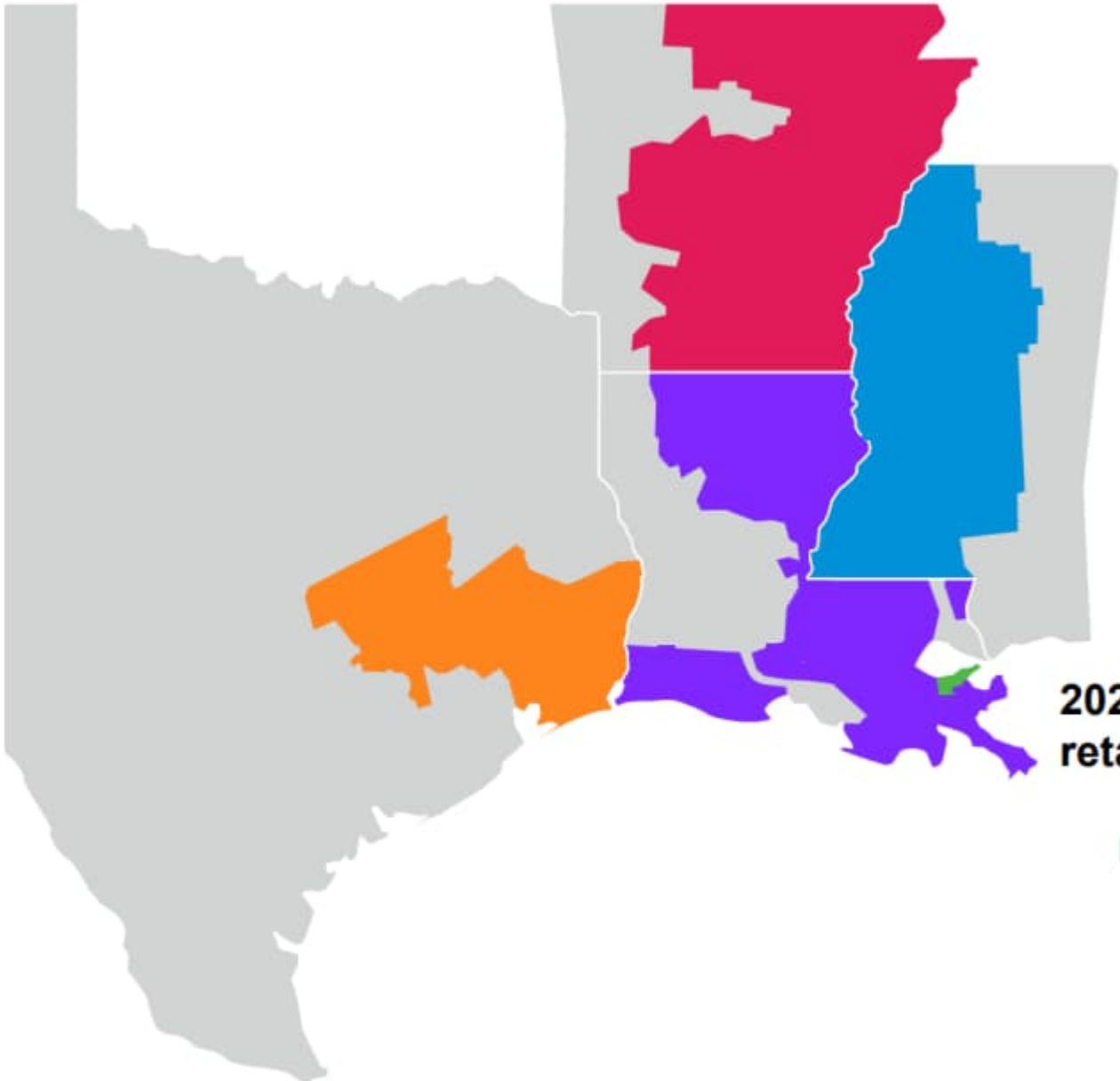
July 9, 2025

Entergy Power Generation and CCS Development Overview

Michael James, Sr. Mgr. – Smart Operations

01 Entergy General Overview



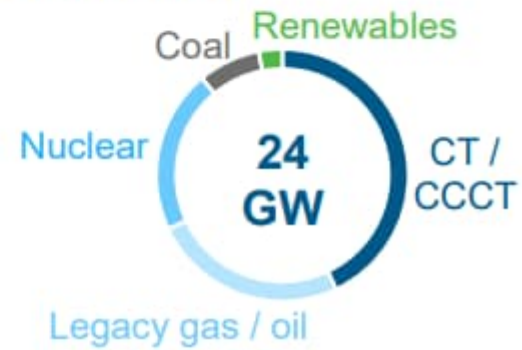
About Entergy

Vertically integrated utility with five operating companies in four states – AR, LA, MS, and TX

- 3 million retail customers
- 24,479 MW owned and leased generating assets
- 16,100 circuit miles of interconnected high-voltage transmission lines
- 106,900 circuit miles of distribution lines

2024 Utility weather-adj. retail sales

Owned and leased capacity as of 12/31/24



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Utility generation

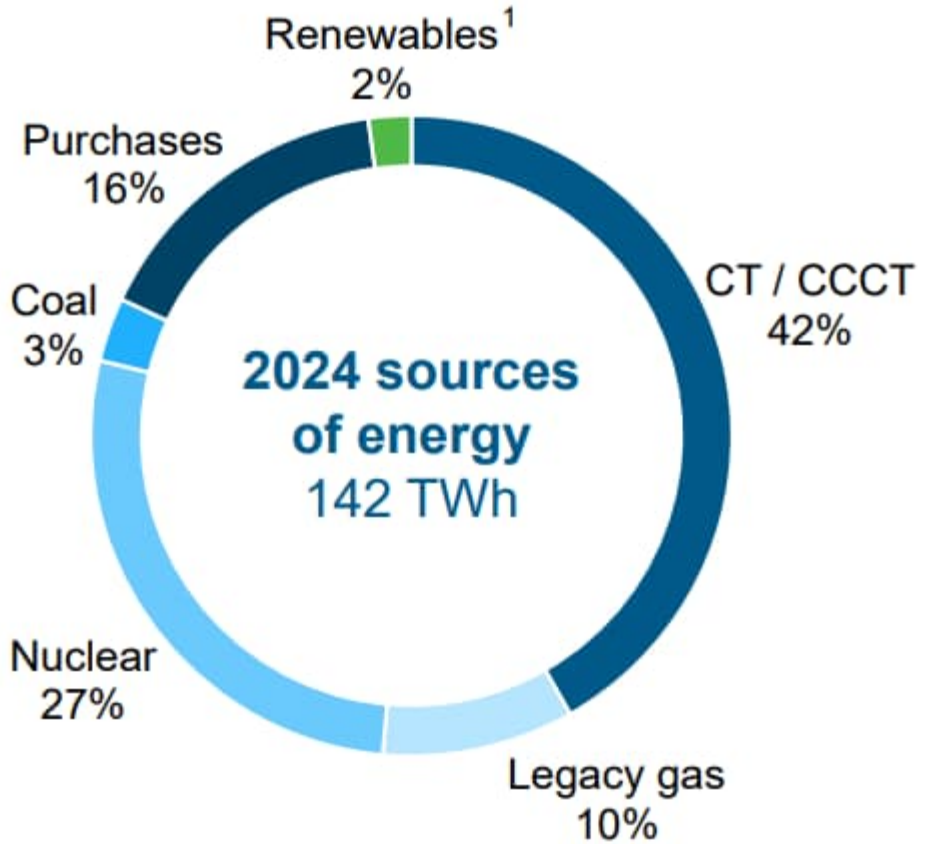
Renewable and fossil operations

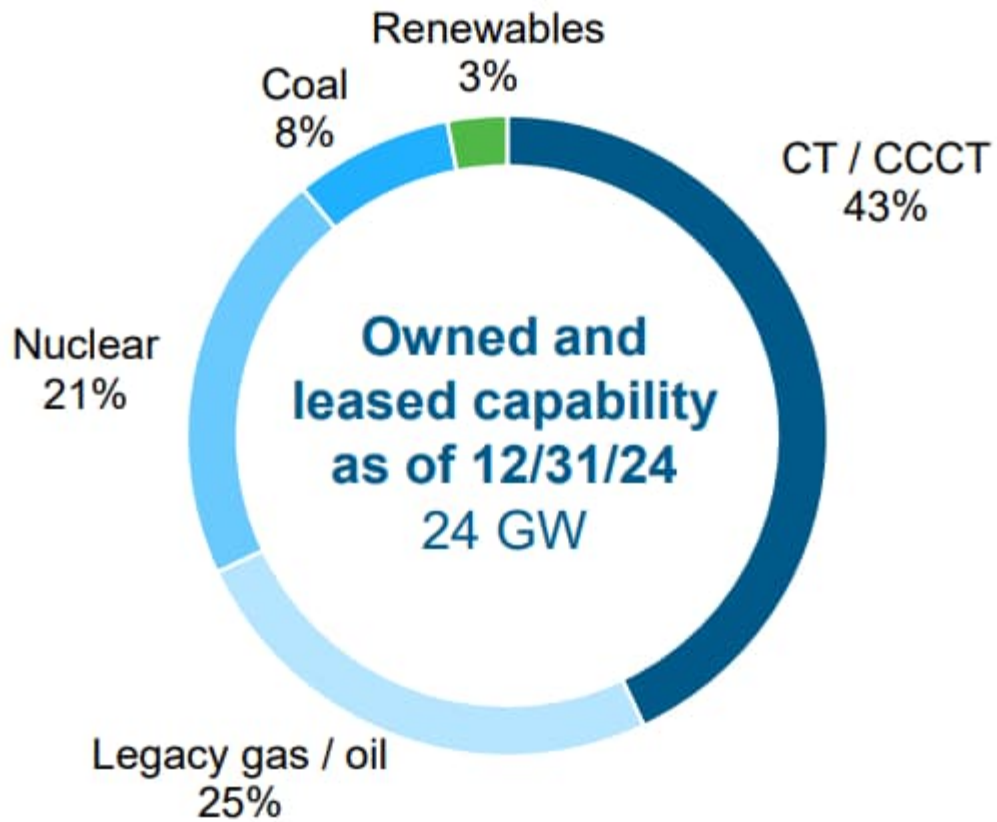
Entergy owns and operates one of the cleanest large-scale generation fleets in the country, with approximately 24,075 megawatts of owned and leased generating capacity.

The fleet includes 28 active natural gas, oil, hydroelectric and coal generating facilities, with the capacity to generate nearly 19,000 megawatts of power.

Our nuclear fleet produces 5,211 megawatts of nuclear capacity. This carbon-free power source is critical in meeting our climate commitments to achieve net-zero emissions by 2050.

Utility generation overview





Note: the percentage of renewable and nuclear energy includes energy procured or produced for the benefit of certain customers through special tariffs, contracts, or renewable program subscriptions, and those customers retain the exclusive claims to all associated environmental attributes, RECs, and other relevant clean energy certifications

1. Includes generation from both owned and purchased power resources

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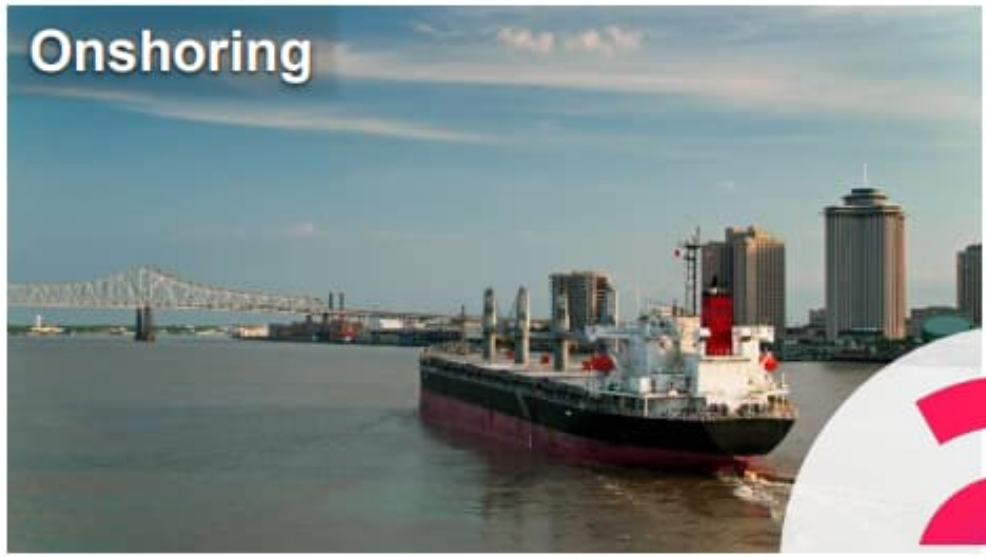
Customer Growth Overview

Entergy at intersection of major macro trends



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Entergy Louisiana Recent Announcements

Entergy Louisiana to power $4B, world's largest low-carbon ammonia facility in Ascension

04/08/2025

Entergy Louisiana to power $5.8B Hyundai steel plant

03/24/2025

CONTACT Brandon Scardigli | 504-576-4238 | bscardi@entergy.com

Entergy Louisiana to power Meta's data center in Richland Parison

12/05/2024

CONTACT Brandon Scardigli | 504-576-4238 | bscardi@entergy.com

December 4, 2024 · News Release

Meta Selects Northeast Louisiana as Site of $10 Billion Artificial Intelligence Optimized Data Center; Governor Jeff Landry Calls Investment 'A New Chapter' for State

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Entergy Texas Recent Announcements

Entergy Texas proposes new power plants to support rapid growth in Southeast Texas

06/04/2024

CONTACT | Entergy Texas Media | 281-297-2353 | EntergyTexasMedia@entergy.com

BUSINESS // ENERGY

Sempra will build $13B LNG facility in Port Arthur

By **Amanda Drane**, *Investigative Reporter, Energy*
March 20, 2023

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Entergy Mississippi Recent Announcements

Entergy Mississippi breaks ground on Delta Blues Advanced Power Station

11/07/2024

BUSINESS

Nissan's $661 million deal will bring batteries to Canton, MS, plant. Get the details

Ross Reily
Mississippi Clarion Ledger

Published 11:31 a.m. CT March 19, 2025 | **Updated 11:39 a.m. CT March 19, 2025**

JANUARY 25, 2024

Amazon Web Services plans to invest $10 billion, creating 1,000 jobs to establish data center complexes in Mississippi

BUSINESS NEWS | MDA NEWS

JACKSON, Miss. (Jan. 25, 2024) – Amazon Web Services, Inc. (AWS) is investing $10 billion to establish multiple data center complexes in two Madison County industrial parks. The project is a planned $10 billion corporate investment and will create at least 1,000 high-paying, high-tech jobs.

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Delivering what customers want

Building off unique advantages in our region

Natural advantages

- Infrastructure, access to ports
- Business friendly
- Available sites
- Proven workforce
- Welcoming communities
- Existing energy infrastructure

What Entergy brings to the table

- Timely new service
- Clean energy
- Value and affordability
- Customer partnership
- Reliability and resilience
- Ability to bring stakeholders together

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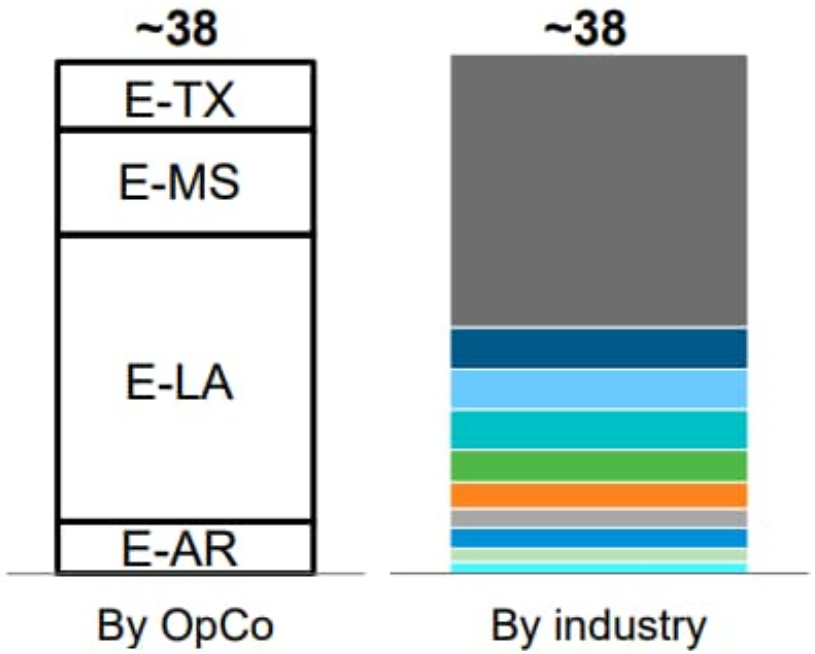
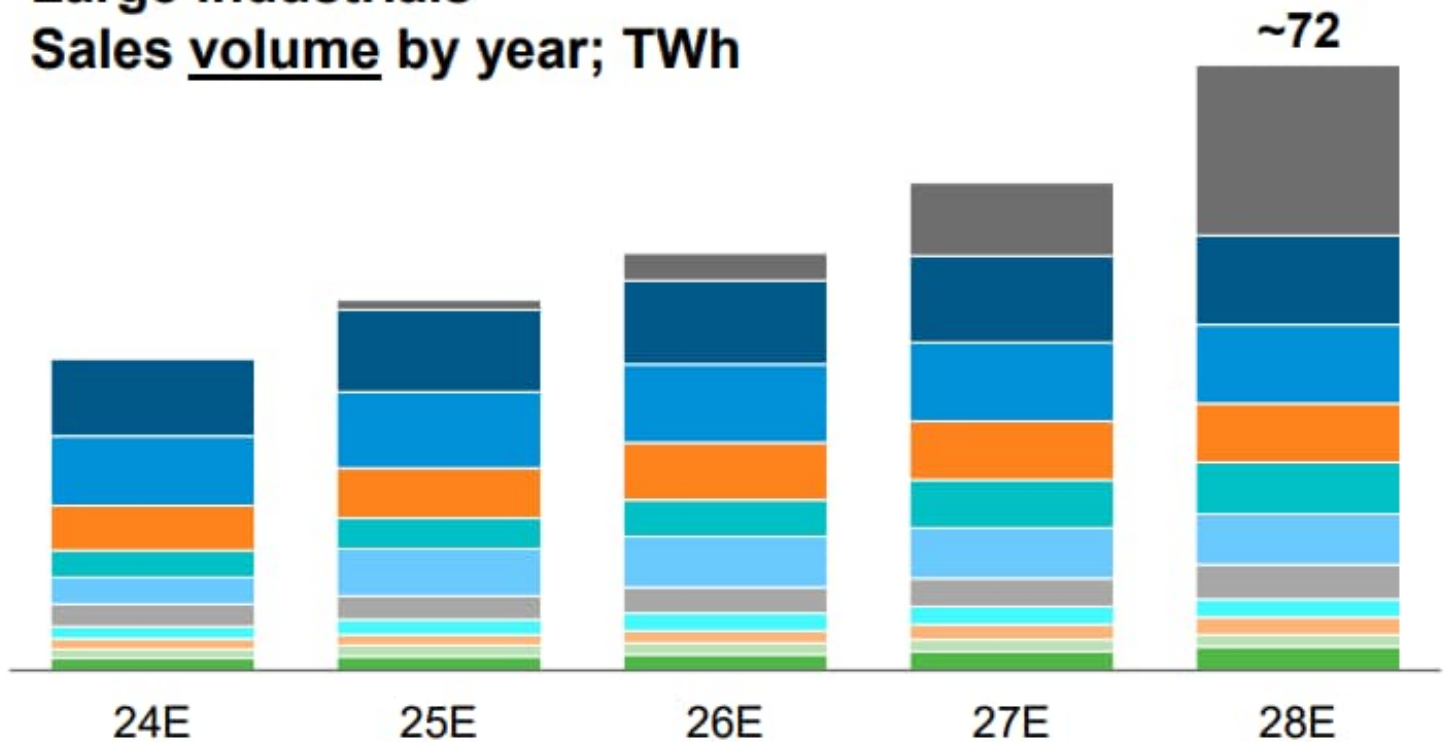
Diversified large industrials

Industry and geographic diversity

Large industrials
Sales growth 28E vs 23; TWh



Large industrials
Sales volume by year; TWh



- Other
- Transportation
- Chlor-alkali
- Technology
- Primary metals
- Petroleum refining
- Other chemicals
- Industrial gases
- Data centers
- Agricultural chemicals
- Petrochemicals

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03

Carbon Capture Overview

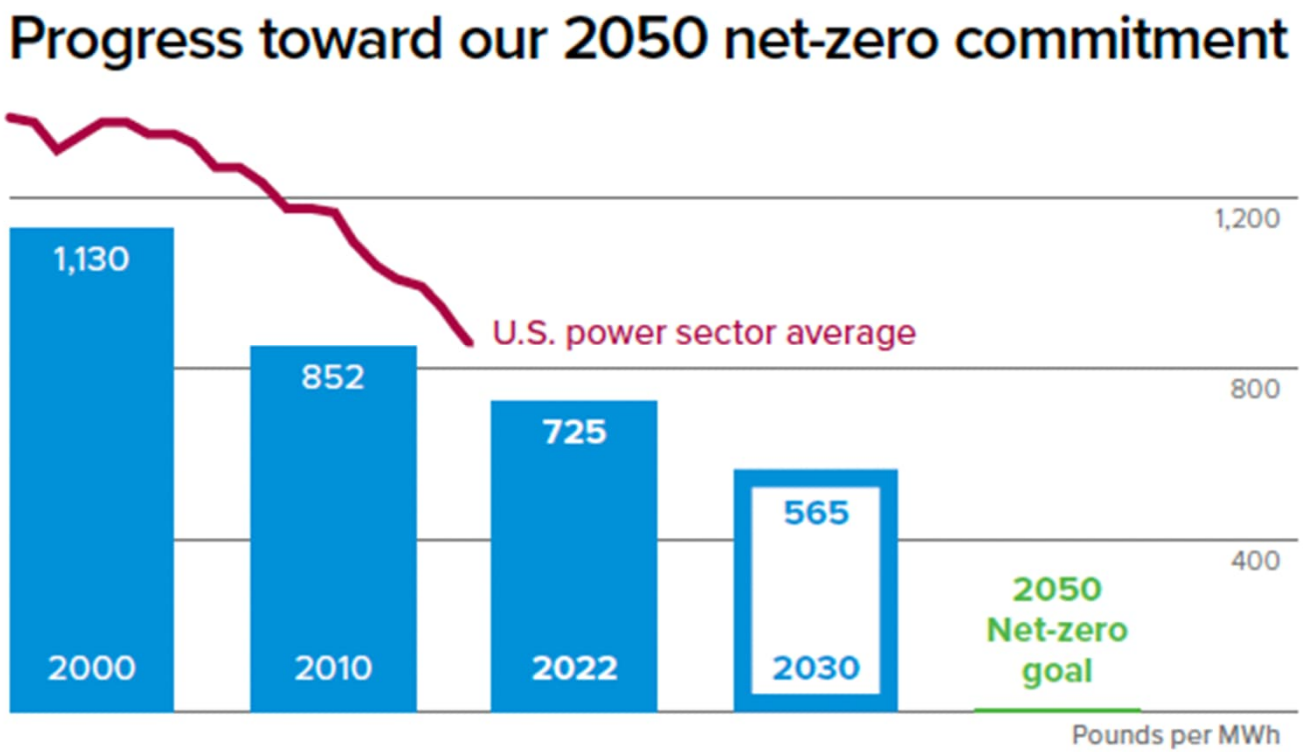
Entergy is committed to net-zero emissions by 2050

Carbon-free energy capacity of 50% by 2030.

- Includes all nuclear and renewable capacity, both owned and purchased.
- Additional capacity is provided by some accompanying battery storage paired with renewables.

Carbon dioxide emission rate reduction of 50% by 2030.

- Includes all generation, owned and purchased.
- 2000 base year.



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CCCTs and CTs Are Key to Meeting Near-term Growth While Providing Path to Low Carbon Power

	Customer economics	Capacity contribution	Energy contribution	Reliability attributes	Geographic availability	Execution timing (years)
CCCT w/ carbon capture	◕	●	●	●	◕	5-9
On-system wind	◕	◑	◔	◔	◑	5-7
Off-system wind	◔	◕	◑	◔	◔	7-11
Solar	◕	◔	◔	◔	◕	3-5
Solar + battery	◑	◑	◔	◑	◕	3-5
Nuclear SMR	○	●	●	●	●	10-15

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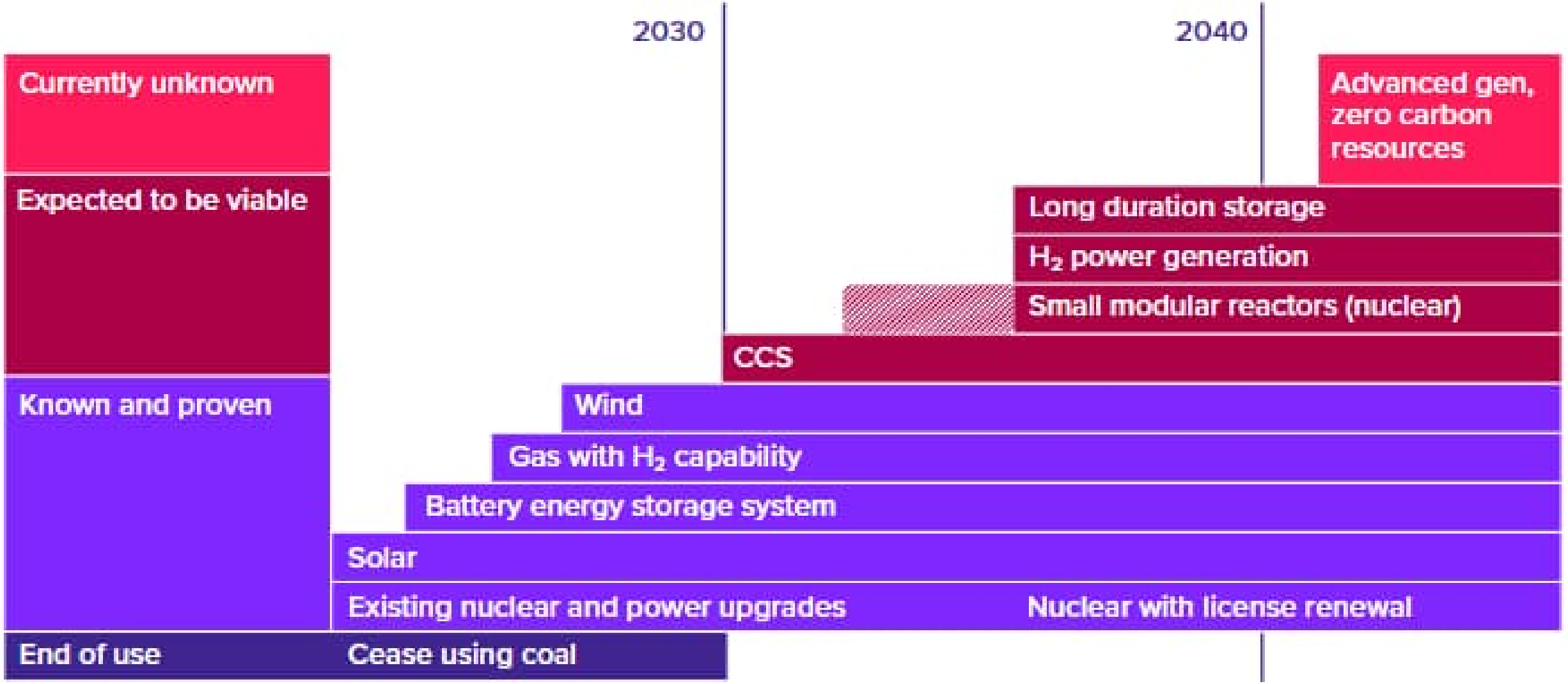
Clean energy transition technologies (illustrative)



Our plan to achieve net-zero carbon emissions includes cleaner, low-carbon-emitting and carbon-free technologies ranging from those that exist today to those that are maturing. This chart provides an illustrative view of a potential timeline for adopting these technologies. Additionally, our plan includes ceasing use of coal by the end of 2030.

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Why CCS?

Serving critical customer needs

Timely new service

- Building combined cycle combustion turbine (CCCT) plant first, and subsequently CCS (or staggered), is the only feasible near-term solution to meet the ***timing*** and ***scale*** needs of hyper-scaler customers

Value and affordability

- With tax incentives from Inflation Reduction Act (IRA), CCCT + CCS provides one of ***lowest cost*** low carbon solutions for base load customers

Clean energy

- CCS removes 95% of CO_2 from gas plant emissions, resulting in ***lower lb/MWh carbon emission rate*** than feasible local renewable with battery backed by gas plant without CCS, especially for high load factor customers

Reliability, resilience

- ***Enhanced system reliability*** compared to renewable only solutions

Risk mitigation

- ***Pathway to comply*** with EPA Section 111(b) that sets new source performance standards for new, modified, and reconstructed fossil fuel fired power plants to have CCS – COD by 1/1/2032

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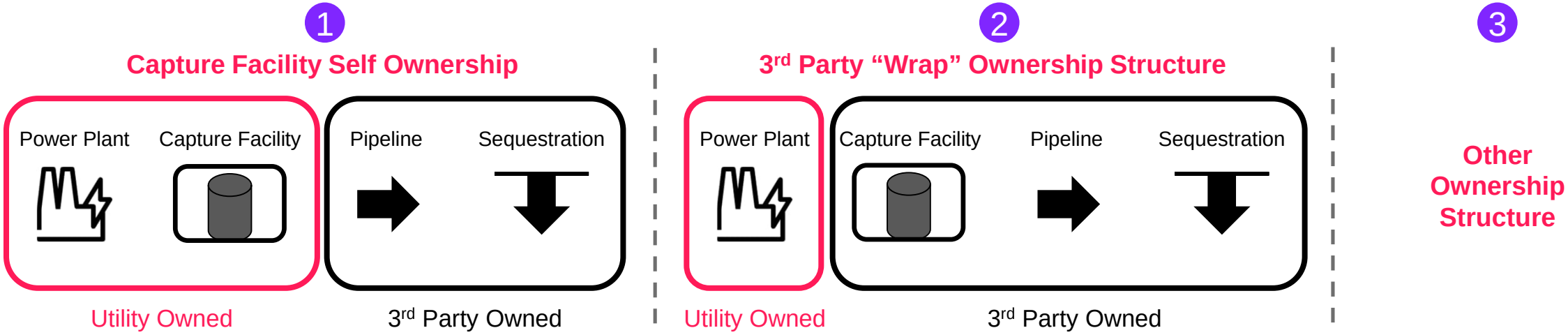
Utilities have multiple key considerations for CCS

Key considerations for CCS within a utility framework include:

- **Ownership structure** should appropriately consider the risks and benefits to the



- **Evaluation of dispatch economics inclusive of 45Q tax credits** – tax credit provides a significant portion of the customer net benefit analysis, but is allocated on a $/tonne captured basis, so careful consideration should be given to how the plant is estimated to run under market dispatch inclusive of tax credits and CCS costs

- **Meeting customer needs** – CCS provides 24/7 low carbon power, but customers are serving worldwide markets with different regulatory/legislative treatment of scope 2 emissions

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Developing CCS with plan to deploy at LCPS

When operationally and financially feasible; not yet included in capital plan

DOE-funded FEED study

- $18M project ($9M funded from DOE award)
- Outcomes:
  - Scope of work for construction and operation
  - +/- 15% cost estimate
  - Project schedule

CCS service feasibility study

- Crescent Midstream developing comprehensive feasibility assessment
- ETR developed contract for carbon capture as a service (wrap) to define commercial framework
- Crescent's partners in the project:
  - Samsung E&A (EPC)
  - Honeywell (technology provider)

CCS funding options

- DOE awards
- IRA 45Q tax credits for carbon sequestration
- Subscription-based customer tariff

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Overview of DOE FEED study award

- Lake Charles Power Station Plant information:
  - 994 MW natural gas fired power plant
  - Located in Westlake, Louisiana
  - Relatively new plant – commercially online in 2020
- The study will develop a cost estimate for construction and operation of CCS at this location
- Pre-FEED study completed in 2022
- LCPS chosen for the study due to:
  - Age of the plant
  - Proximity to CO2 infrastructure
  - Available land for the carbon capture facility
  - Availability of water
- Results of the study will inform options for Entergy's broader natural gas power generation fleet
- Partners for the FEED study include Sargent & Lundy, Kiewit, Mitsubishi Heavy Industries, and Talos Energy*

Lake Charles Power Station

1. The Talos business unit that this project was associated with was acquired by TotalEnergies.

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Overview of CCS Service Feasibility Study

3rd Party "Wrap" Ownership Structure

- The study will develop a cost estimate 3rd party construction and operation of CCS for a service fee.
- Structure provides option for a subscription-based customer tariff cover service fee.
- Lake Charles Power Station CCS Service Feasibility Study:
  - Crescent Midstream
  - Samsung E & A
  - Honeywell (technology provider)
- Current RFPs for 3rd Party "Wrap" Ownership Structure
  - Legend Power Station (TX)
  - EML (MS)

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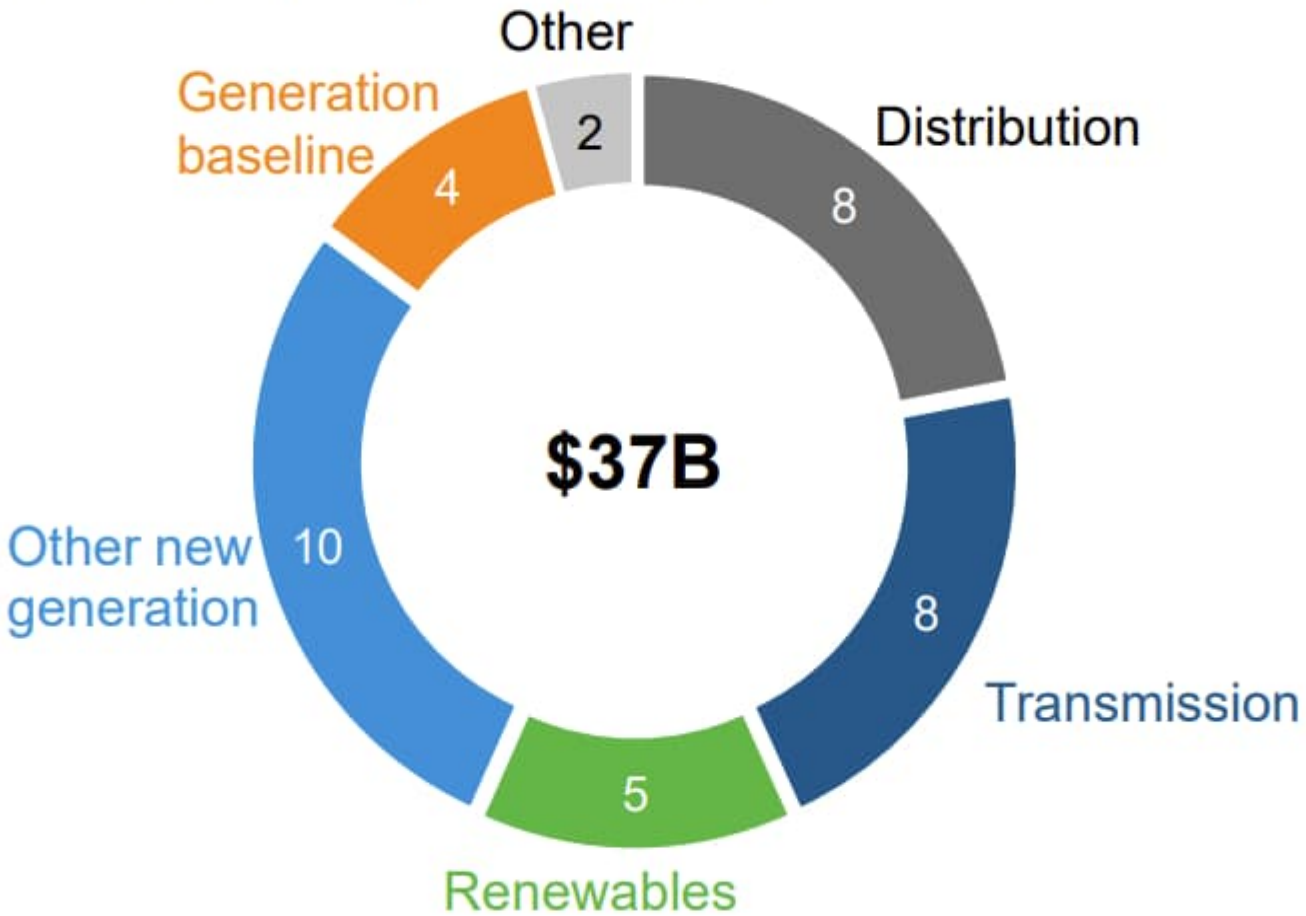
04 Questions

04 Appendix

Investing for customer benefits

Four-year capital plan

25E–28E capital plan by function[1]



Calculations may differ due to rounding

1. Excludes capital funded with contribution in aid of construction from customers

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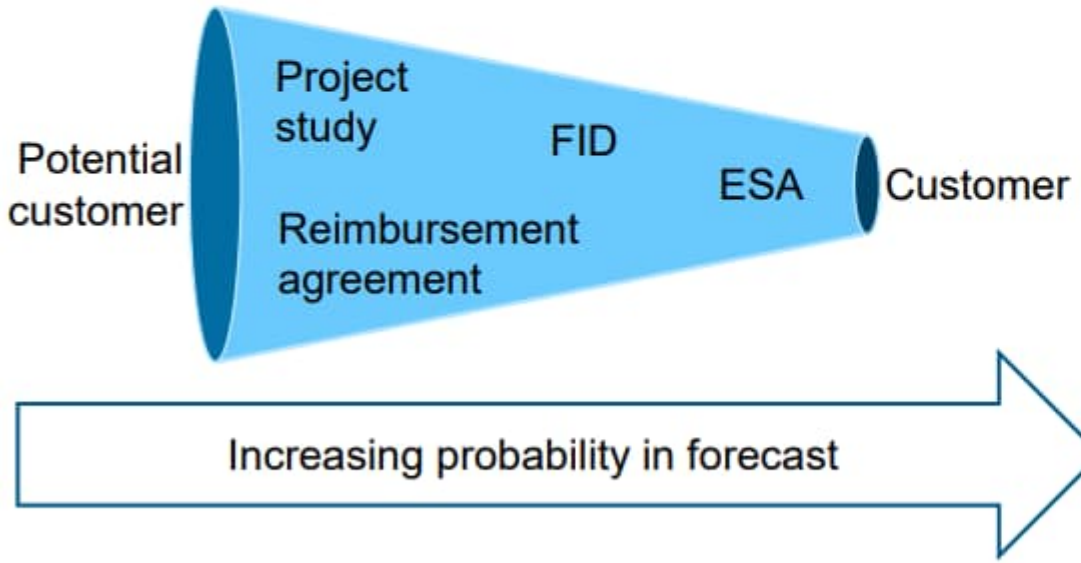
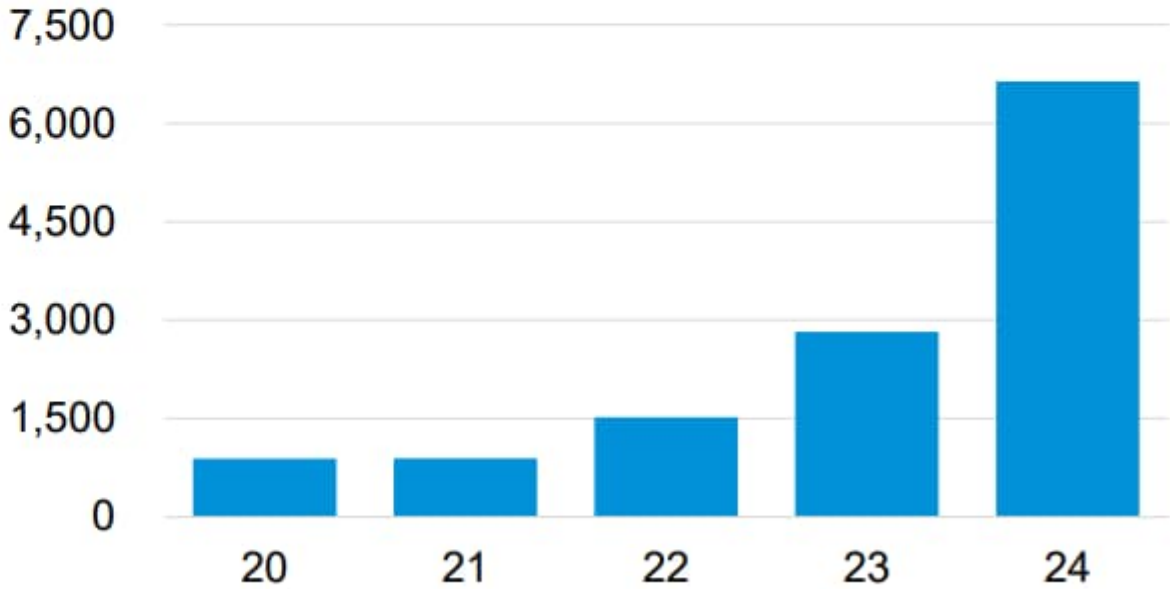
Entergy is attracting new customers

Pipeline shows robust growth in all stages

Customer pipeline development



Growing backlog of ESAs[1]; MW



1. Electric service agreements in place with future in-service dates

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Entergy Supply Plan is Aligned to Customer Needs

Customers' Priority of Demands Are Often…

- ❑ Speed
- ❑ Price
- ❑ Clean or Path to Clean

…Which is Aligned to Entergy's Generation Supply Planning Philosophy of Balancing

- ❑ Reliability
- ❑ Affordability
- ❑ Sustainability

There are many external factors that impact our long-term planning goals, but our primary focus is Affordability, Reliability, and Sustainability.

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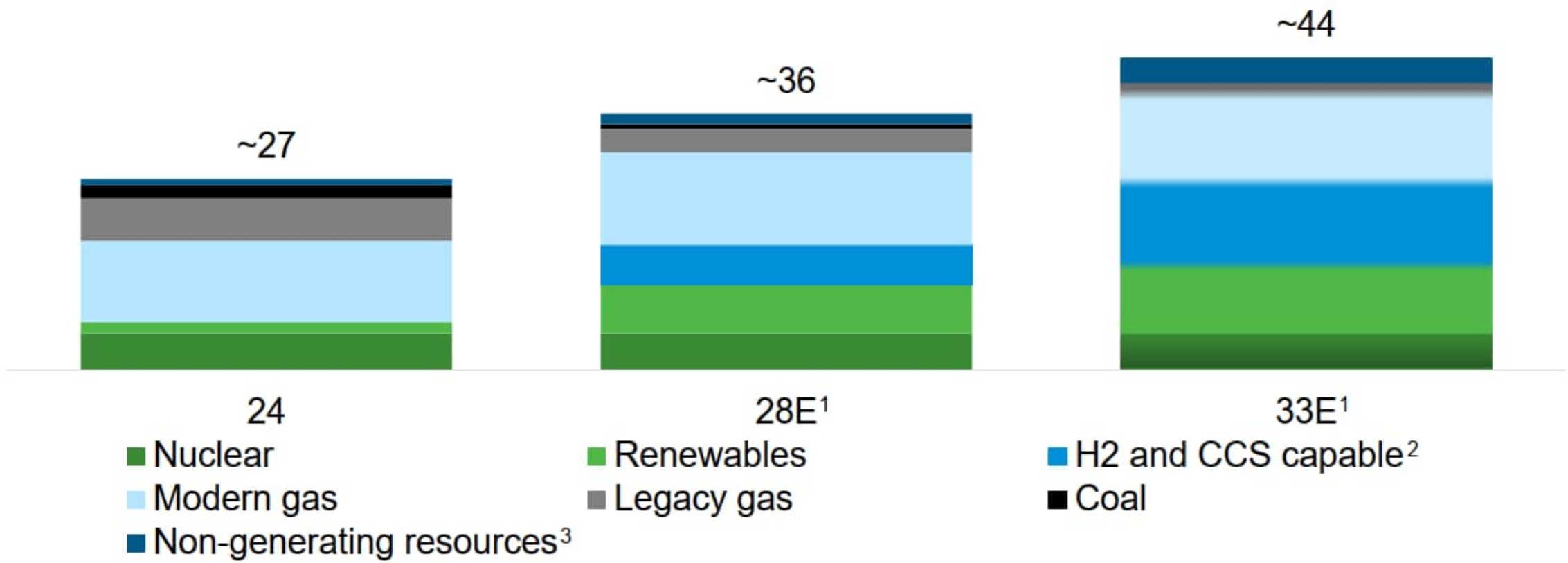
A clean portfolio that supports growth

Expanding renewables, planning for optionality with H_2, CCS

Planned resource capacity; GW



Includes owned resources and purchased power contracts
1. Subject to integrated resource planning processes, economic evaluations, and regulatory approvals
2. H_2 capable turbine technology with carbon capture optionality
3. Includes load modifying and storage resources

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Wind and Solar Cannot Supply High Factor Loads Alone

While wind, solar, and batteries are a key part of generation supply plans, gas power plants can fill critical hourly generation needs

100 MW Solar and 100 MW Wind Average Hourly Output (MWh)

Illustrative

Example Summer Load Curve

Example Summer Load Curve

Opportunity for Battery Resources

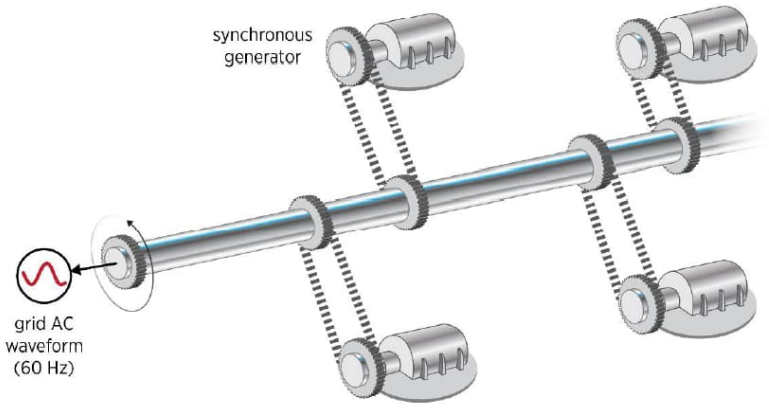
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

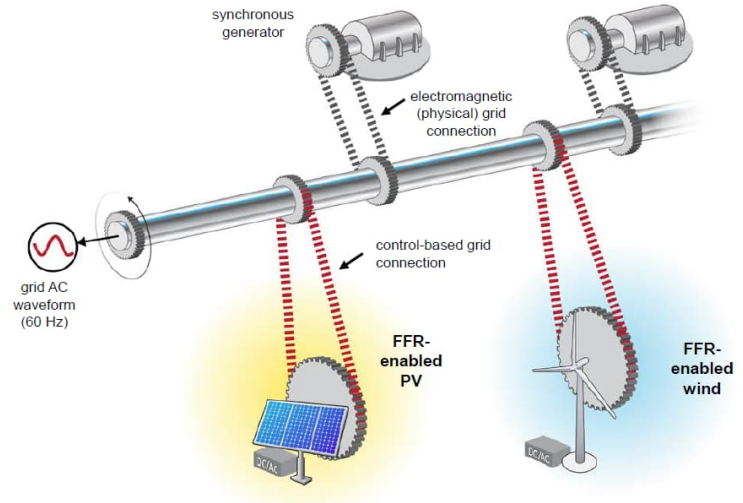
Solar Hourly Average Capacity Factor

Wind Average Hourly Capacity Factor

Inertia and power system reliability

As conventional rotating generators are replaced with inverter-based technology, the grid is facing new challenges to maintain reliability





- In the power grid, inertia is derived from many generators synchronized at the same frequency
- These generators all work to contribute to grid inertia
- Grid frequency can drop if a large power plant or transmission line fails
- Inertia resists this drop in frequency by providing stored energy and gives the grid time to rebalance
- Inertia is only one of several grid services that help maintain power system reliability

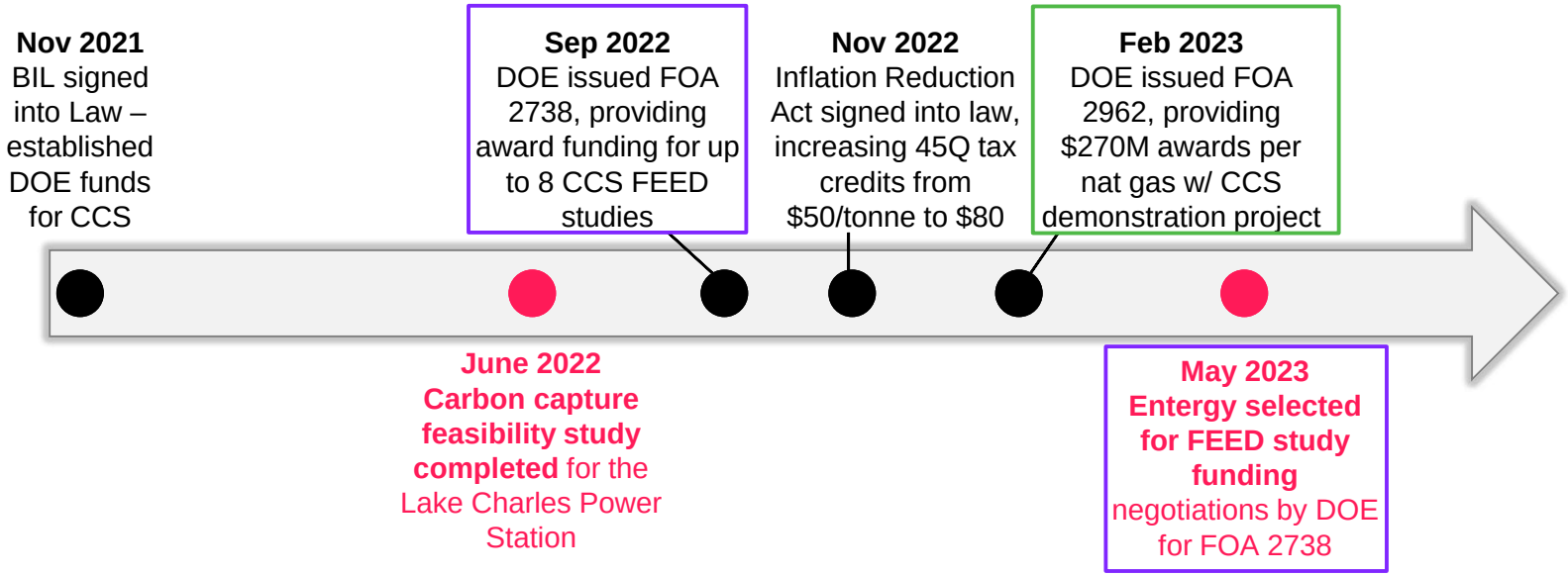
- Some new generator technologies, like wind and solar, are connected through inverters
- Inverter based resources decrease the amount of system inertia available
- These resources, if configured correctly, can provide fast frequency response (FFR)
- Interconnection and reliability standards must and will evolve to maintain system reliability
- Rotating generators continue to play a critical role in maintaining grid frequency

Figures and information used from *Inertia and the Power Grid: A Guide Without the Spin*. Denholm, Paul, Trieu Mai, Rick Wallace Kenyon, Ben Kroposki, and Mark O'Malley. 2020. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6120-73856. https://www.nrel.gov/docs/fy20osti/73856.pd

Entergy selected for DOE FEED study award for the Lake Charles Power Station

Government Actions

Entergy CCS Milestones



There are **2 distinct funding opportunities from the DOE** from the Bipartisan Infrastructure Law:

- **FOA 2738 → allocates funding for up to 20 FEED studies for CCS**
  - DOE will co-fund up to 50% of the cost of the study (up to $10 million)
  - Entergy was one of 8 projects selected for this award

- **FOA 2962 → allocates funding for construction of CCS projects**
  - Completed FEED study is a pre-requisite
  - Future similar funding opportunities expected

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Many C&I customers looking to address lifecycle emissions and time matching requirements

Many industrial customers are now addressing decarbonization through a lens of lifecycle emissions with key requirements like hourly time matching.

Several recent legislative/regulatory requirements that customers are working to comply with include:

- **European Carbon Border Adjustment Mechanism – taxes on direct and indirect carbon emissions** for a variety of imported products (e.g., steel, cement, fertilizer, hydrogen, etc) starting in 2026
- **US and EU green hydrogen requirements** (e.g. 45V Hydrogen PTC) – **include requirements for hourly time matching**


EU launches first phase of world's first carbon border tariff

By Philip Blenkinsop and Kate Abnett

October 2, 2023 10:44 AM CDT · Updated 4 months ago

Lifecycle Emissions Segments

Type	Description
Scope 1	Direct emissions (i.e., out of your own stack)
Scope 2	**Indirect emissions produced on your behalf (e.g., grid emissions for electricity consumed)**
Scope 3	Additional indirect emissions up and down the value chain (e.g. employee commuting)

Where we can assist customers

1. https://www.reuters.com/business/environment/eu-launches-first-phase-worlds-first-carbon-border-tariff-2023-09-30/

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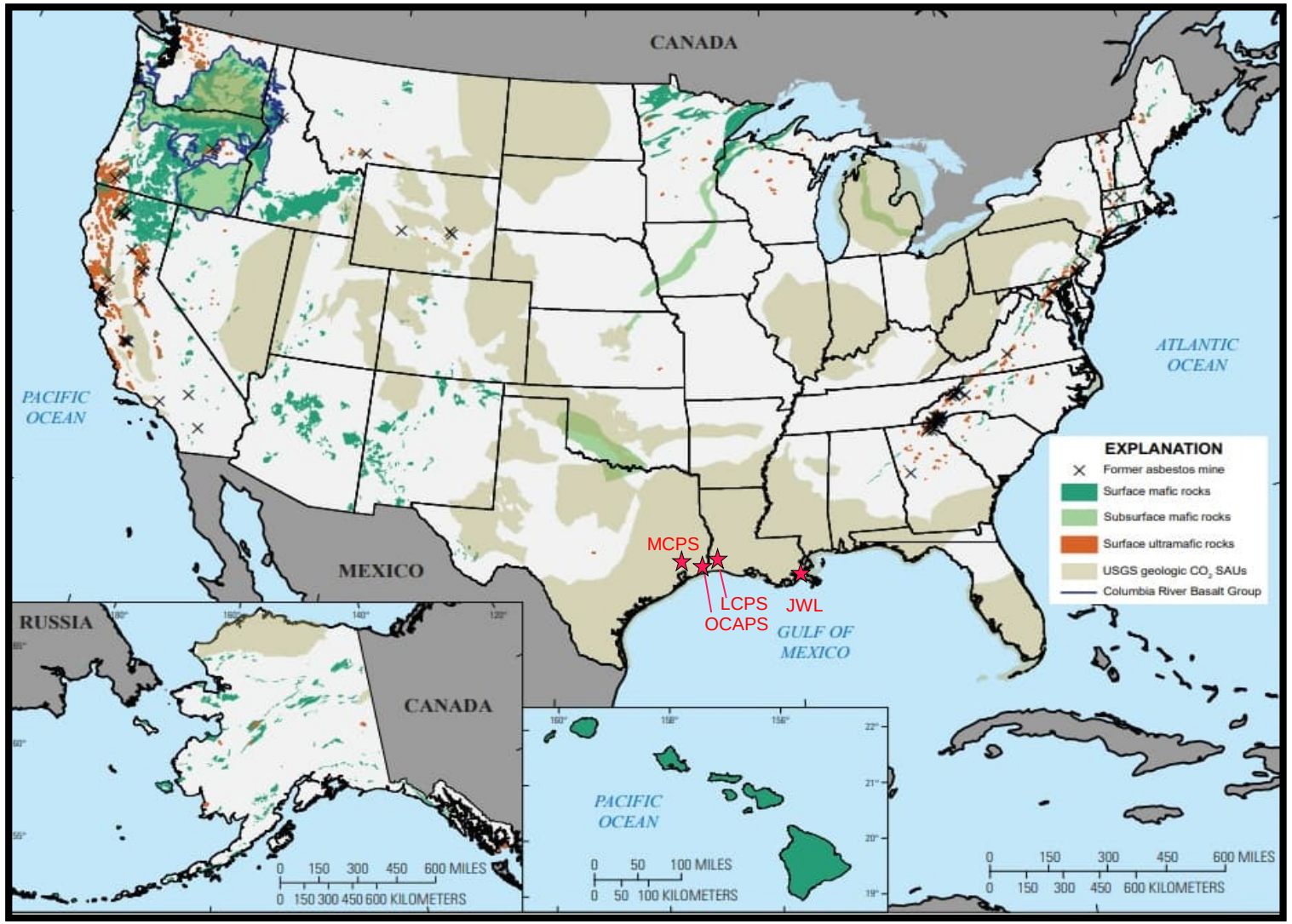
Gulf South advantaged with geological attributes for storage and existing pipeline infrastructure



Gulf Coast experience:

- Approximately 740 miles of pipelines in MS, LA, E-TX with several sources of CO_2.
- 3 large main lines located between MS, LA, E-TX recently acquired by ExxonMobil.
  - Green Line
    - S. Houston Area to SE LA
  - NE Jackson Dome
    - Jackson Dome to SE LA
  - Delta
    - Jackson Dome to N. LA

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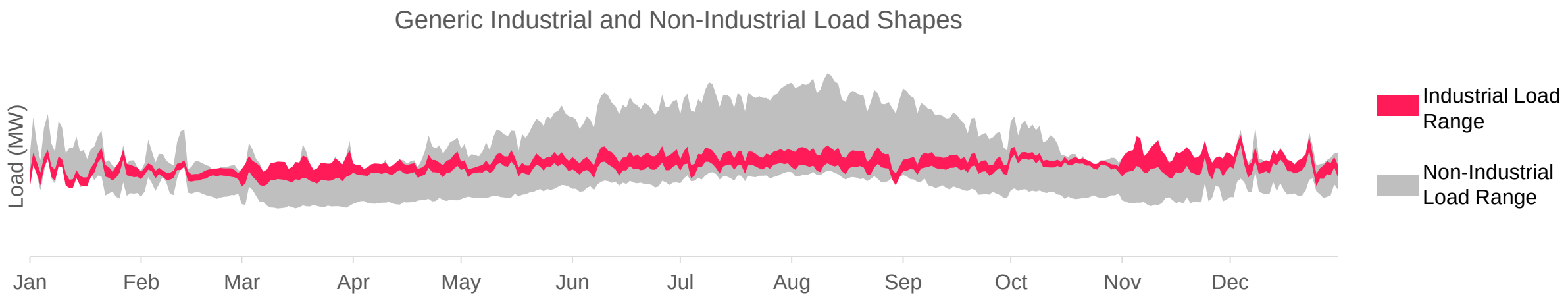
Customers are asking for 24/7 low carbon power – Industrial customers facing carbon taxes abroad

- >40% of customer base comprised of industrials

- Carbon taxes abroad and focus on sustainability are driving unique interest amongst industrials
  - Industrial customers have high load factors (similar usage at night versus the day)
  - EU Carbon Border Adjustment Mechanism



Multiple existing and planned carbon capture power generation projects in North America

Number of carbon capture projects in North America is increasing

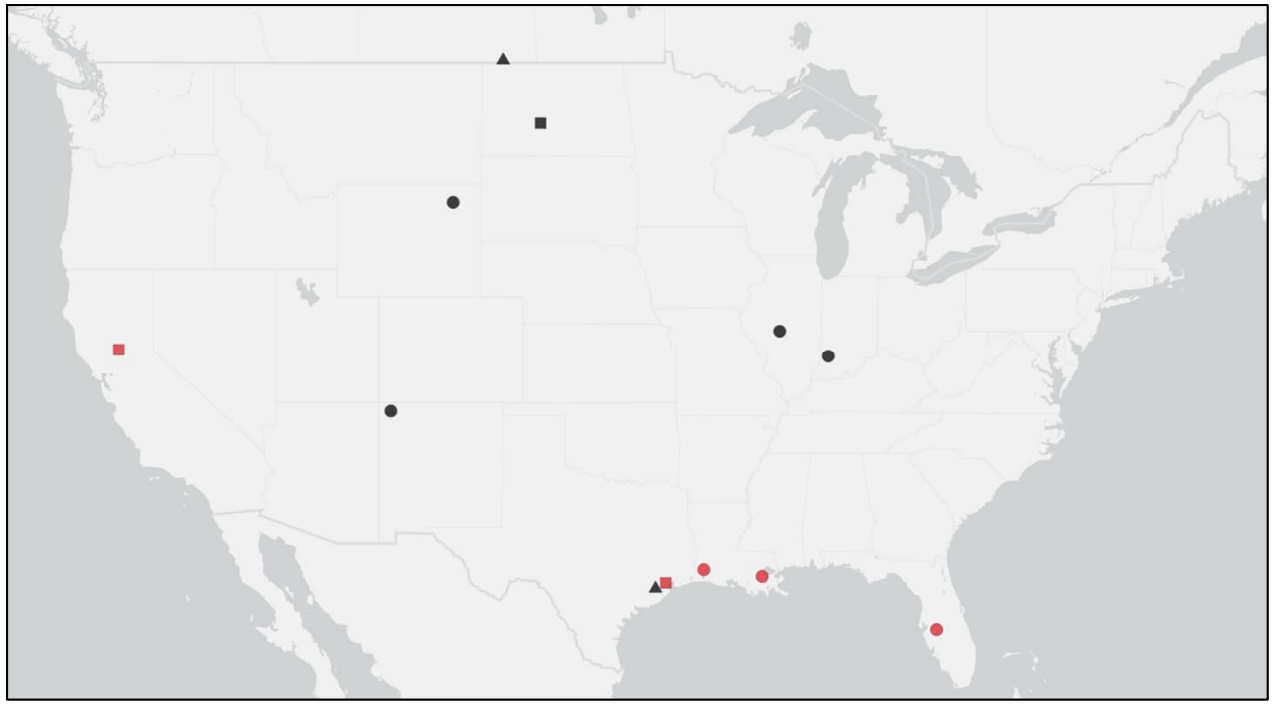
- 2 facilities in operation today at coal plants
  - Petra Nova ~1.4 MMTPA[1] CO_2[2] (near Houston)
  - Boundary Dam ~1.0 MMTPA CO_2 (in Canada)

- The DOE recently announced up to $890M in funding awards for carbon capture and storage at 3 power plants:
  - Baytown Energy Center 2.0 MMTPA CO_2 (CCGT near Houston)
  - Sutter Energy Center 1.75 MMTPA CO_2 (CCGT in California)
  - Milton Young Station 4.0 MMTPA CO_2 (Coal plant in North Dakota)

- The DOE announced awards for FEED studies for 9 carbon capture projects, including 7 at power plants
  - 3 natural gas power plants, including LCPS/Entergy and Taft/Occidental in Louisiana
  - 3 coal plants and 1 IGCC plant

1. MMTPA refers to million metric tonnes per year.
2. For reference, the emissions capacity at the Lake Charles Power Station is roughly 3.2 MMTPA (or 2.5 MMTPA at an 80% capacity factor) and the emissions capacity at Legends/Sawgrass is ~2.3 MMTPA (or ~1.8 MMTPA at an 80% capacity factor).

Location of carbon capture projects



Legend

Status	*Power Type*
△ In service	Red = Nat Gas
□ DOE construction award	Black = Coal or IGCC
○ DOE FEED study award	

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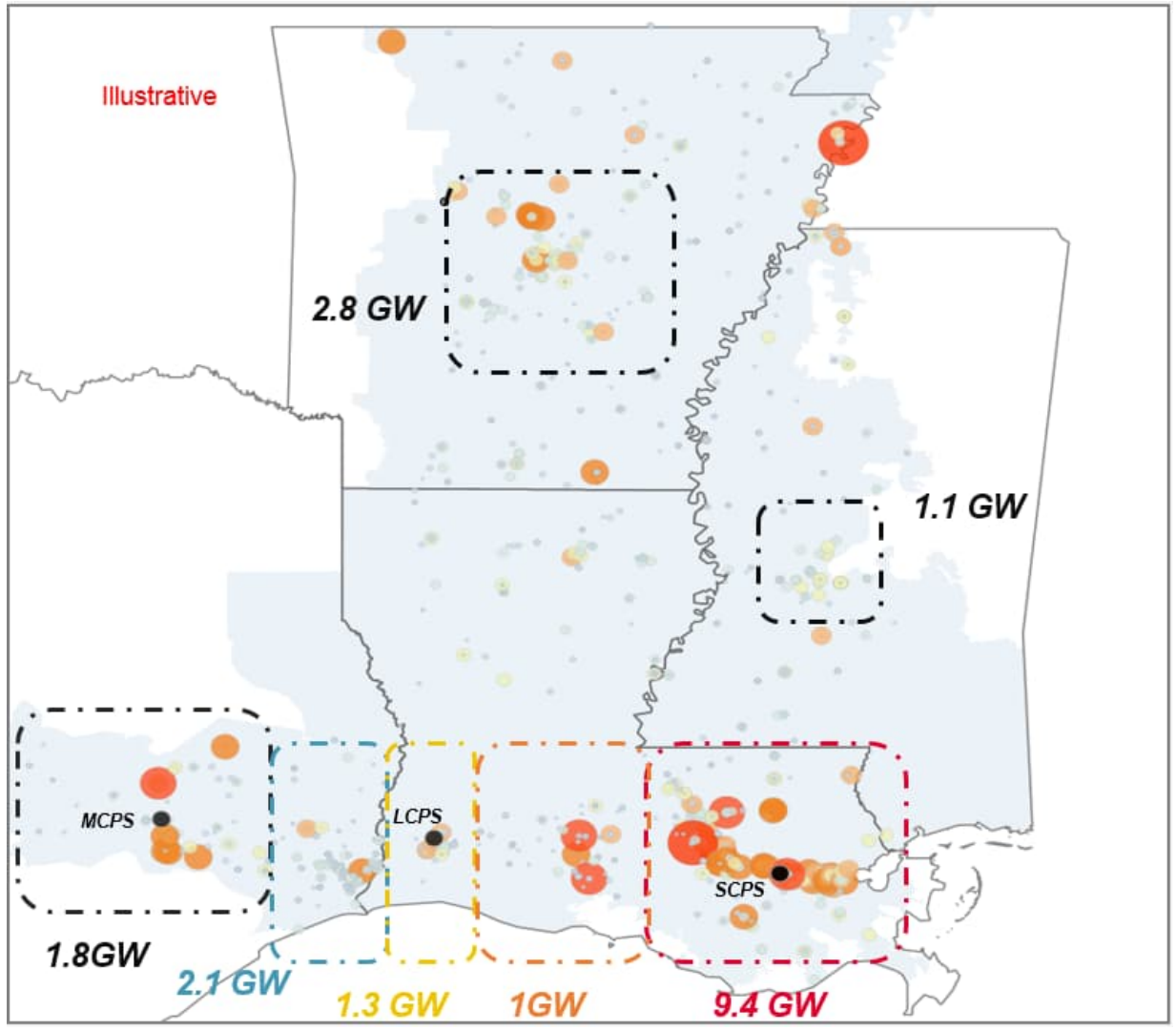
Different load types require different resource requirements



The majority of demand is located along the Gulf Coast.

LEGEND

- MISO South
- CCGT Additions
- Cities

Bus level loads at peak [1]

- 140 – 400 MW
- 60 –140 MW
- 30 – 60 MW
- 0 – 30 MW

1. S&P Global, bus level peak loads, 9/18/2018