# Duke Energy's Clean Energy Vision

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03/30/2022

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# Key takeaways

- **Major changes** are coming in electricity infrastructure
- Duke Energy is driving the **largest out-of-coal transition** in the industry
- Large clean-generation enters **2030-2035** timeframe
- Significant **emerging technologies** needed **post 2035**
- Decarbonized generation mix will still **require water**
  - Regional watershed planning remains important

# Accelerating toward a clean energy future

Actions we're taking for our communities, while keeping energy affordable and reliable

## BOOSTING RENEWABLES

24,000 MW of renewable energy by 2030

**13,000 MW**
of energy storage by 2050

Renewables 40% or more of our energy mix by 2050

## CHAMPIONING NEW TECHNOLOGIES

$CH_4$ Advancements in emission monitoring

*Advocating for new, zero-emission technologies such as:*

- Advanced nuclear
- Hydrogen
- Energy storage technologies

## MAINTAINING CRITICAL SUPPORT

Pursuing subsequent license renewals for carbon-free nuclear

Leveraging the benefits of

**RELIABLE**

natural gas to support emission reductions and more renewables

# Duke Energy is leading the industry's largest clean energy transition

## What we're doing

### Completing the largest planned coal retirement in the industry

- Retired 56 units (7.5 GW) since 2010
- Coal generation <5% fuel mix by 2030
- Goal to exit coal generation by 2035(1)

### Expanding our renewable resources

- Top 10 US renewable company by capacity, with operations in 25 states
- Passed 10 GW owned, operated or purchased in 2021, targeting 24 GW by 2030

### Targeting Net-Zero Emissions by 2050

- Reduced carbon emissions by 44% since 2005, on pace to exceed 50% reduction by 2030 and net zero by 2050 (Scope 1)
- Net zero methane emissions by 2030 (Scope 1)
- Setting new 2050 goals to include Scope 2 and certain Scope 3(2) emissions for electric and gas utilities

## How we're doing it

### Collaborating with state and federal policymakers

- Landmark bipartisan legislation in NC that accelerates our clean energy transition
- Engaging policymakers and regulators to advance shared objectives on climate

### Integrated resource plans that match our climate goals

- Significant stakeholder engagement on jurisdictional IRPs & NC Carbon Plan
- Balancing affordability and reliability priorities on behalf of our customers

### Executing our plan

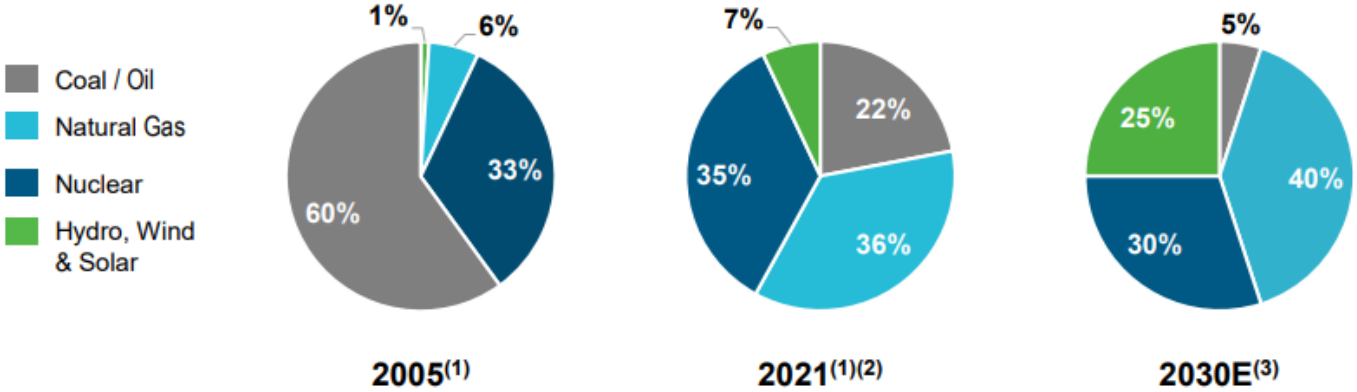
- Constructive rate cases that accelerate coal retirements and call for more renewables
- Extending the life of the largest regulated nuclear fleet in the country
- Managing through supply chain issues
- Leveraging our size and scale to efficiently finance this robust capital plan

*(1) Subject to regulatory approvals. Contemplates retiring Edwardsport coal gasifiers by 2035 or adding carbon capture utilization and storage to reduce carbon emissions*

*(2) Certain scope 3 emissions include: emissions from upstream fossil fuel procurement, production of power purchased for resale, and from downstream use of sold products in our natural gas distribution business*

# Transforming the way we produce power

**Generation (MWh) by Fuel Type**




(1) 2005 and 2021 data based on Duke Energy ownership share of U.S. generation assets as of Dec. 31, 2021
(2) 2021 data excludes 9,088 GWh of purchased renewables, equivalent to ~4% of Duke Energy's output
(3) 2030 estimate will be influenced by customer demand for electricity, weather, fuel and purchased power prices, and other factors

# Developing technologies

## Carbon Capture Utilization & Sequestration (CCUS)

- Post-ignition carbon capture technology exists
- Limited CO2 utilization
- Requires large scale storage – not available in Carolinas – or transport
- Pre-combustion technologies developing
- Supplemental expense to gas generation

## Hydrogen

- Decarbonization for gas generation assets
- Working with Siemens and Clemson University study project for hydrogen blending
- Opportunities for a regional “Hydrogen Hub” to advance opportunities for a hydrogen economy

## Offshore Wind

- Mature technology with global operating experience
- Inherent resource for the Carolinas
- Technology continuing to evolve
- Operating risk

## Small Modular Reactors(SMR) / Advanced Nuclear(AR)

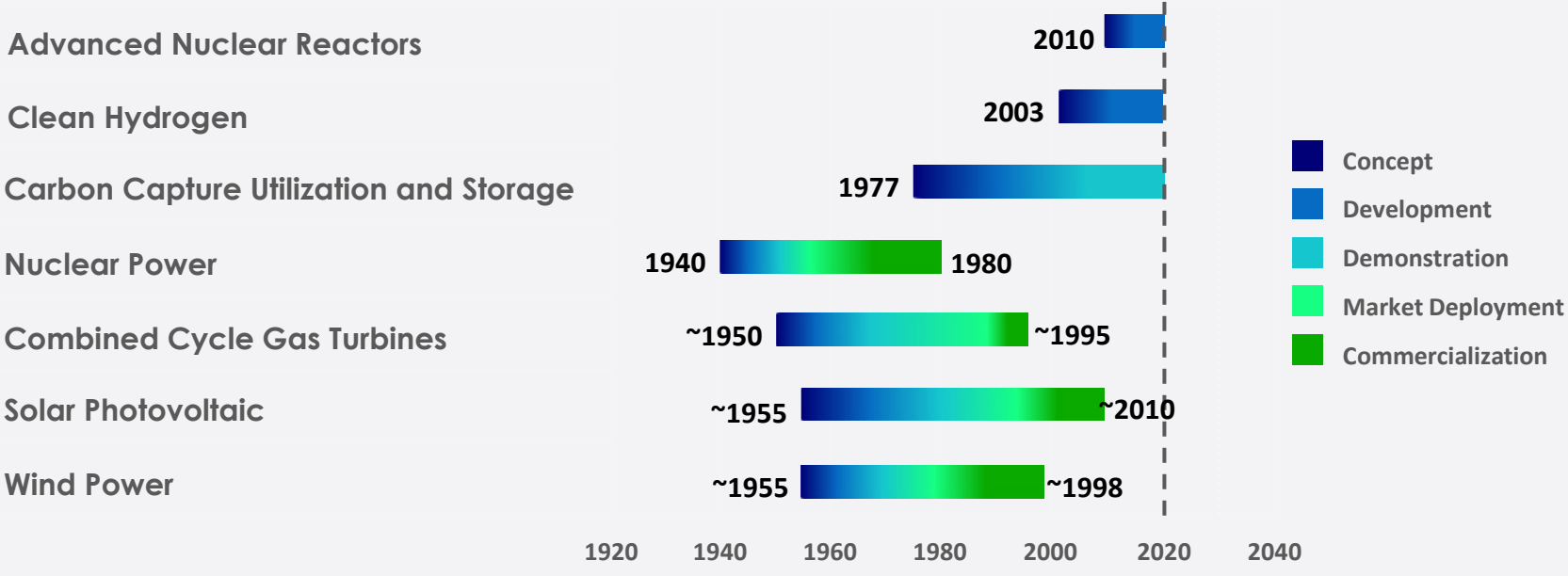
- Dispatchable
- Light water and storage designs
- Duke Energy participating in advisory roles
- Availability in the 2030s

## Long Duration Storage

- More renewables requires longer duration storage
- Complement renewable resources
- Multiple storage technologies – electro-chemical, mechanical, compressed gas, chemical, pumped hydro
- Complement non-dispatchable generating resources
- Availabilities and deployment cost vary

# TECHNOLOGY

## Decades of Effort
from concept to commercialization




*Notional timelines*

# Hydro will continue to play a key role

- **Relicensing** of Bad Creek Powerhouse
- Evaluating **expansion f**or second powerhouse
- Existing hydropower stations are **still important** after more than a century
  - Clean, renewable, most efficient, flexible (shutdown-to-full power-to shutdown in less than 10 minutes)
  - Peaking energy
  - Supports transmission system needs (load following, voltage support, black start)
  - Community values (water supply, waste assimilation, economic development, recreation, quality of life)
- Zero-carbon generation mix **still requires water**: regional watershed planning important
  - Future nuclear
  - Hydrogen

# Summary

- Duke Energy has an **integrated vision** for our energy future and Path to Net Zero
- Aggressive decarbonization of generation warrants **consideration of all technologies**
  - Expansion of today's available carbon free generation technologies
  - Monitoring developing technologies and participating in industry research and pilots to advance developing technologies to commercialization
  - Traditional technology paths from concept to commercialization have taken decades
- Requires a **diverse portfolio of technologies** as we work toward the Path to Net Zero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