

Duke Energy – Long Duration Energy Storage

Emerging Technology Office at Duke Energy – Matt Jacobson, PE



About Duke Energy

Headquartered in
Charlotte, NC

DUK
LISTED
NYSE

A FORTUNE 150 COMPANY

\$79B

MARKET CAP
(AS OF MAY 2024)

\$180B

TOTAL ASSETS

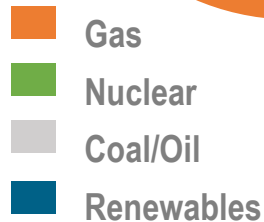
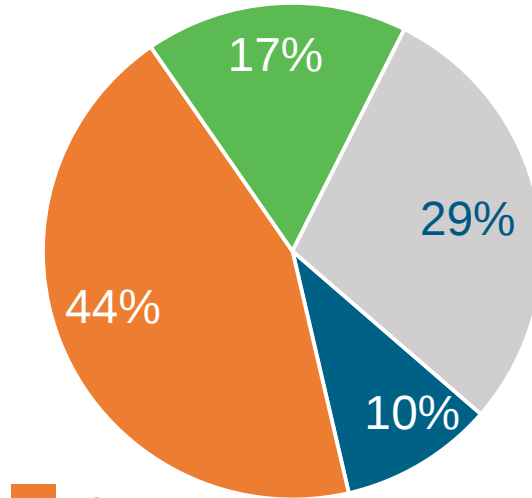
28K

EMPLOYEES

55GW

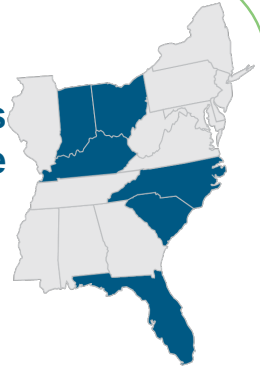
TOTAL GENERATING
CAPACITY

55 GW Generating Capacity



**Electric Utilities
& Infrastructure**

8.4 million
customers
in six states



**Gas Utilities
& Infrastructure**

1.7 million
customers
in five states



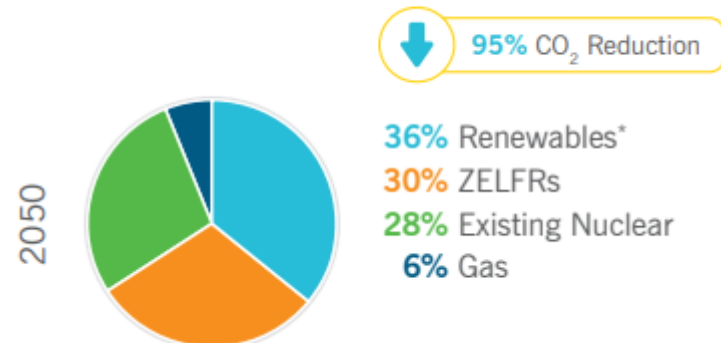
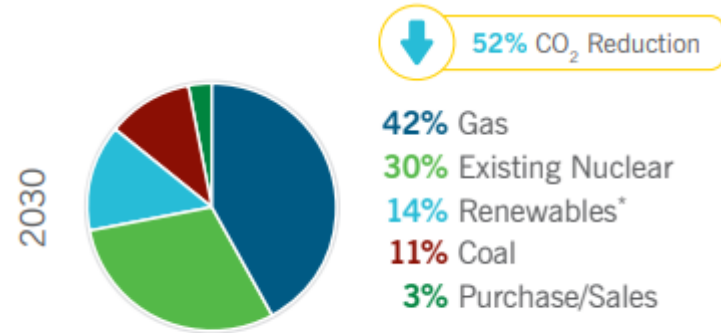
About Duke Energy

- Net-Zero CO₂ Goals
 - 50% reduction by 2030
 - Net-Zero by 2050 (by law in NC)

Duke is hunting for a *Zero-Emitting-Load-Following-Resource* (**ZELFR**)

- Advanced Nuclear
- Carbon Capture with Utilization and Storage
- Hydrogen and other low carbon fuels
- Long Duration Energy Storage

Duke Energy Regulated Generation, MWh



*Renewables include hydro, wind, solar, landfill gas, biomass, etc.

Duke Energy LDES Pilot Activity

- Small Scale Pilots
 - EOS – Aqueous Zinc Battery – 300kW / 4hrs
 - EnerVenue – Nickel-Hydrogen Battery – 250kW / 1.5hrs
 - GKN Hydrogen Fuel Cell – 8kW / 50hrs
- Suwannee Pilot
 - 5MW / 40MWh (8hrs)
 - Technologies Evaluated – Flow, Zinc Aqueous, Sodium Sulfur
 - **Sodium Sulfur (NaS)** Battery by BASF/NGK selected
- Evaluating options for larger pilots/demonstrations
 - Nickel based
 - Sodium based
 - Aluminum based
 - Fuel cells



EnerVenue at Mt Holly Microgrid



Eos at Mt Holly Microgrid

Duke's Roadmap of LDES Technologies

- Include more LDES in future IRPs
 - Technology Readiness Level (TRL) Considerations
 - 3rd Party Cost & Performance Data
 - Round-Trip-Efficiency (RTE) versus CapEx
 - Added 12-hr Proxy into IRPs
- Goals:
 - Continue to monitor and assess for inclusion 100+ hrs LDES technology options into IRPs
- Needs:
 - Supplemental funding opportunities
 - Smart Policy / Recovery Mechanisms
 - Value Stacking – Increasing Unit Flexibility

Thermal Energy Storage – Request for Information

- Submitted an RFI to 7 TES companies to gauge readiness:
 - Magaldi
 - Antora
 - Tempo
 - Cache
 - Brenmiller Energy
 - Rondo
 - Electrified Thermal Solutions
- Path forward:
 - Engaging Large Account Managers
 - Developing a ranking tool for evaluation and testing determination
 - Site evaluations for pilot readiness
 - Technoeconomic analysis



Cache Energy Demonstration



- Cache demonstrated their technology at the Duke Mt Holly site December 2025
- Site prep and setup took less than a week
- All equipment fit into a single shipping container (100kW unit)
- Demonstration kicked off a relationship with a major automobile manufacturer looking to utilize Cache's technology to decarbonize

