



Covid-19 & the U.S. Nuclear Energy Supply

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Great Lockdown – worst downturn since the great recession in 2009

(IMF, 2020)

Economic
near stand
still in many
sectors of the
economy

- * Travel bans
- * Stay at home orders
- * Business closures
- * Plant closures etc...
- * Disrupted supply chains

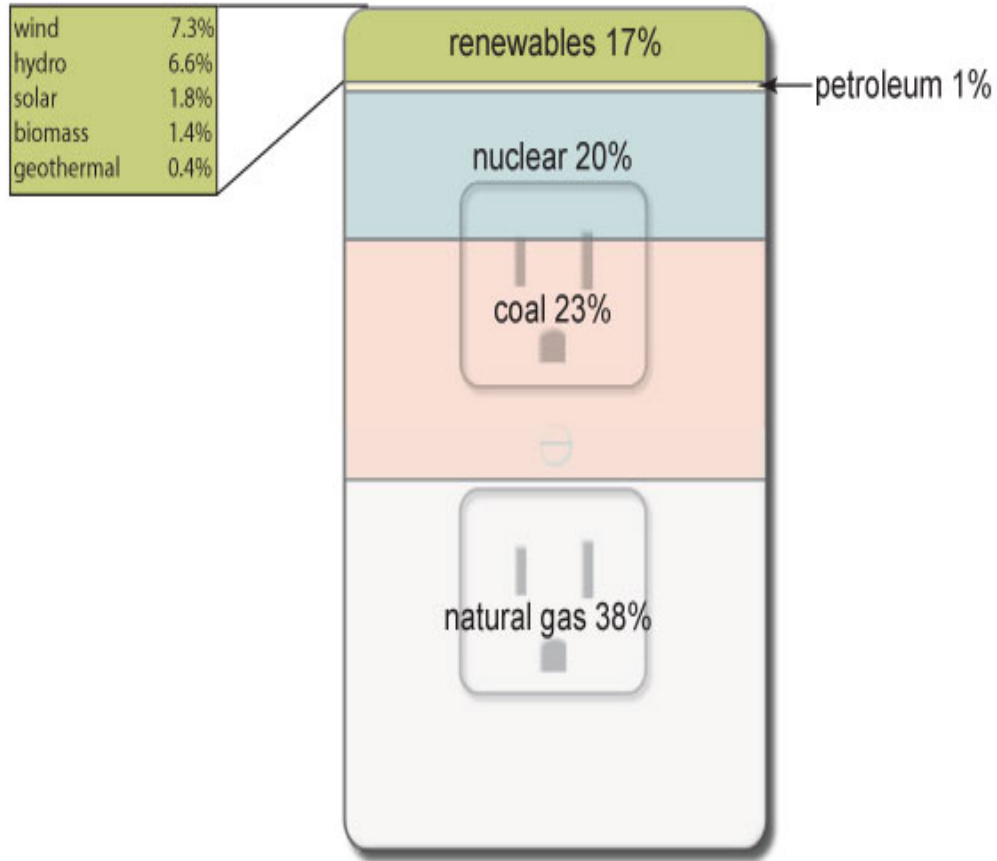
Revised economic growth
forecasts for 2020

- World: -3% (+3.3%)
- U.S.: -5.9% (+2%)
- EU: -7.1% (+1.3%)
- China: +1.2% (+6%)

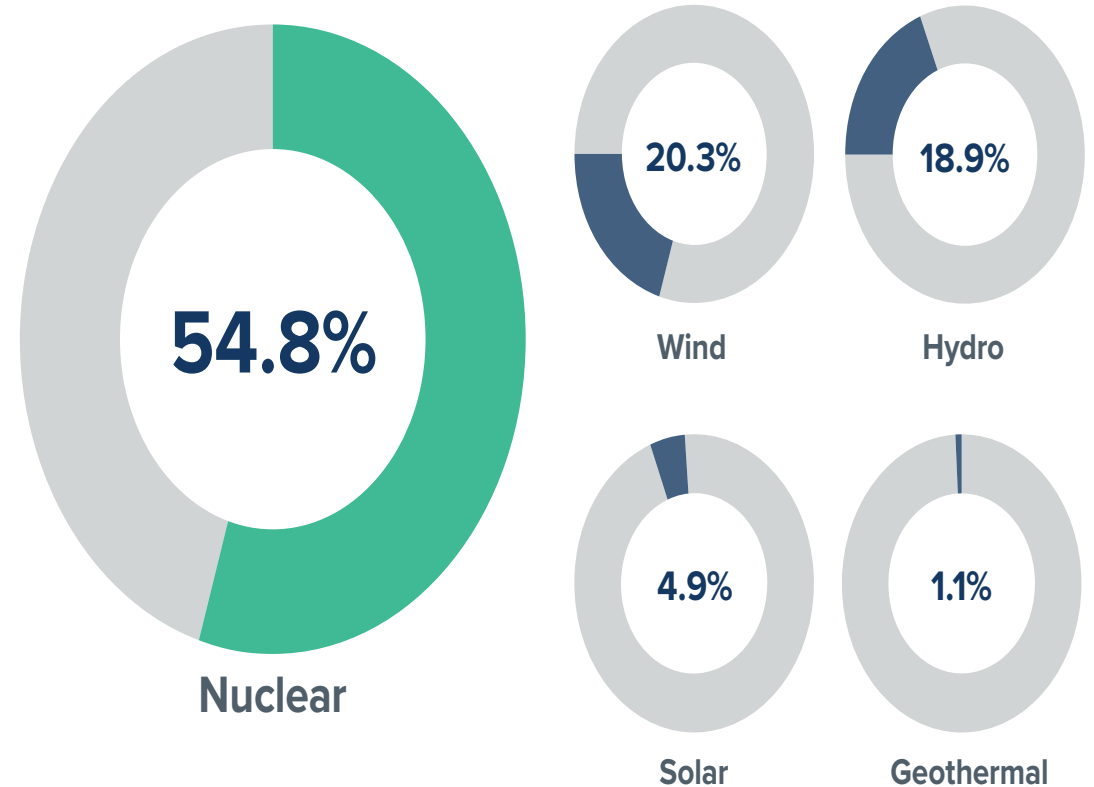
U.S. Nuclear Power – Some Facts

Sources of U.S. electricity generation, 2019

Total = 4.12 trillion kilowatthours



About 55% of emissions free electricity comes from nuclear (NEI, 2020)

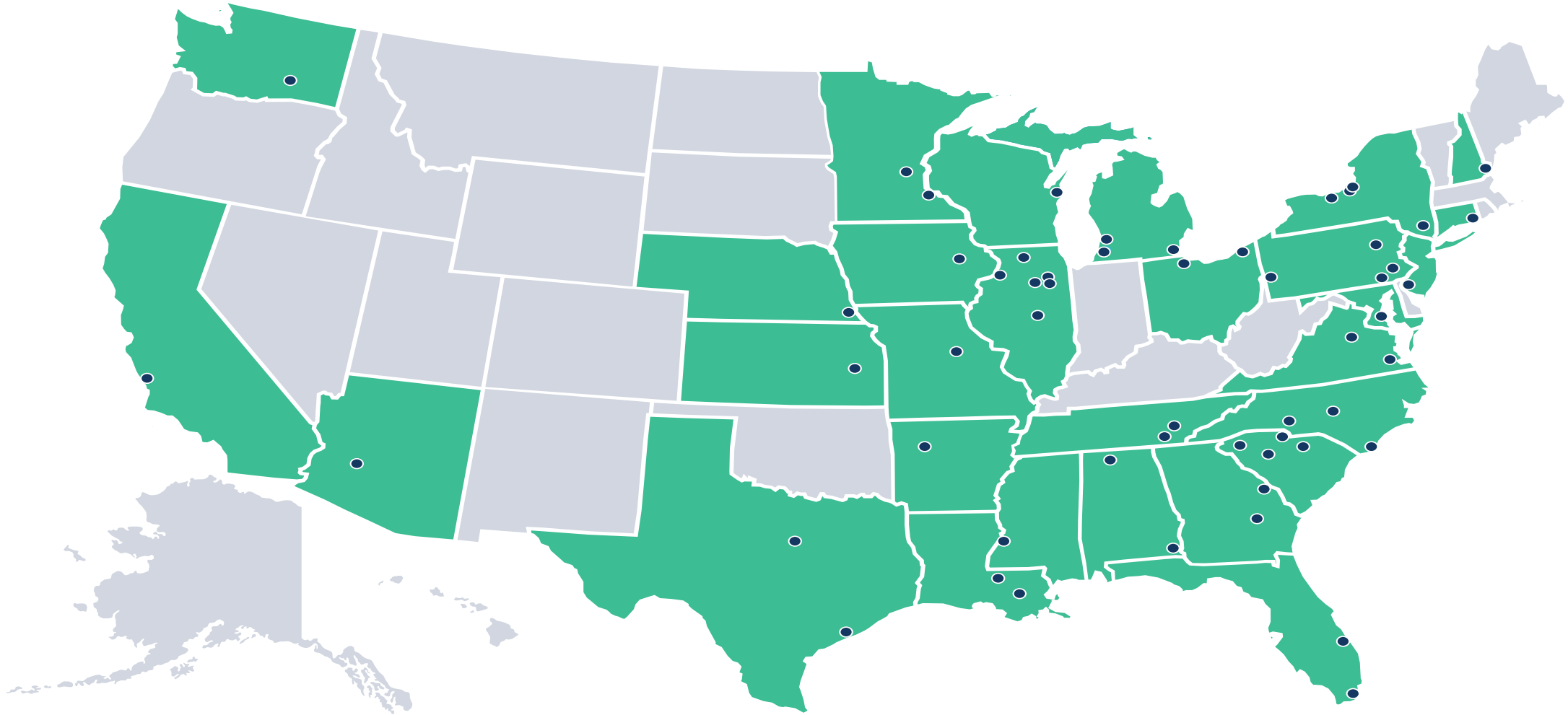


Note: Electricity generation from utility-scale facilities. Sum of percentages may not equal 100% because of independent rounding.

Source: U.S. Energy Information Administration, *Electric Power Monthly*, February 2020, preliminary data



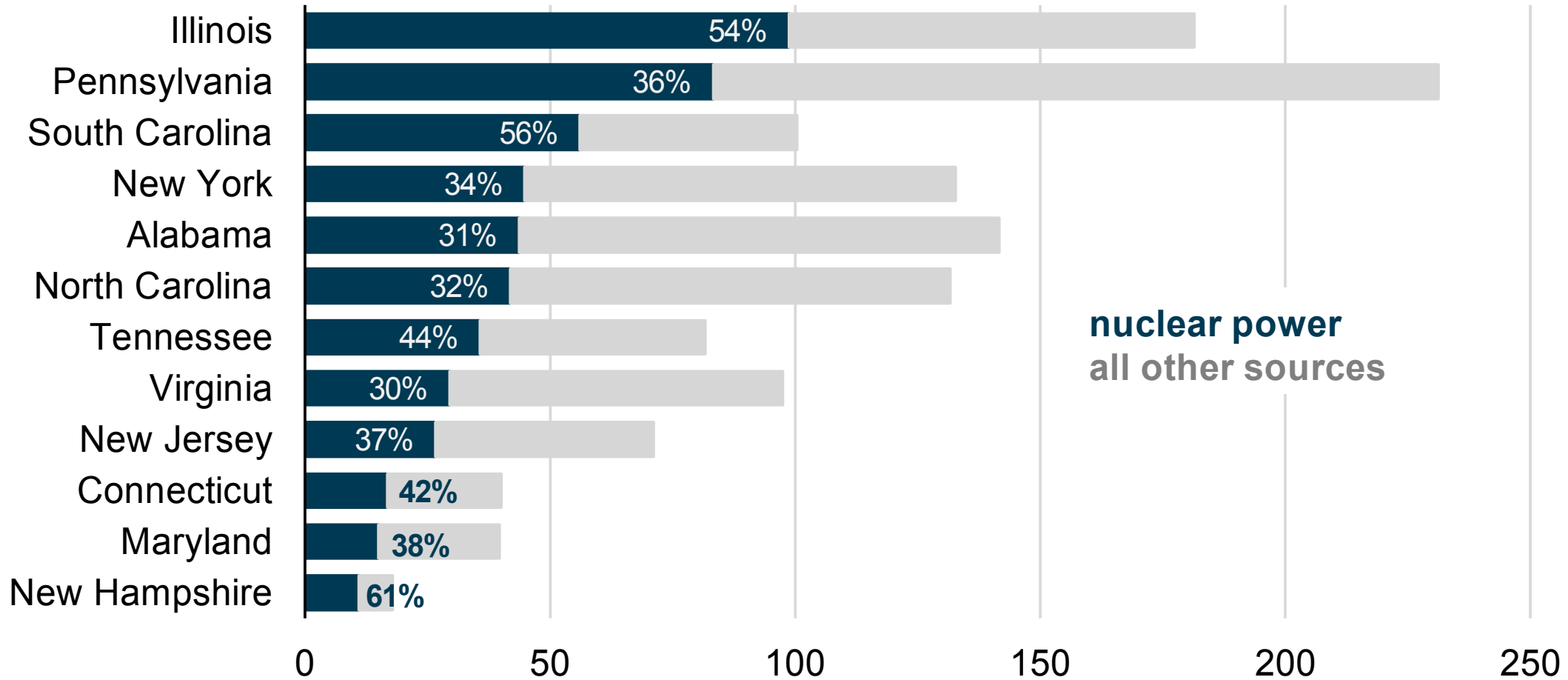
Thirty states have commercially operated nuclear power plants (NEI, 2020)



Twelve states generate more than 30% of their electricity from nuclear

Nuclear electricity generation in selected states (2019)

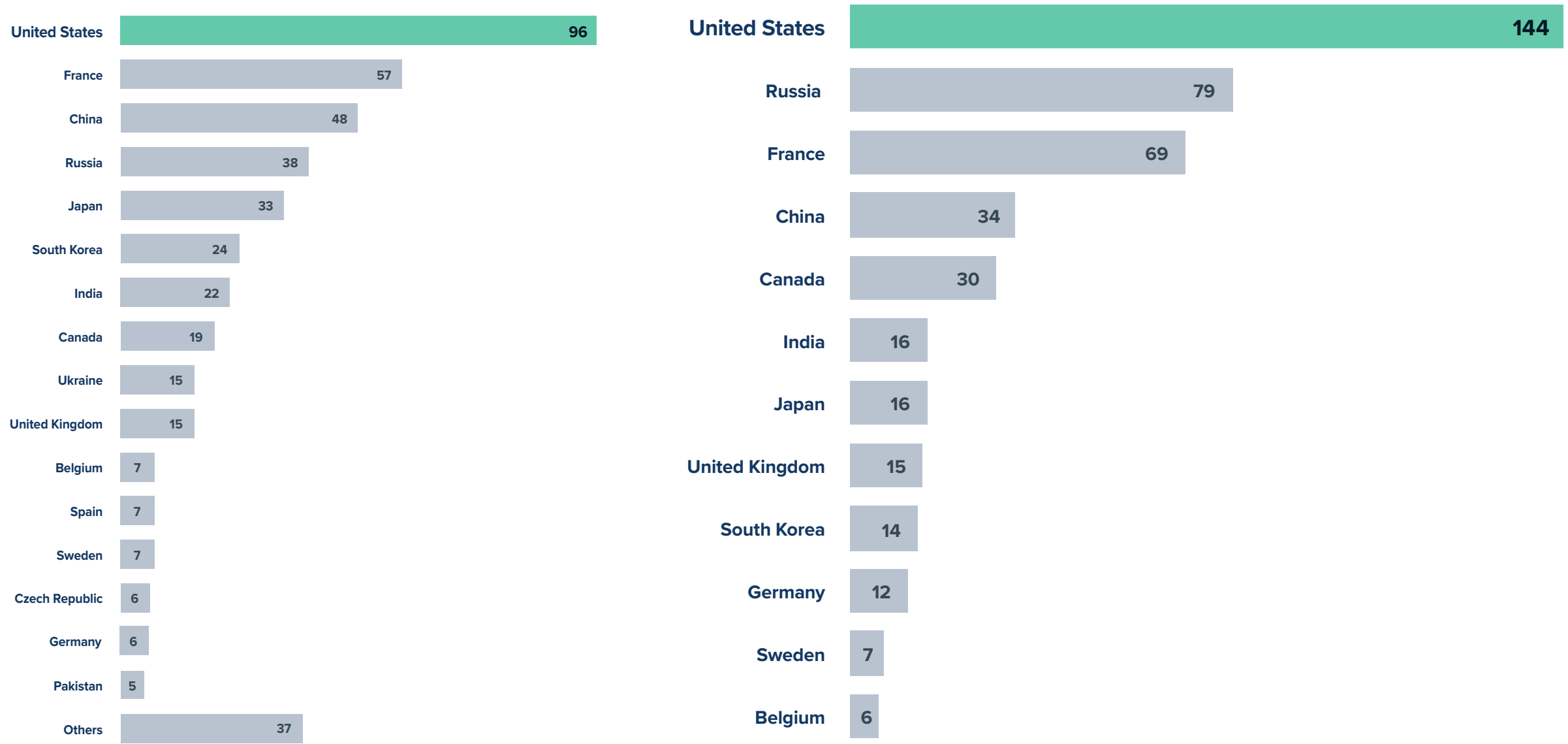
million megawatthours



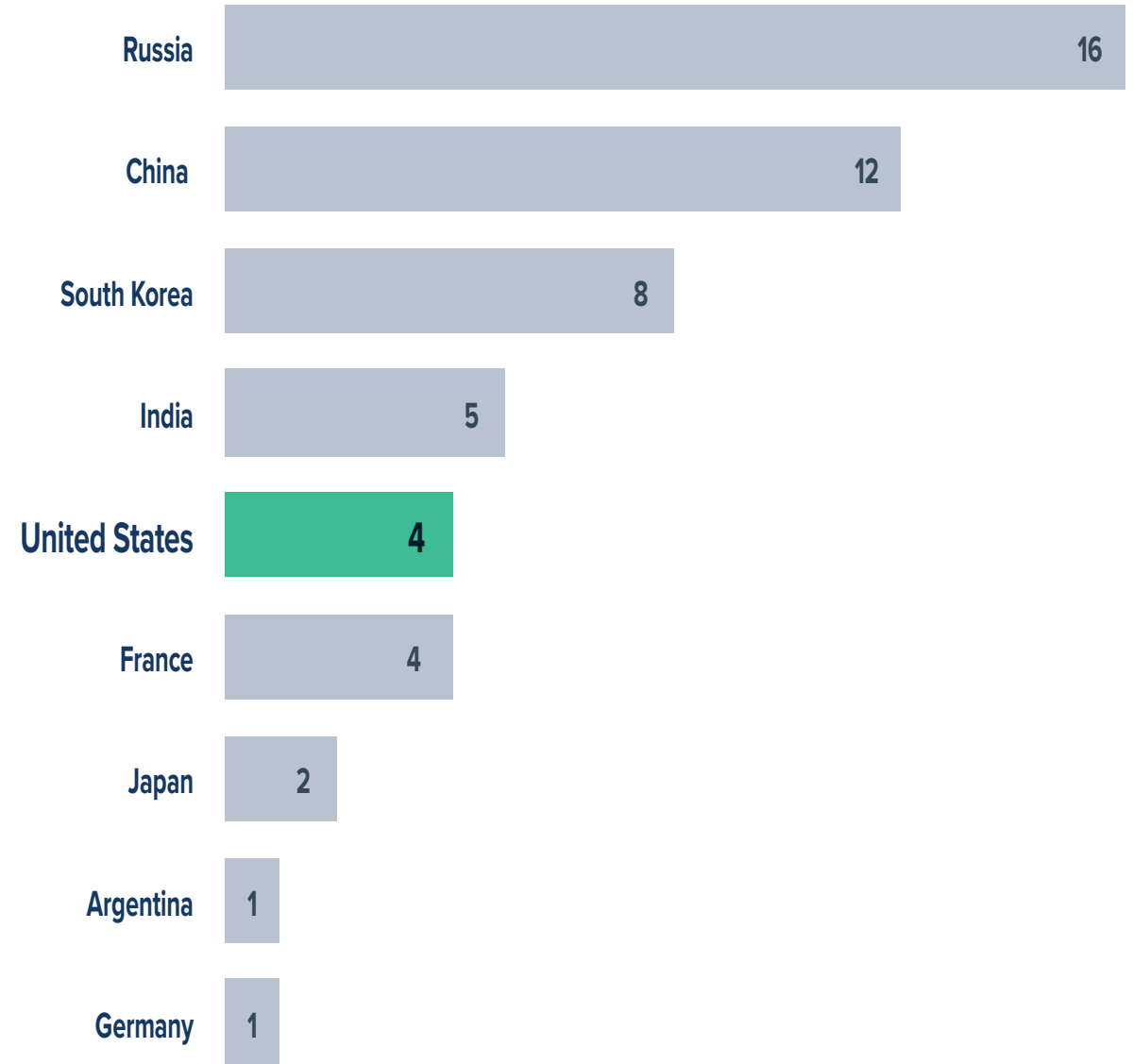
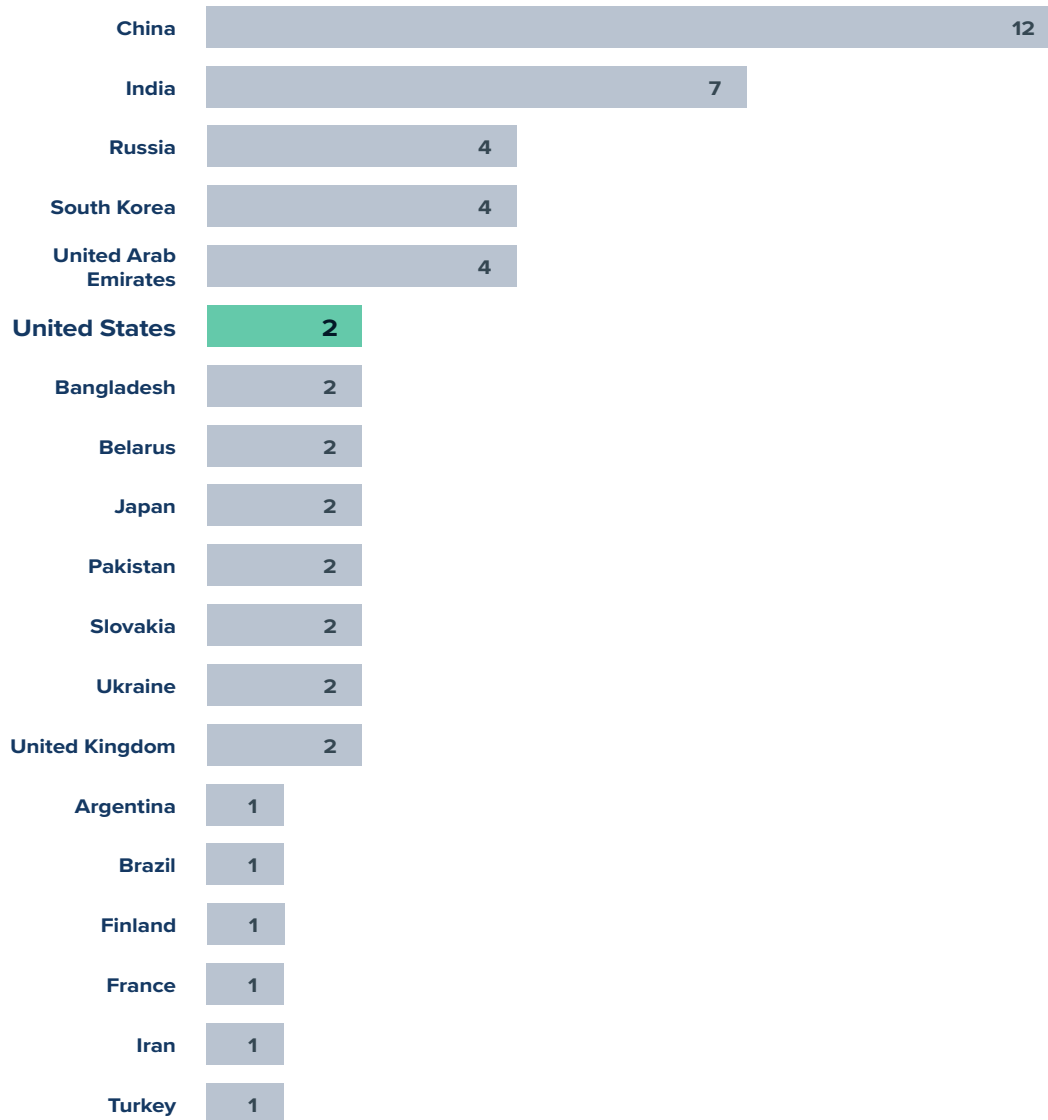
Source: U.S. Energy Information Administration. *Electric Power Monthly*

There are 442 operating reactors worldwide

Operating reactors by country vs. Operating reactors by supplier country (NEI, 2020)



52 Reactors under construction & Supplier countries (NEI, 2020)



Prices, regulations and support programs



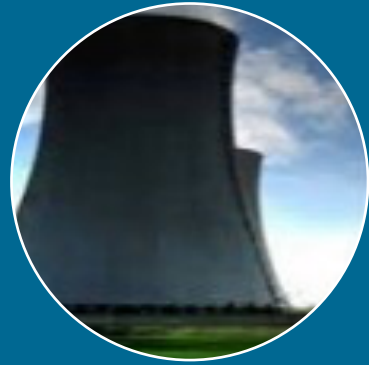
Electricity prices have been declining since 2005

In states with vertically integrated electricity markets, nuclear power plants are typically protected from high price fluctuations.

A number of states have implemented support programs for nuclear power to make up for unrecovered costs.

The support programs rely on surcharges to electricity consumers or participation in clean energy markets.

Nuclear power plants have been designated as critical infrastructure by the Department of Homeland Security



Nuclear power plant employees are *essential workers*



Continued operation is important



Two important factors:

- Licensing
- Refueling



Nuclear Power - Refueling

- Although when in operation, nuclear power plants have a 100% capacity factor, on average plants run at 93.4% of capacity (2019)
- Refueling operations are typically done every 18-24 months:
 - → operation stops completely for 2-4 weeks
 - → power plants bring in 100-200 specialized workers (30-60 days)
- This Spring, 32 nuclear power stations in 21 states are planning to undergo refueling outages.

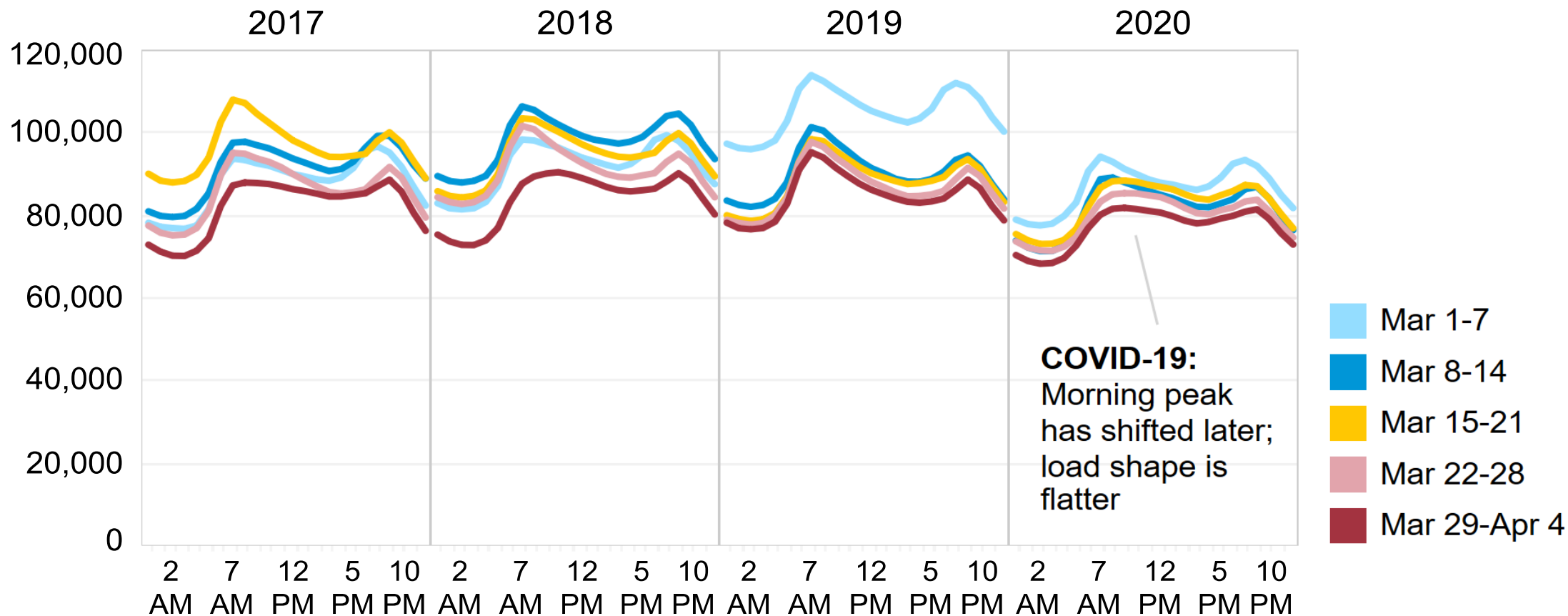
Industry concerns amid Covid-19 pandemic & potential solutions

- Essential workers typically come from all over the U.S. and stay in hotels and eat in restaurants. Travel restrictions, and closures of restaurants and hotels are hurdles.
- Access to PPE and medical protective equipment that is in short supply
- Covid-19 testing.
- Additional problems:
 - product orders are delayed or cancelled
 - industry electricity demand decreased
 - workforce availability constrained

Changes in electricity demand due to Covid-19



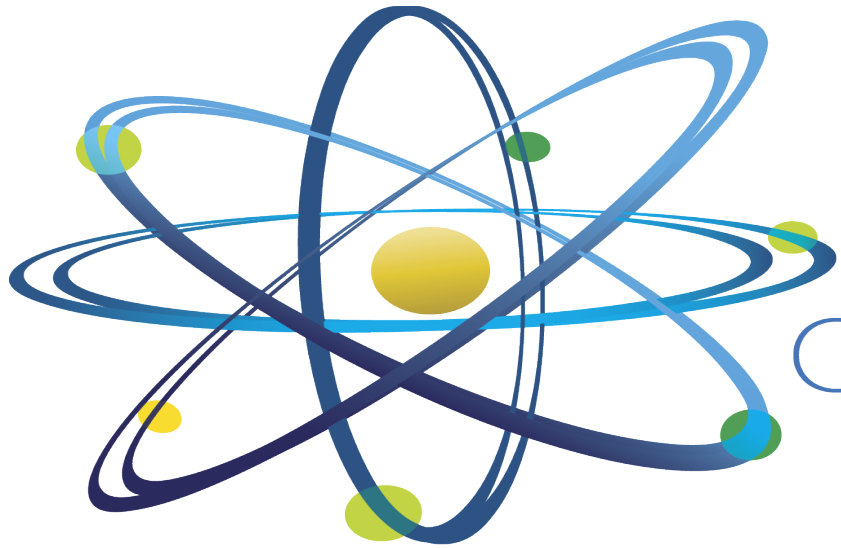
PJM average weekday load shapes, 2017-2020
megawatthours (MWh)



Covid-19: What are the implications in the medium term? Long-term?

- Developments will depend on how fast the economy recovers and there could be some lasting effects:
 - On the load shape
 - Energy usage
 - Energy fuel mix
 - Investment projects behind climate and clean energy projects could suffer.

Questions?



Clean. **Reliable. Nuclear.**

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