Energy Transition – The Role of Energy Statistics and Indicators





Amy Gasca Manager, Americas Power Pricing IV Semana de la Energia – Lima, Peru November 11-14, 2019



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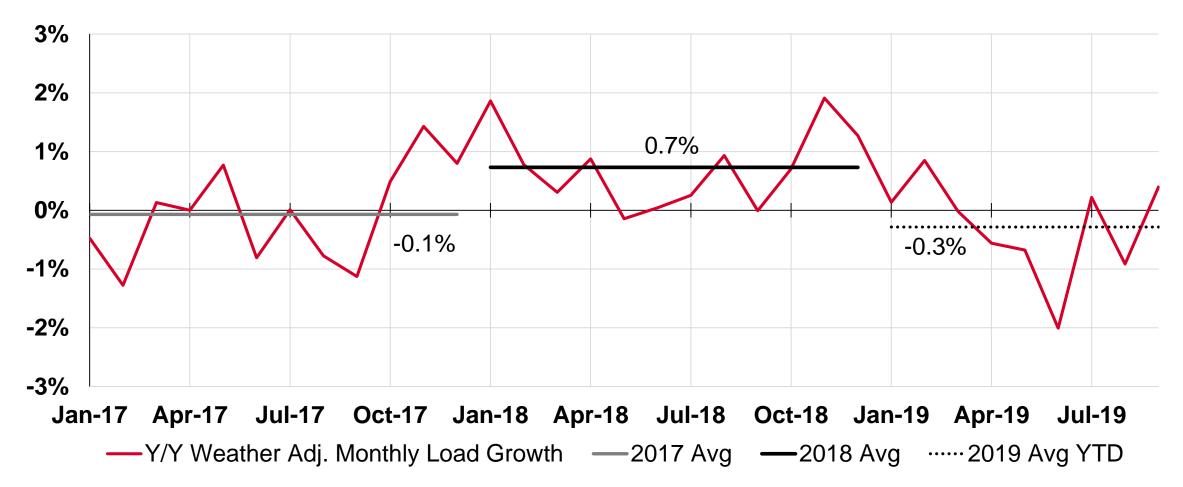
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The energy transition has become an increasingly important driver of energy and commodity markets. The power generation industry is clearly going through a profound transformation across the globe

5 Key statistics and indicators that drive Power Transition

- a. Demand & Supply
- b. Price Divergence
- c. Policy
- d. Technology & Energy Efficiencies
- e. Consumers

Demand: U.S. load grew up in 2018; YTD 2019 growth slower



Source: Platts Analytics (Monthly Load Report)

Recent results have confirmed this slowdown in load growth; trade issues and strong dollar as macro causes

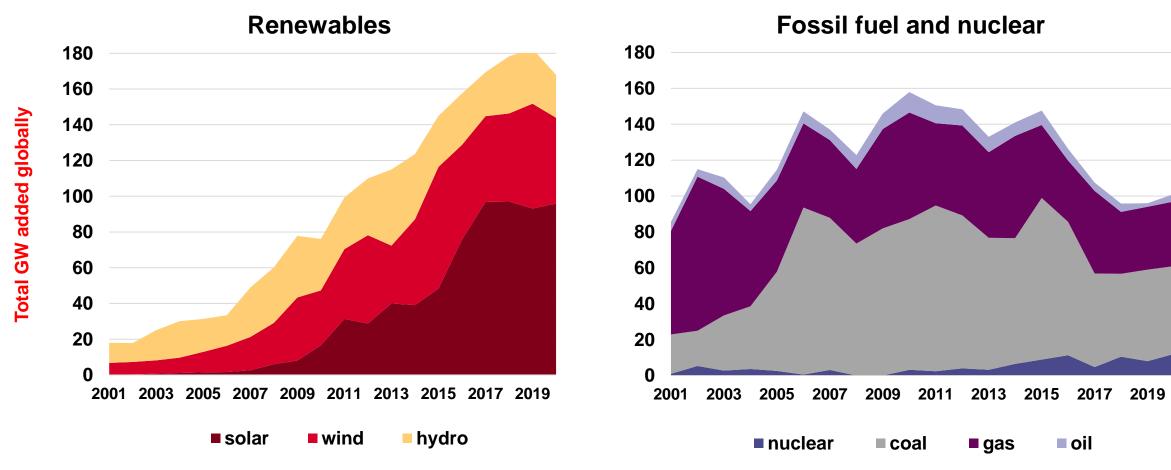
AEP: "..Industrial sales decreased by 2.7% for the quarter, which brought the year-to-date comparison down to 1.5% below last year. Sales to the industrial class have been slowing in recent quarters as the impact of a strong dollar and more restrictive trade policy have challenged export manufacturers within AEP's footprint..."

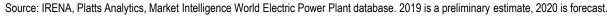
AEP: "...commercial sales decreased by 0.9% for the quarter and were down 1.3% year-to-date. For both comparisons, <u>commercial sales were down</u> <u>across all operating companies. The tightening</u> <u>labor market and rising interest rates have limited</u> <u>this sector's growth in recent quarters..."</u> Southern Co.: "... <u>weather-adjusted retail electric</u> <u>sales were down</u> just over 1% year-over-year due to a combination of factors, including continued energy efficiency and technology advances across all customer segments and <u>continued weakness in</u> industrial sales..."

"...Industrial sales, particularly primary metals, chemicals and stone, clay and glass were down due to global trade concerns and a strong dollar's impact on trade as well as changes in production levels..."

Ameren: "...Kilowatt-hour sales to low margin Missouri industrial customers decreased 2.5% after excluding the effects of our energy efficiency plan..."

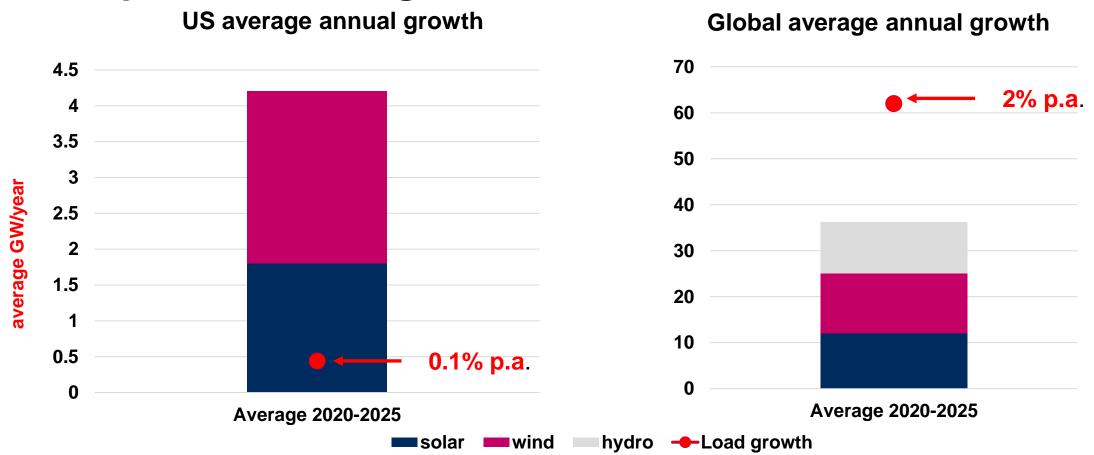
Supply Mix: Power transition: renewables additions slowing, but outpace fossil fuel new builds







S&P Platts Analytics is forecasting that renewables generation growth will exceed load growth in US, but about half of global annual power demand growth



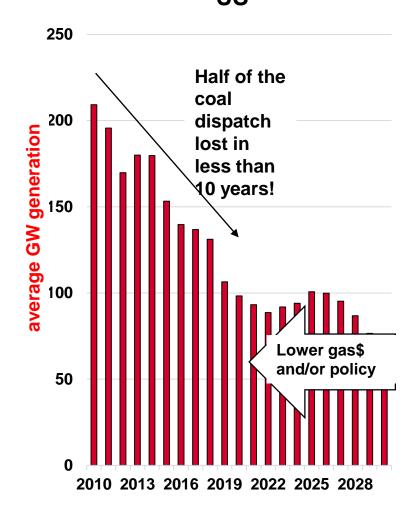
Source: Platts Analytics World Energy Demand, Platts Analytics North American Power Service. DG solar not included in US generation view.



Price Divergence === Lower Consumer Prices === Clean Energy

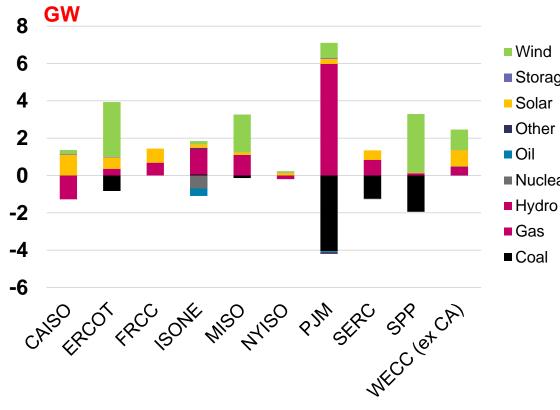
- Plunging Prices means development of New Renewable Energy Is Cheaper Than Running Existing Coal and Fossil Fuels
- 42% of global coal capacity is currently unprofitable
- Across USA Costs changes from 2009:
 - Solar photovoltaic (PV) lower by 88%
 - Wind costs lower by 69%
 - Coal decreased just less than 9%
 - Nuclear increased by 23%

Even without subsidies, renewable energy costs are now lower than the marginal cost of conventional energy technologies.

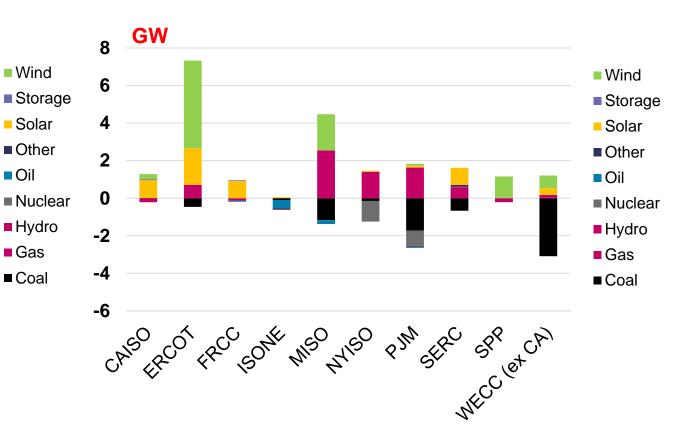


More Renewables; Coal and nuclear generation continue to retire





Next 12 months



Source: Platts Analytics (September 2019 Short Term Forecast)

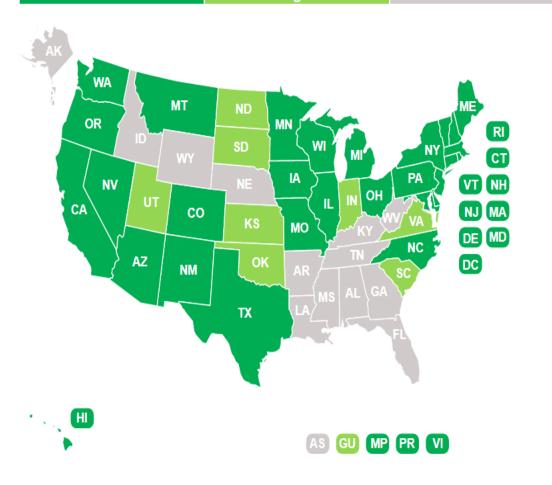


Policy Across North America

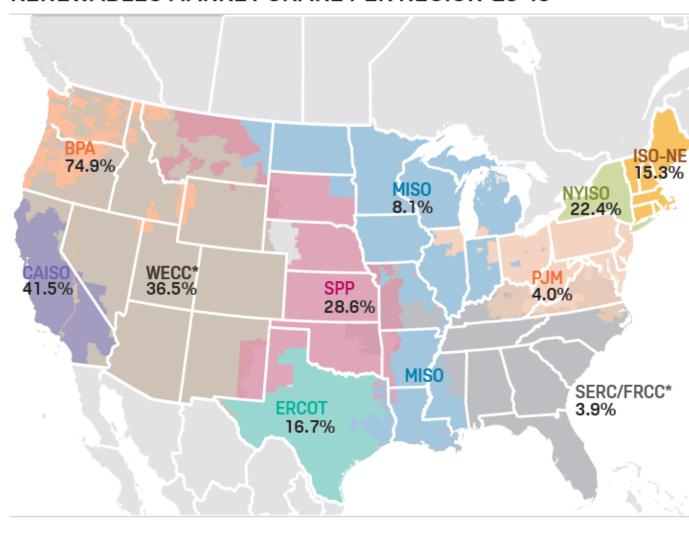
States and territories with Renewable Portfolio Standards

States and territories with a voluntary renewable energy standard or target

States and territories with no standard or target



RENEWABLES MARKET SHARE PER REGION Q3-19





Major transformation taking place in global power, with a number of key issues driven by Policy such as:

- Renewables growth impacted by policy uncertainties and step-down of incentives, but solid pipeline of projects in US
 - Declining PV module prices continue to push solar PPAs to record low levels
 - US will see strong onshore wind additions in the short-term. Growing interest in offshore wind, but uncertain timing. Limits to onshore developments emerging in more mature markets (e.g. Germany).
 - Renewables output growth exceeds load growth in US, but <u>below power demand growth globally</u>
- Nuclear: new builds and restarts underpin nuclear generation in Asia, but retirements looming in US/Europe, absent further policy action
- Gas to benefit from <u>large</u> coal retirements, but with lingering questions:
 - What will trigger further coal retirements? Policy (climate change/air quality concerns) or market drivers?
 - Emerging cheap(er) alternatives

Technology & Energy Efficiencies

Shift of power generation sources

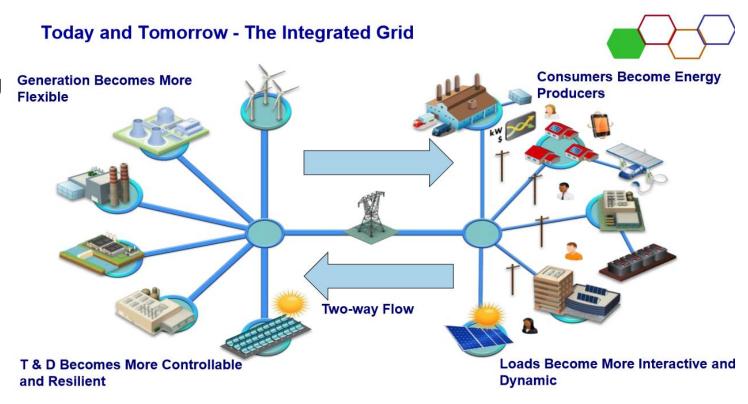
- Coal to natural gas (short term)
- Aggressive renewable growth
- Natural gas to sustainable hydrogen (long term)

Efficient energy management

- Electricity storage for fluctuating renewables- batteries
- Smart grid technology for demand response

Improved energy efficiency

- Efficient use of energy
- Power-to-X to decarbonize other Sectors such as transportation, Industry, etc.)

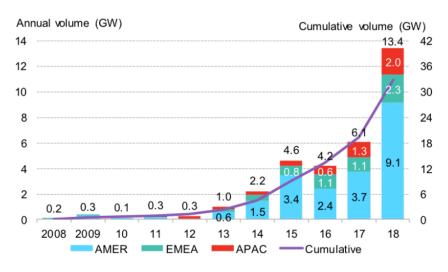


Consumers

Corporations more than doubled commitment to renewable energy in 2018 and expected to increase in 2020-2025



Global corporate PPA volumes



Source: BloombergNEF. Note: Data in this report is through 2018. Onsite PPAs not included. Australia sleeved PPAs are not included. APAC number is an estimate. Premarket reform Mexico PPAs are not included. These figures are subject to change and may be updated as more information is made available.

Thank you!

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