Load Following Generation Overview

Benny Ethridge, P.E.
Executive VP, Energy Supply

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AGENDA

- **LOAD FOLLOWING RESOURCES**
- **CHANGING ERCOT GRID CHARACTERISTICS**
- **PEAKING & STORAGE TECHNOLOGY**

HOW WE SERVE BY THE NUMBERS [1]

Up to **14%** of our annual revenue goes to the City of San Antonio's General Fund

Largest Municipally Owned Electric & Natural Gas Utility in the U.S.

1st in Solar Power Production in Texas & **5th** in the Nation [2]

2nd in Wind Power Production in Texas

897K Electric

371K Gas

Our Customers

$361M

Annual Payment to the City 27.1% of CoSA's FY2022 General Fund

162

Years of Serving San Antonio

FY2022 Total Spend

68% Local

48% Diverse

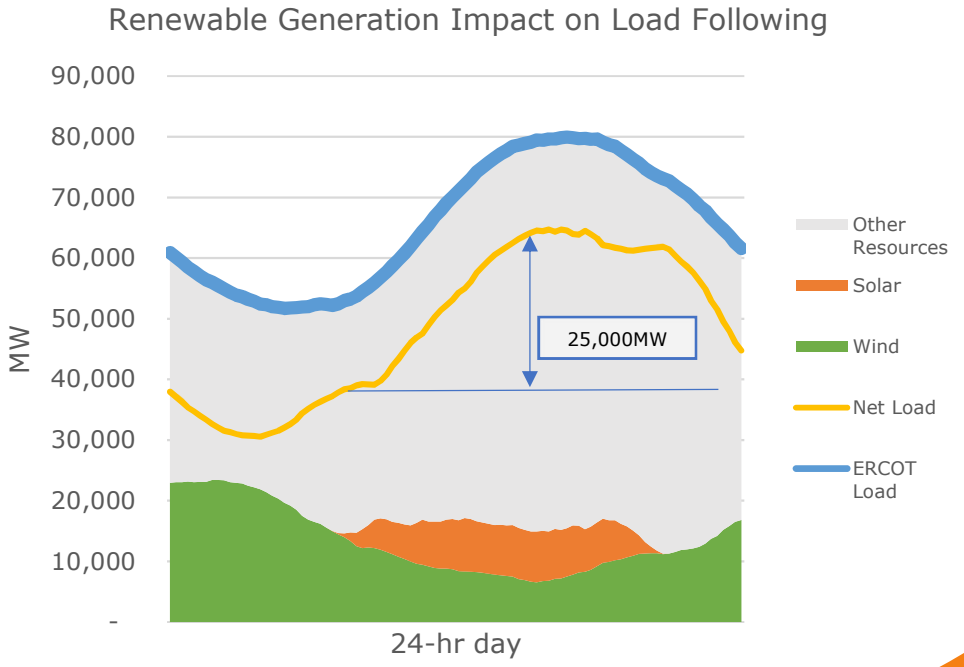
35% Diverse & Local

~3,000 Employees

[1] As of 1/31/2022 [2] Environment Texas Research & Policy Center. "Shining Cities 2022: The Top US Cities for Solar Energy"

LOAD-FOLLOWING RESOURCES

- Dispatchable: Flexible and controllable
- Typically, run during the day and early evening and are operated in direct response to changing demand for power supply.
- Usually, shut down or greatly curtail output during the night and early morning, when the demand for electricity is the lowest.

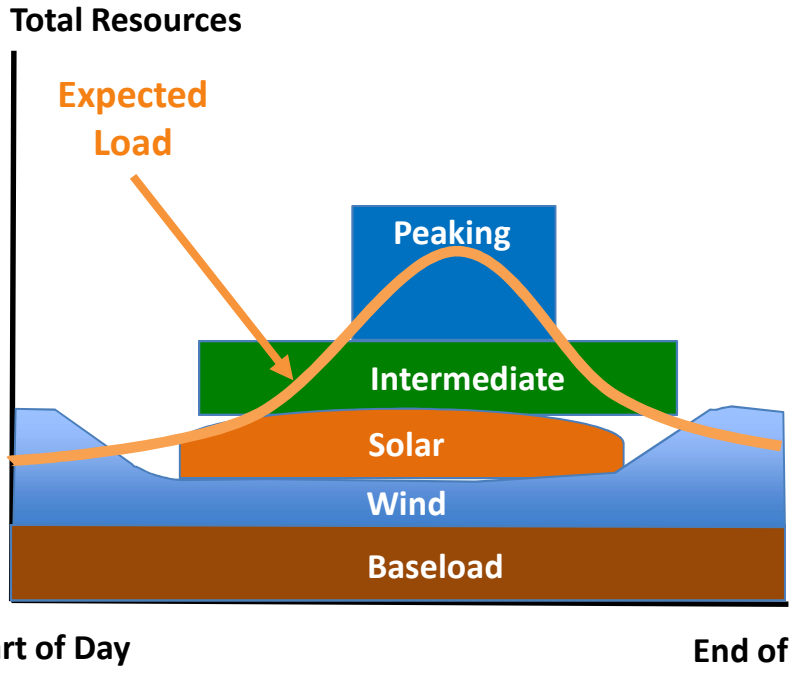


Daily variations in demand require an adequate load following or peaking power plant capacity.

HOW GENERATION RESOURCES ARE USED

In general, four different types of resources are utilized:

- **Peaking Generation**: To minimize capacity shortages and costs over short periods of time
- **Intermediate Generation**: To balance the resource needs of the system between peak and baseload on a daily basis.
- **Renewable Generation**: To minimize emissions & energy costs over long periods of time
- **Baseload Generation**: To minimize fuel & energy costs over long periods of time

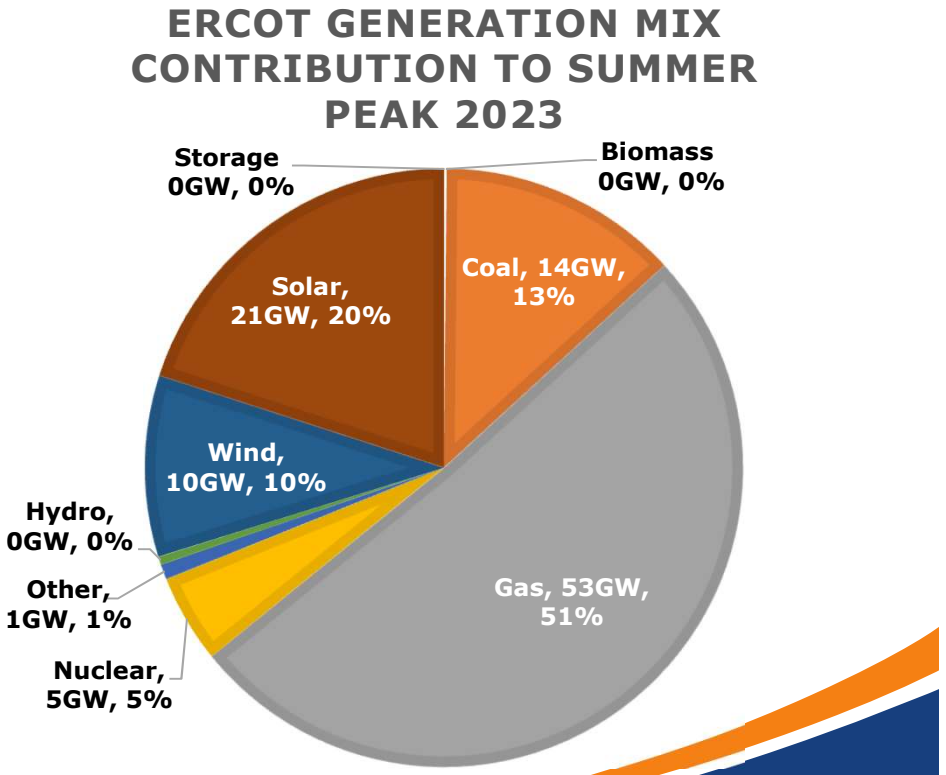


Peaking and Intermediate Generation are essential to Load Following.

ERCOT CAPACITY MIX - 2023

The generation mix in ERCOT is made up of the following types of resources:

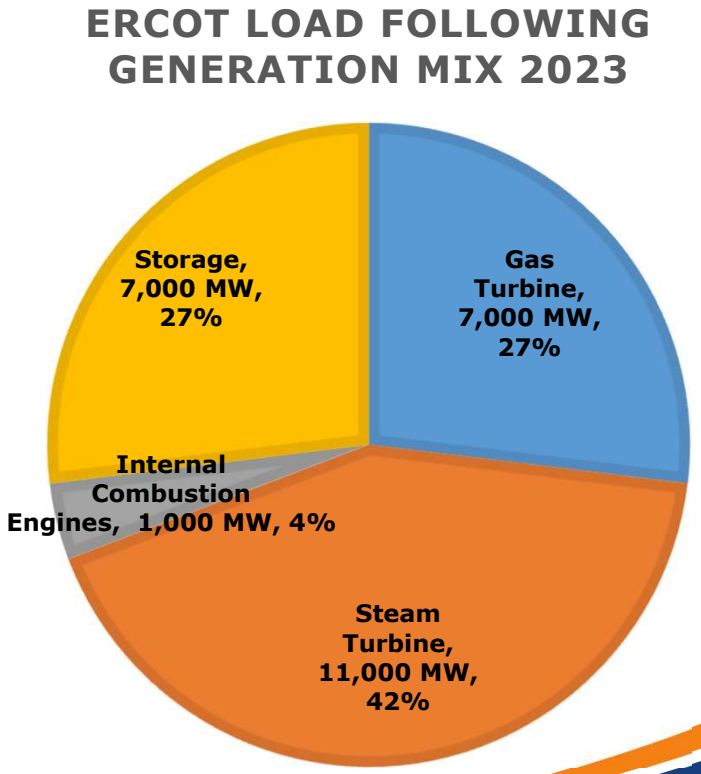
- **Coal and Nuclear**: Totals 18,500 MW of baseload generation or 18% of the capacity
- **Natural Gas**: Accounts for 51% of the generation capacity in ERCOT. Can be baseload, intermittent or peaking.
- **Renewable Generation***: Is expected to contribute 31,000 MW to the summer peak. This is 27% of the wind capacity and 81% of the solar capacity
- **Other**: The DC transmission lines between ERCOT and other regions can either import or export power.



* The capacity contribution is the amount of the installed capacity that cab be expected to be producing at the time of the peak – From ERCOT Capacity, Demand and Reserves Report May 2022

ERCOT LOAD-FOLLOWING RESOURCES

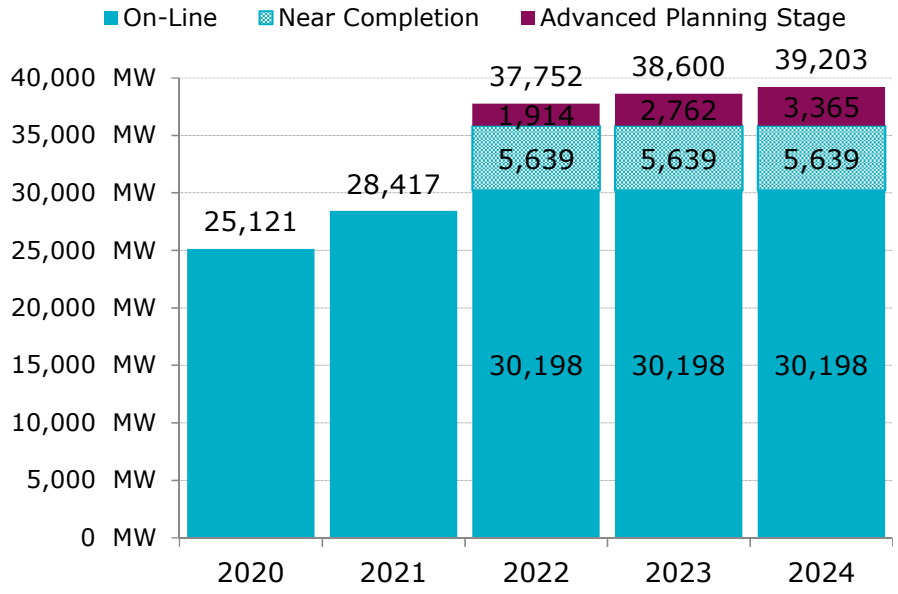
- **Simple Cycle Gas Turbine**: Ramp rates of 20MW/min is typical
- **Steam Turbine**: natural gas steam turbine power plants have not been built in many years; ramp rates are 5 – 10 MW/min
- **Internal Combustion Engines**: Fast ramp rates, can reach full output in under a minute
- **Energy Storage**: Used in ERCOT to provide ancillary services rather than support customer demand on a sustained basis; very fast ramp rates; ~2,000 MW installed and 5,000 planned for 2023



ERCOT RENEWABLE GROWTH

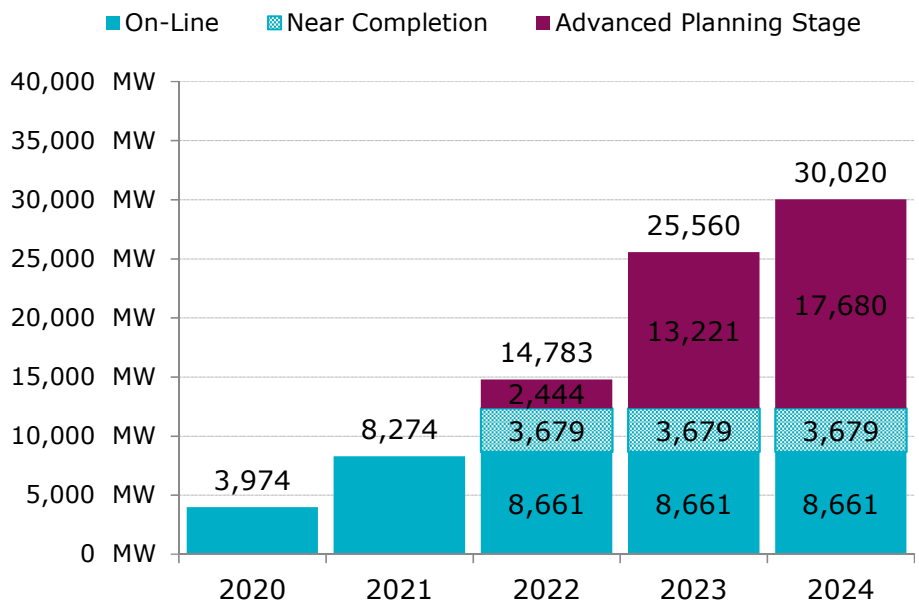
Wind

ERCOT Wind Additions by Year (as of Jul 31, 2022)



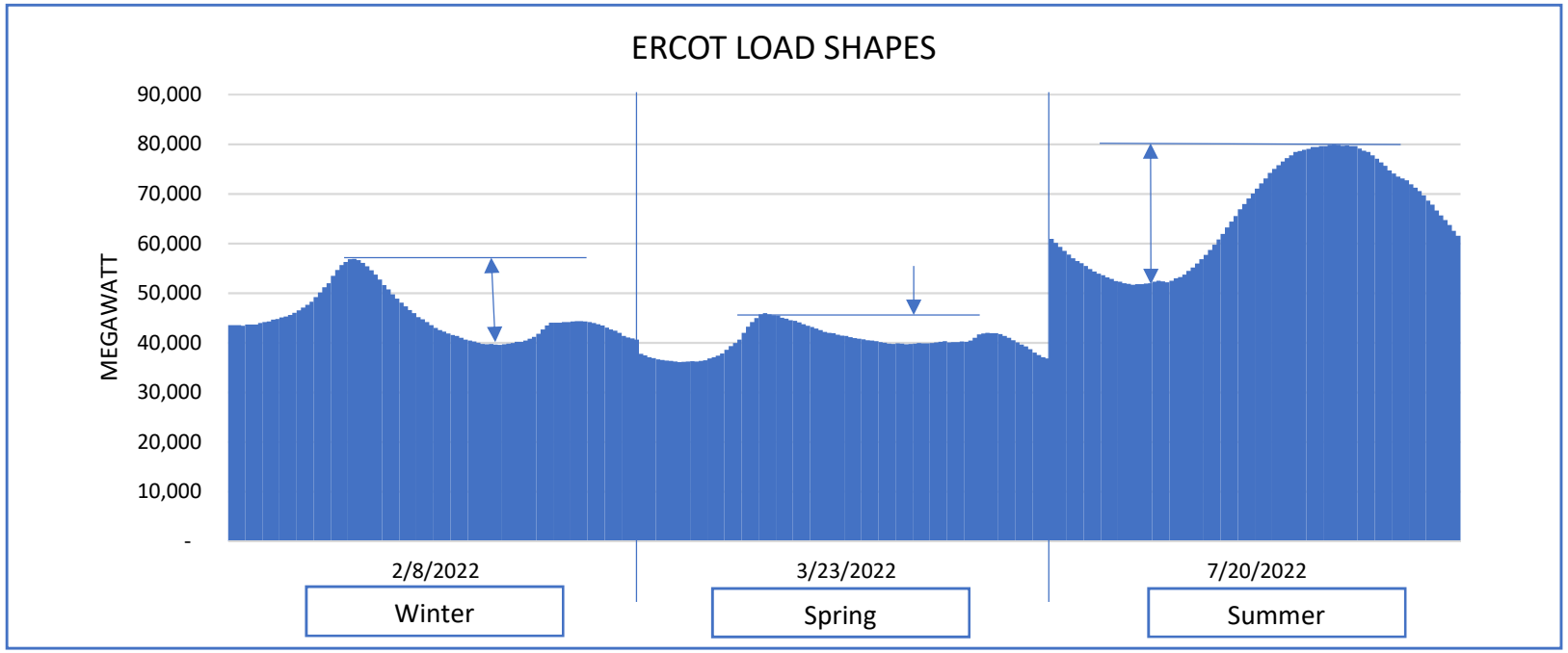
Solar

ERCOT Solar Additions by Year (as of Jul 31, 2022)



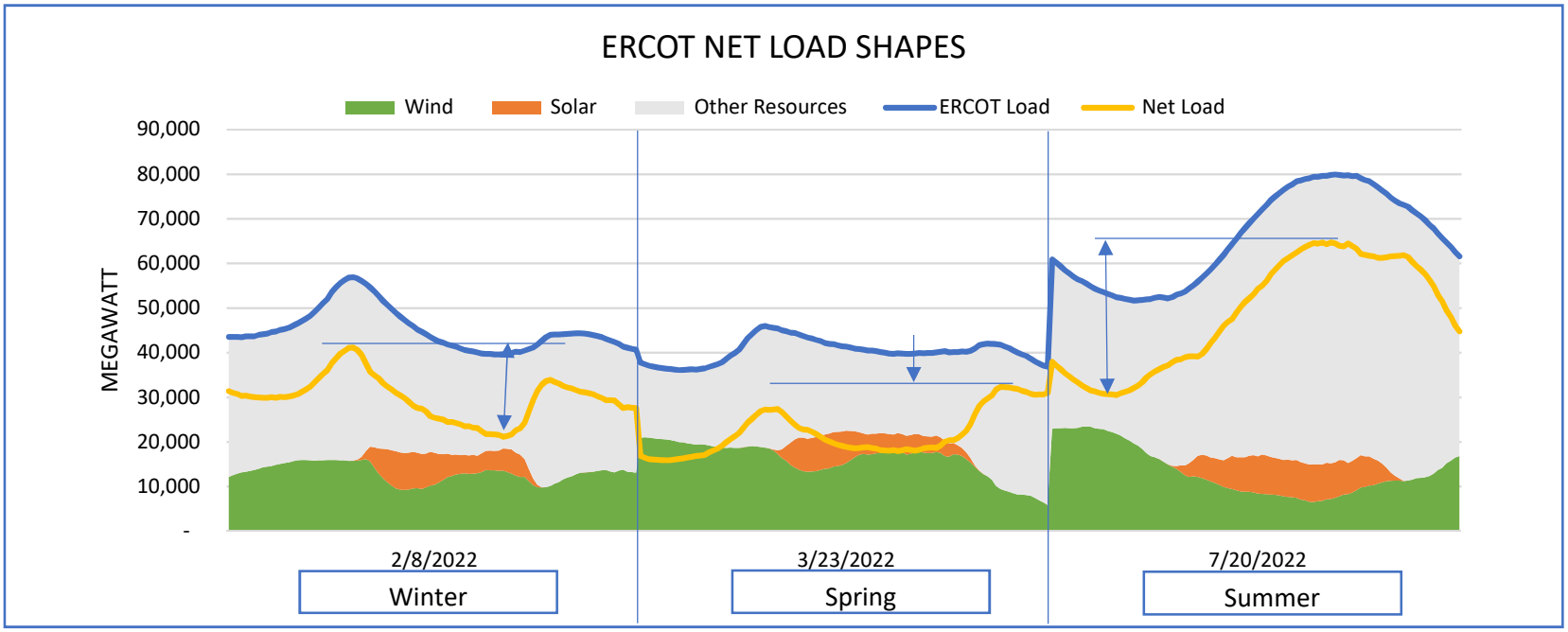
Increased renewable generation intermittancy will drive greater need for load following resources.

ERCOT LOAD SHAPES
WINTER / SPRING / SUMMER



Weather and seasonal energy use patterns drive seasonal variations.

ERCOT NET LOAD
IMPACT OF RENEWABLE GENERATION



Renewable generation intermittency results in large load swings that must be managed by dispatchable generation.

Net Load: Load minus renewable generation, the load to be served by other resources

TODAY'S PEAKING TECHNOLOGIES

Combustion Turbine - CT

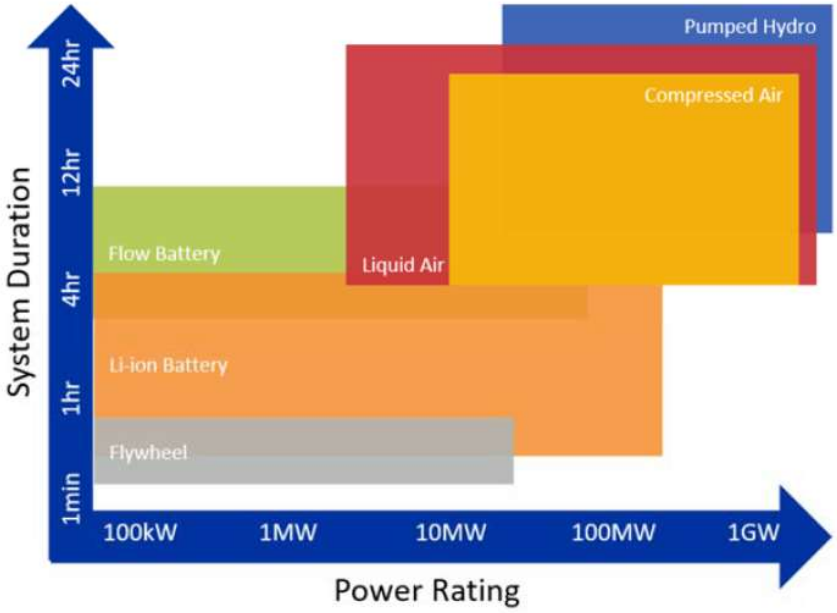
Battery Energy Storage

Reciprocating Internal Combustion Engine - RICE

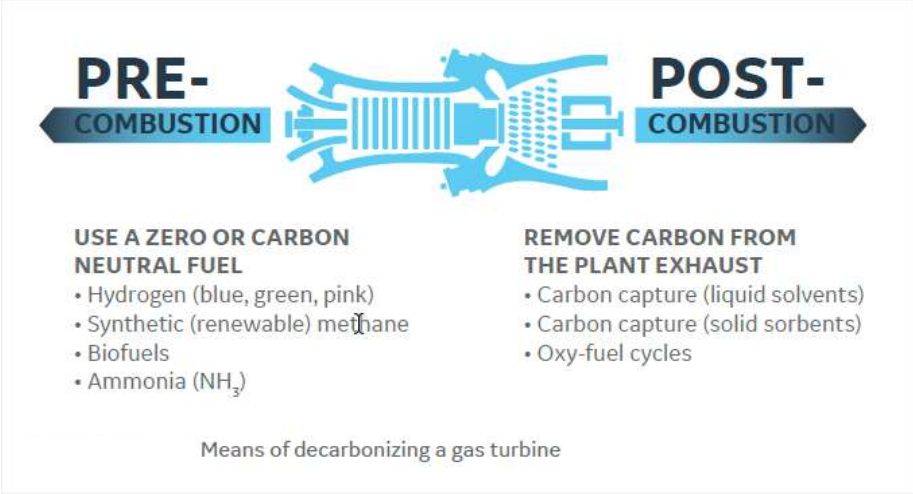
While flexible & fast starting, the natural gas systems still contribute to our carbon foot print.

STORAGE & CARBON CAPTURE

Storage System Ratings



Near-Zero Carbon with Gas Turbines



Large-scale long-term storage & economical carbon capture technologies can speed our shift to carbon neutrality.

KEY TAKEAWAYS

- Load following generation resources are key to grid reliability
- Heavily dependent on natural gas technology
- More flexible, faster-responding, carbon neutral resources are needed
- Innovation is key to deploying large-scale, long-duration storage & economical carbon capture to support grid transformation.

Thank You