vehicle Outlook 2018* ([web](#) | [terminal](#)).

Corporate procurement: is creating additional demand

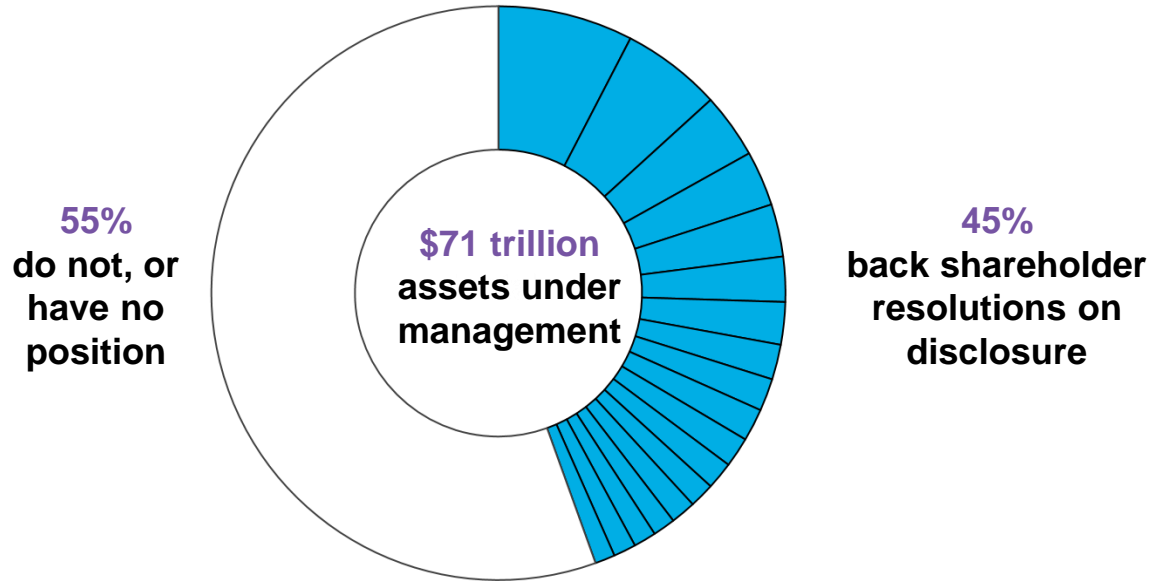
Projected global renewable electricity shortfall for RE100 member companies



Source: BloombergNEF, Bloomberg Terminal, The Climate Group, company sustainability reports

Investor risk management: pushing capital towards clean

Asset managers as a percentage of all assets under management



Source: Bloomberg Gadfly, as of June 2017

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Source: BloombergNEF

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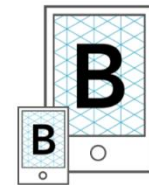
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