Item#2024-114

THE ENERGY AUTHORITY - INTRODUCTION

ORIGINS OF TEA

TEA
THE EnergyAuthority

TEA TODAY

PUBLIC POWER

- Local Ownership, Control & Governance
- Non-Profit
- Physical Complexity
- Public Pressures

ENERGY MARKET

- Financial Complexity
- Dynamic
- Competitive
- Data Intensive
- Specialized Skillsets

TEA THE EnergyAuthority

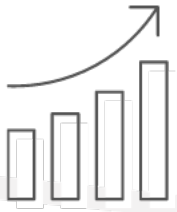
OUR MISSION

MAXIMIZE THE VALUE OF OUR CLIENTS' ASSETS IN THE WHOLESALE ENERGY MARKETS

ECONOMIES OF SCALE

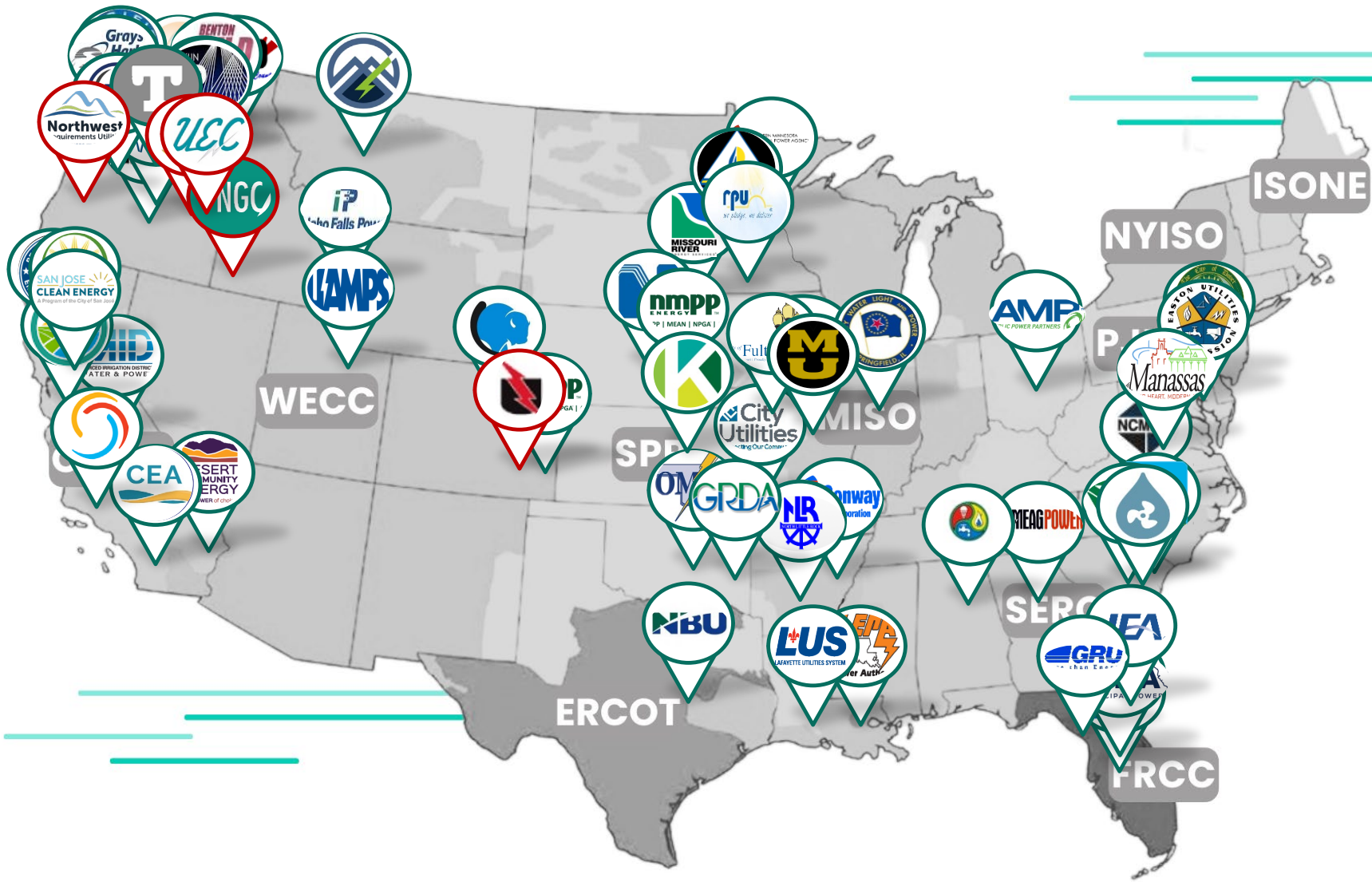
> 60 PUBLIC POWER CLIENTS

- Over $5B in gross revenues in 2022
- 240 employees
- Offices in Jacksonville, FL & Bellevue, WA



- Over 200,000 transactions per year
- #1 in volume among community-owned entities
- Trade across 40 states

- 25,000 MW of Generation
- 30,000 MW of Peak Demand
- > 250 Bcf of NG/year
- 75 Million MWh/year


ISONE
NYISO
WECC
MISO
SPP
ERCOT
SERC
FRCC
Northwest
UEC
NGC
LAMPS
CEA
NBU
LUS
GRU
AMP
nmpp
GRDA
City Utilities
Manassas
MEAG POWER

STRATEGIC SOLUTIONS

ADVISORY SERVICES

BILATERAL ENERGY TRADING

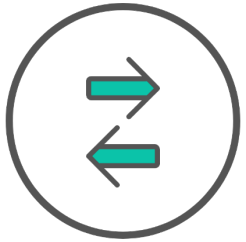
SEEM SERVICES

NATURAL GAS MANAGEMENT

PORTFOLIO MANAGEMENT

RENEWABLE FORECASTING

RENEWABLE RFP PROCUREMENT PLATFORM



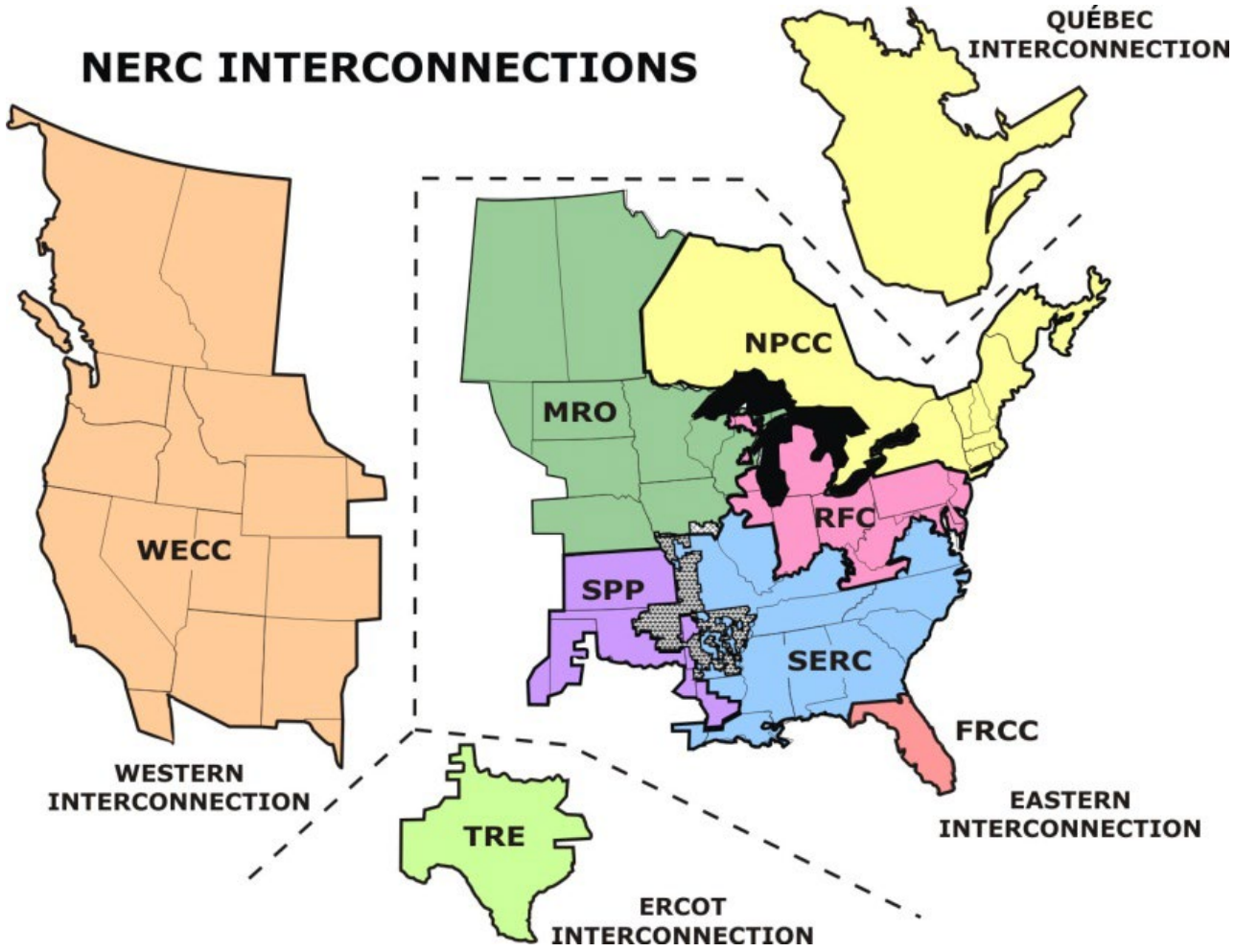
RTO MARKET MANAGEMENT & TRADING

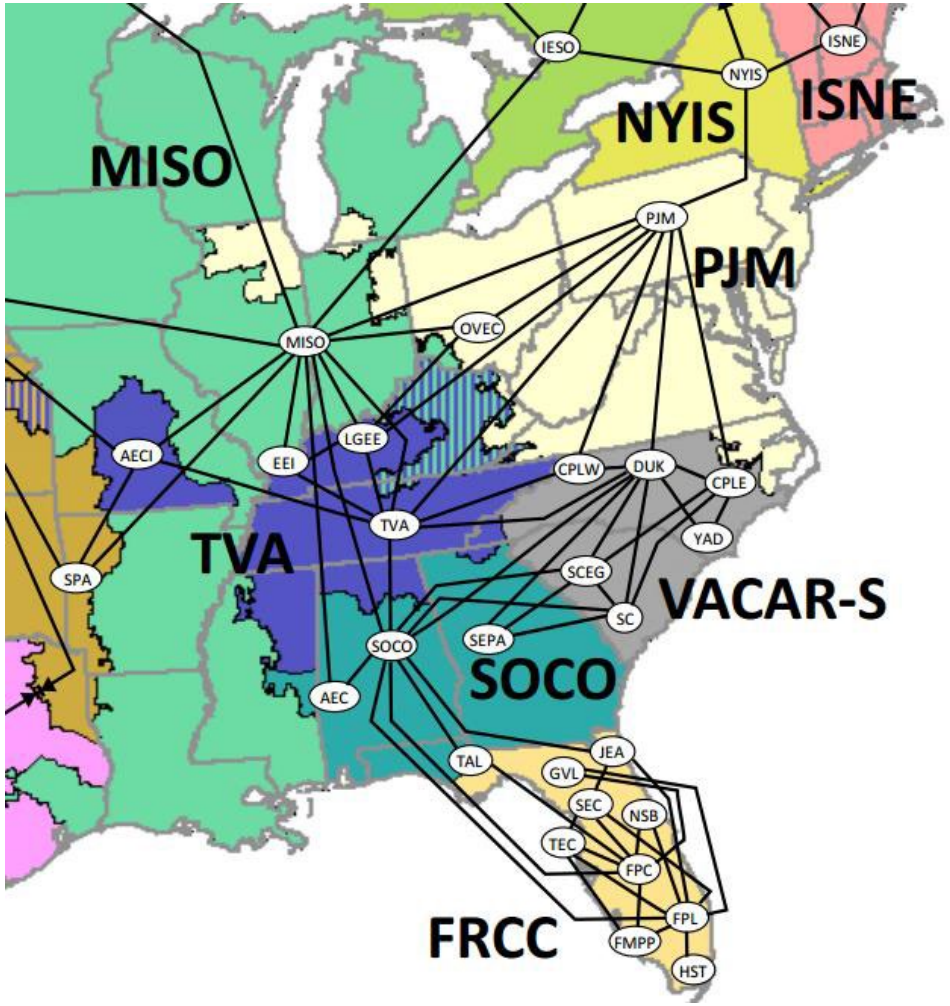
DATA DYNAMICS

STORA OPTIMIZATION ENGINE

MARKET OVERVIEW

BALANCING AREAS – EASTERN INTERCONNECTION



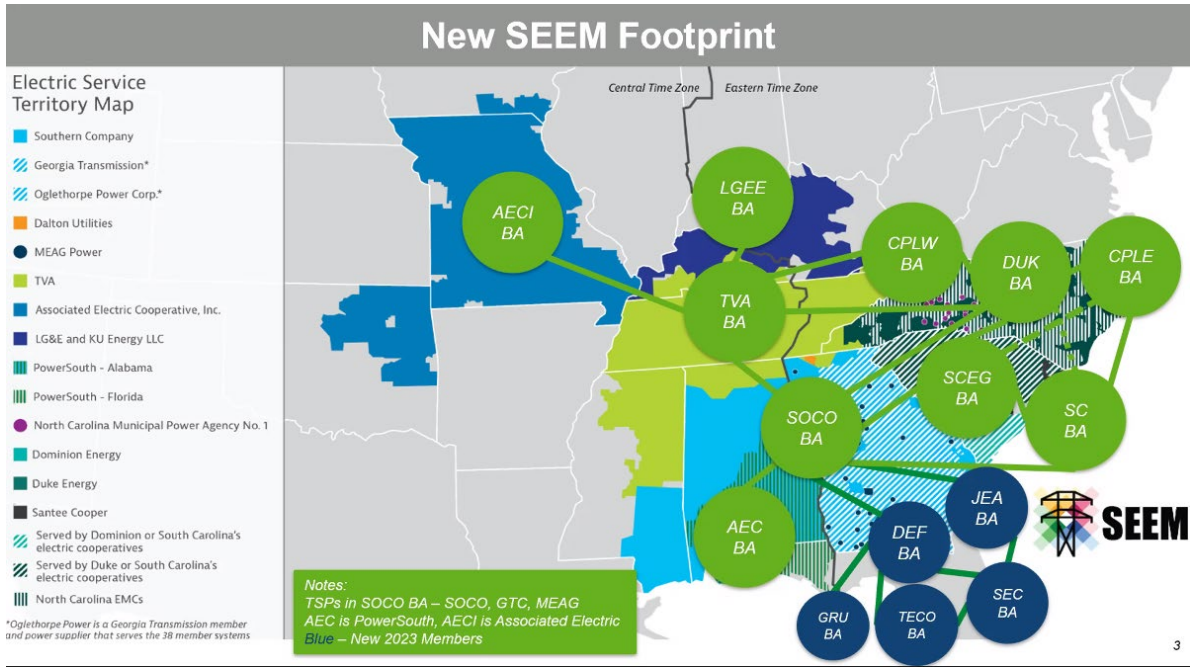


PURCHASES AND SALES BETWEEN UTILITIES

- Factors that affect interchange between utilities:
  - Marginal cost of resources:
    - How does the market compare to utility owned generation?
    - Electricity market is greater than marginal cost, GRU sells electricity into the marketplace
    - Electricity market is less than the marginal cost, GRU purchases electricity from the marketplace and displaces its generation (backs down or turns off a power plant)
  - Load forecast & unit commitments
  - Transmission cost:
    - GRU has only two transmission links to other market players (FPL and Duke Energy Florida)
  - Market liquidity – depth:
    - How many MWs can the market provide? Purchases
    - How many MWs can GRU sell? Sales
  - Credit capabilities:
    - Will GRU be paid by the counterparty and can GRU pay for the power?
  - Risk Management
  - Emergency needs:
    - Utility losses generation and needs power within 15 minutes

MARKET TRANSACTIONS

- Multiple lengths of time for transactions
  - Long-term Power Purchase Agreements (PPA)
    - Can vary in term – but are typically one year or greater through 30 years
      - Example: GRU/Origis PPA for solar
  - Term Transactions
    - Purchase or sell 3 months to one year
  - One-month transactions
  - Cash or Next Day Transactions
    - For tomorrow, or through a weekend and Monday
  - Hourly
  - Southeastern Energy Exchange Market
    - 15-minute increments within the Southeast only



INTEGRATED RESOURCE PLAN (IRP)

IRP PRIMARY OBJECTIVE

Forecasting future demand and supply requirements to determine the optimal mix of resources to minimize future costs while meeting reliability, regulatory, and social expectations

Develop a repeatable process for creating a 20-year strategic resource plan

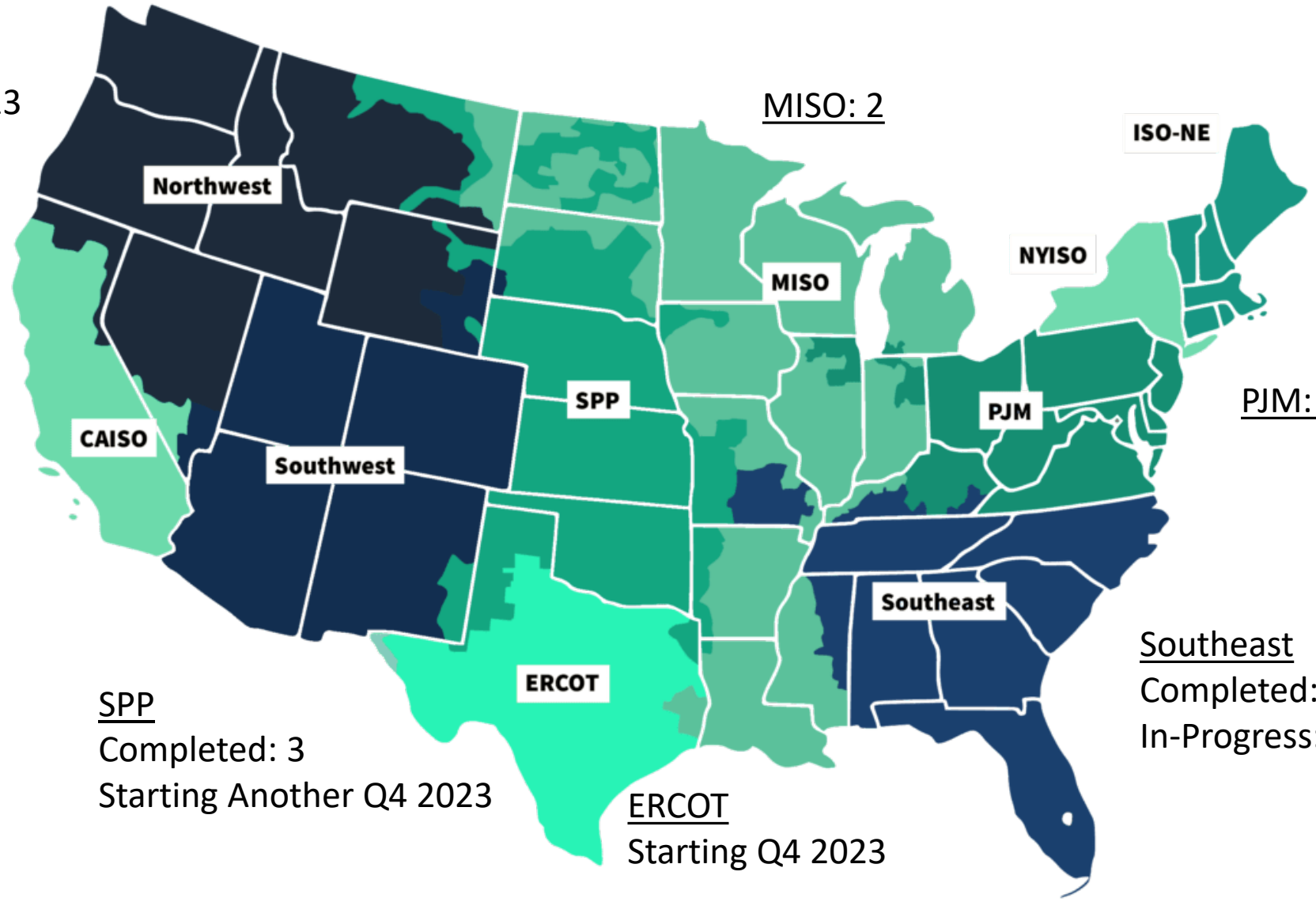
The Strategic Resource Plan is a long-term "buy" or "build" plan for capacity resources needed to meet a utility/state/market capacity, or energy, obligation requirement

TEA IRP Services Since 2017

Pacific Northwest: Bi-annually
Full: 6
Updates: 3
Starting 2-3 Q4 2023

WECC: 1

CAISO: Annually



MISO: 2

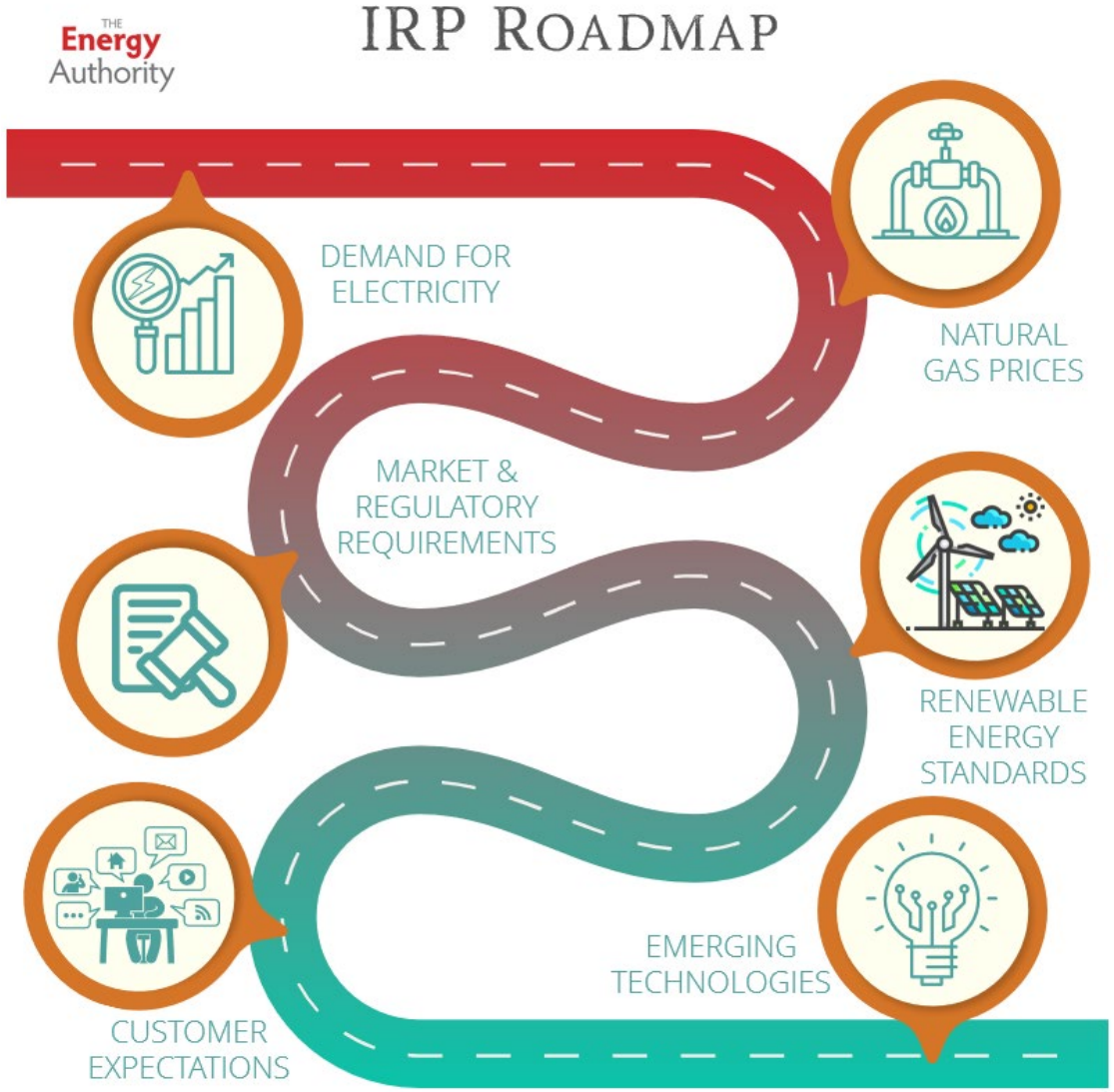
PJM: 2

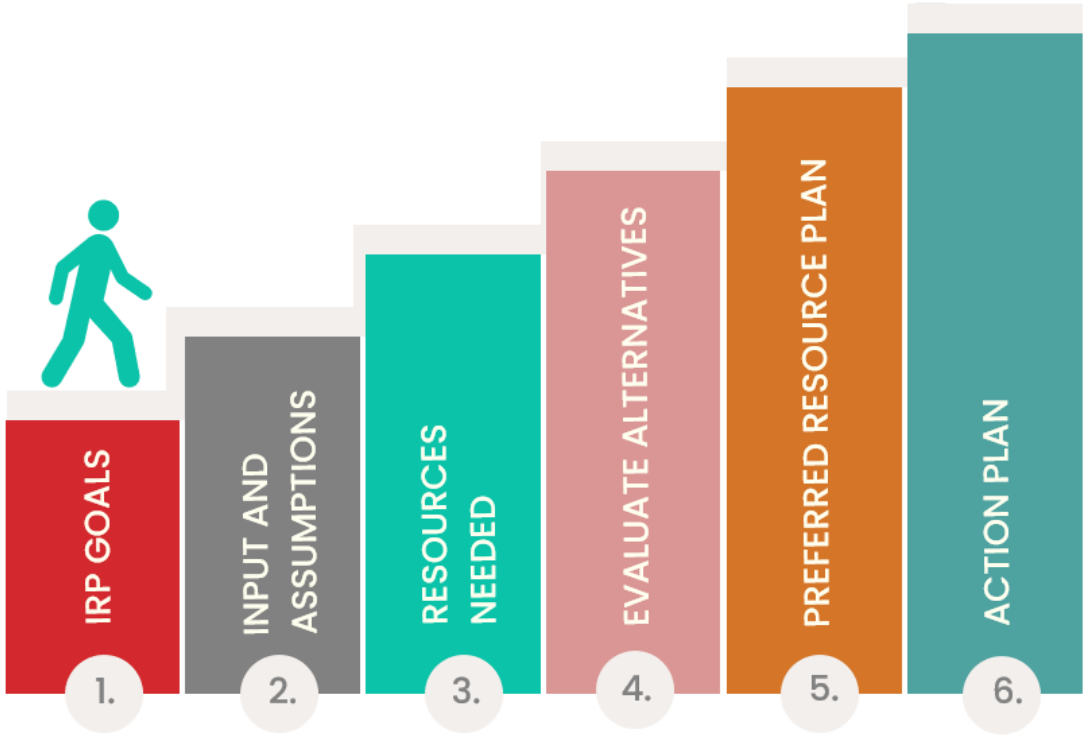
SPP
Completed: 3
Starting Another Q4 2023

ERCOT
Starting Q4 2023

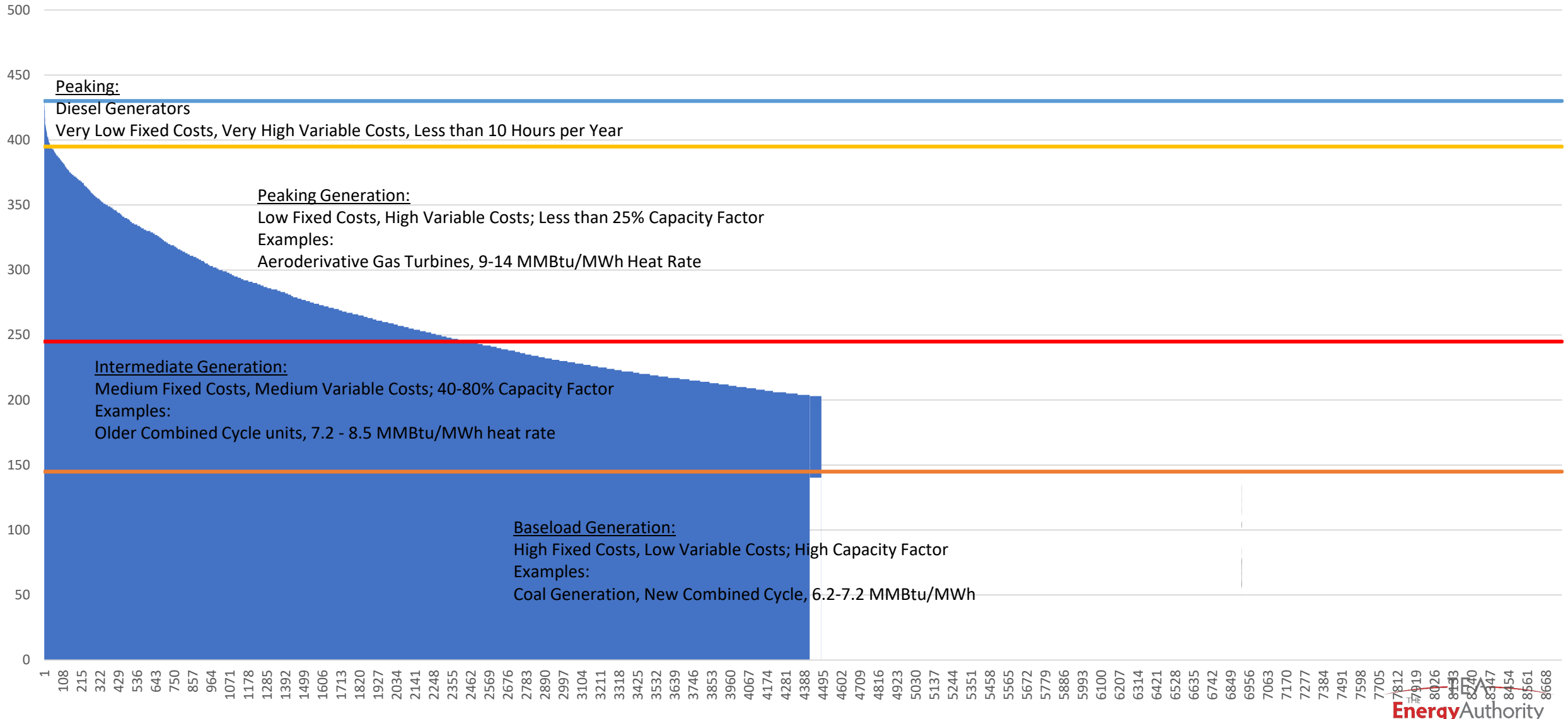
Southeast
Completed: 4
In-Progress: 3

GENERAL IRP PROCESS AND ROADMAP



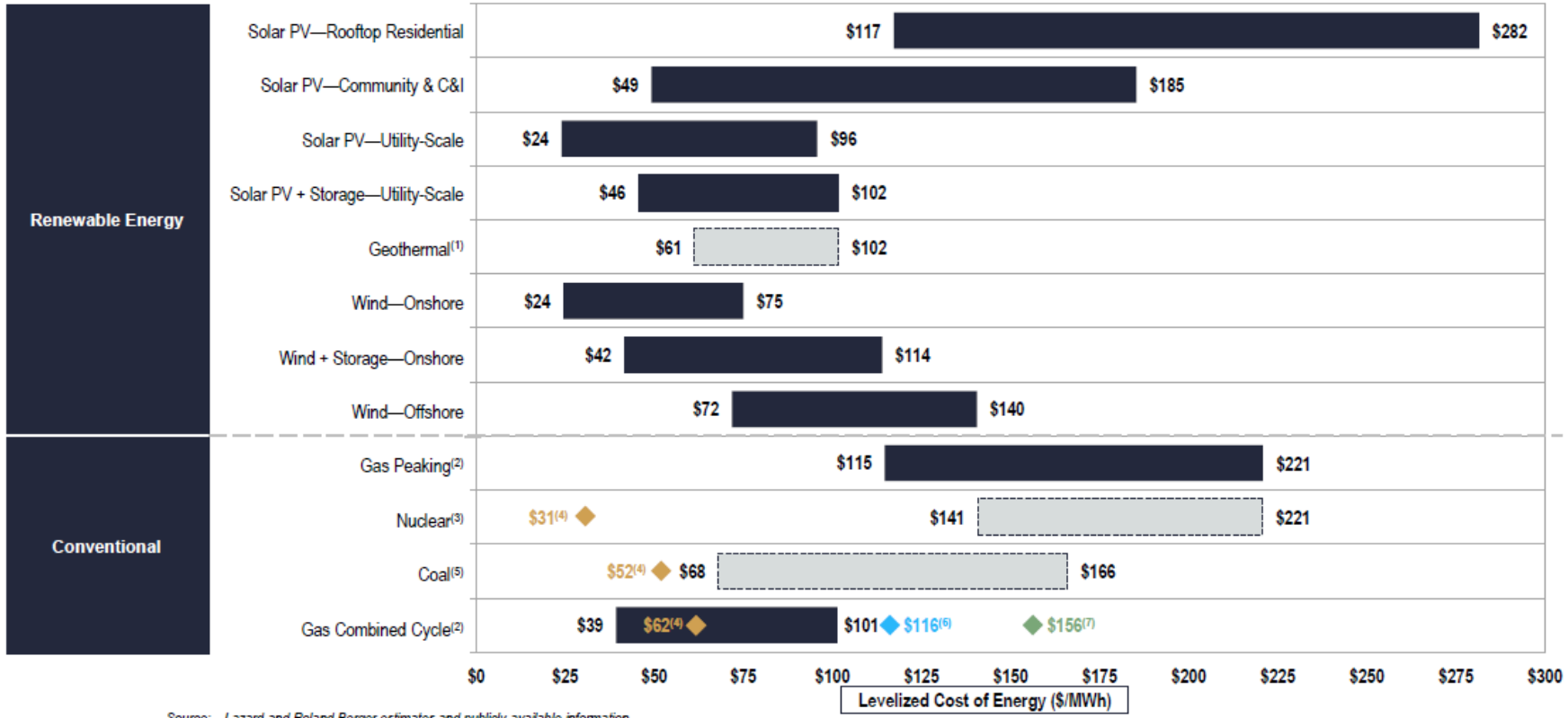


SUPPLY/DEMAND CURVE



Levelized Cost of Energy Comparison—Unsubsidized Analysis

Selected renewable energy generation technologies are cost-competitive with conventional generation technologies under certain circumstances



Source: *Lazard and Roland Berger estimates and publicly available information.*

Note: Here and throughout this presentation, unless otherwise indicated, the analysis assumes 60% debt at an 8% interest rate and 40% equity at a 12% cost. See page titled "Levelized Cost of Energy Comparison—Sensitivity to Cost of Capital" for cost of capital sensitivities.

(1) Given the limited data set available for new-build geothermal projects, the LCOE presented herein represents Lazard's LCOE v15.0 results adjusted for inflation.

(2) The fuel cost assumption for Lazard's unsubsidized analysis for gas-fired generation resources is $3.45/MMBTU for year-over-year comparison purposes. See page titled "Levelized Cost of Energy Comparison—Sensitivity to Fuel Prices" for fuel price sensitivities.

(3) Given the limited public and/or observable data set available for new-build nuclear projects and the emerging range of new nuclear generation strategies, the LCOE presented herein represents Lazard's LCOE v15.0 results adjusted for inflation (results are based on then-estimated costs of the Vogtle Plant and are U.S.-focused).

(4) Represents the midpoint of the unsubsidized marginal cost of operating fully depreciated gas combined cycle, coal and nuclear facilities, inclusive of decommissioning costs for nuclear facilities. Analysis assumes that the salvage value for a decommissioned gas combined cycle or coal asset is equivalent to its decommissioning and site restoration costs. Inputs are derived from a benchmark of operating gas combined cycle, coal and nuclear assets across the U.S. Capacity factors, fuel, variable and fixed operating expenses are based on upper- and lower-quartile estimates derived from Lazard's research. See page titled "Levelized Cost of Energy Comparison—Renewable Energy versus Marginal Cost of Selected Existing Conventional Generation Technologies" for additional details.

(5) Given the limited public and/or observable data set available for new-build coal projects, the LCOE presented herein represents Lazard's LCOE v15.0 results adjusted for inflation. High end incorporates 90% carbon capture and storage ("CCS"). Does not include cost of transportation and storage.

(6) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Blue" hydrogen, (i.e., hydrogen produced from a steam-methane reformer, using natural gas as a feedstock, and sequestering the resulting CO_2 in a nearby saline aquifer). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $5.20/MMBTU, assuming ~$1.40/kg for Blue hydrogen.

(7) Represents the LCOE of the observed high case gas combined cycle inputs using a 20% blend of "Green" hydrogen, (i.e., hydrogen produced from an electrolyzer powered by a mix of wind and solar generation and stored in a nearby salt cavern). No plant modifications are assumed beyond a 2% adjustment to the plant's heat rate. The corresponding fuel cost is $10.05/MMBTU, assuming ~$4.15/kg for Green hydrogen.

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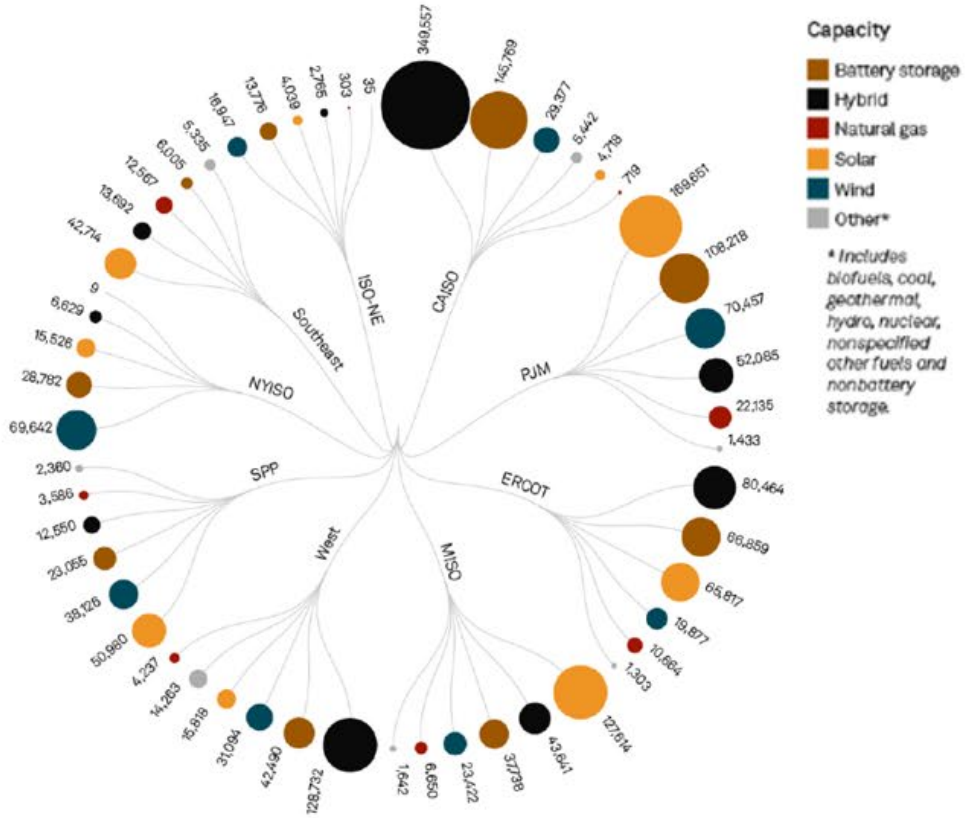
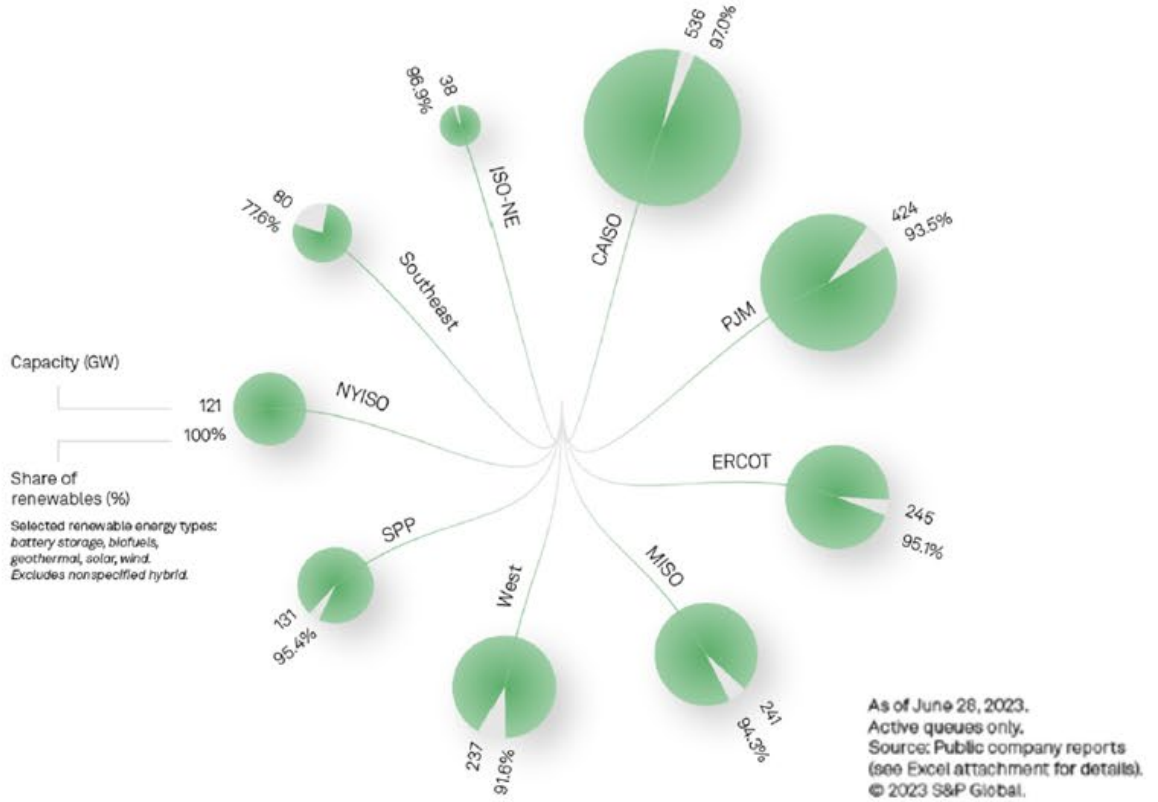
CAPACITY TRENDS ACROSS THE US

- Renewable capacity is actively undergoing impact studies for grid connectivity above 90% across all regions except the Southeast (77.6%)

Interconnection queue capacity by region, type (MW)

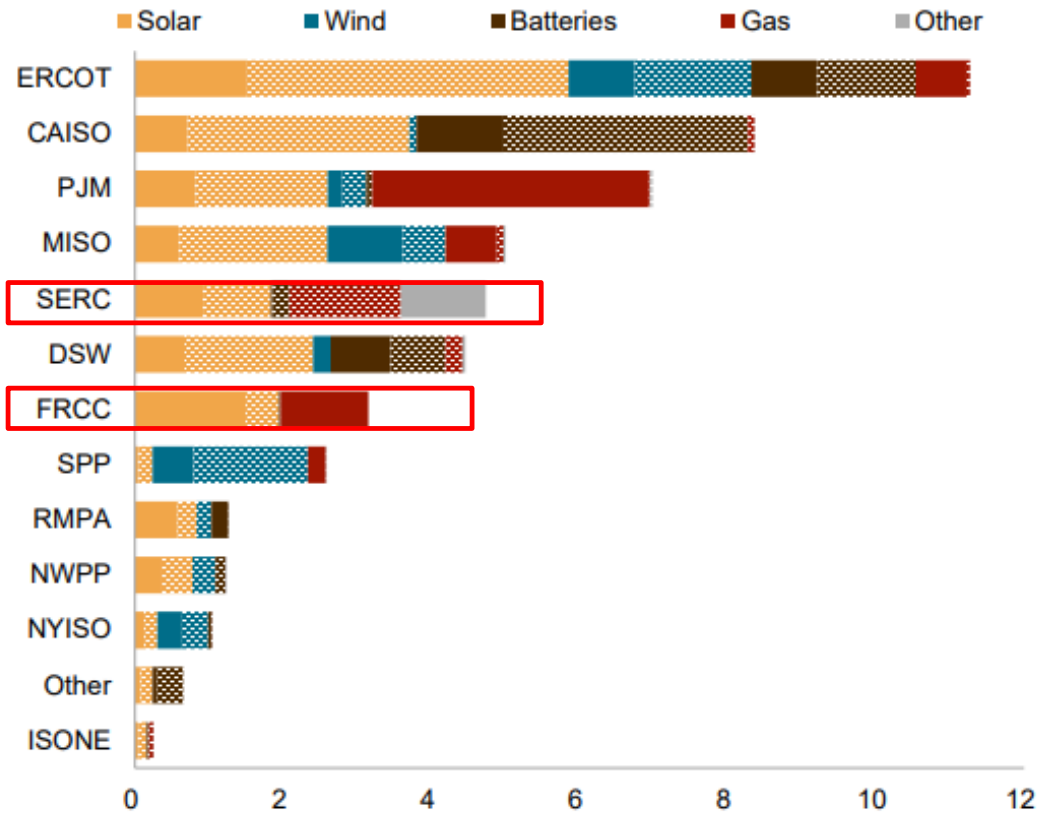


Share of renewables in interconnection queue by region

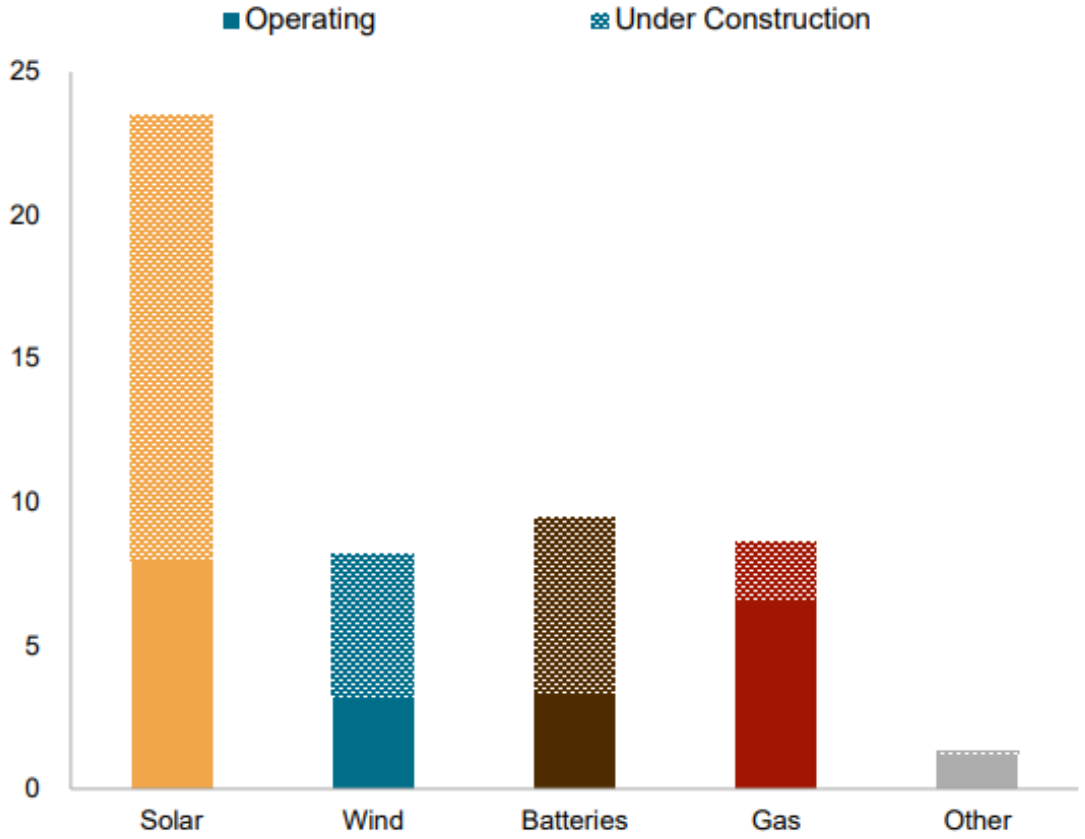


2023 - ON TRACK TO SET RECORD FOR ANNUAL CAPACITY ADDITIONS

US capacity additions 2023, operating and under construction
GW

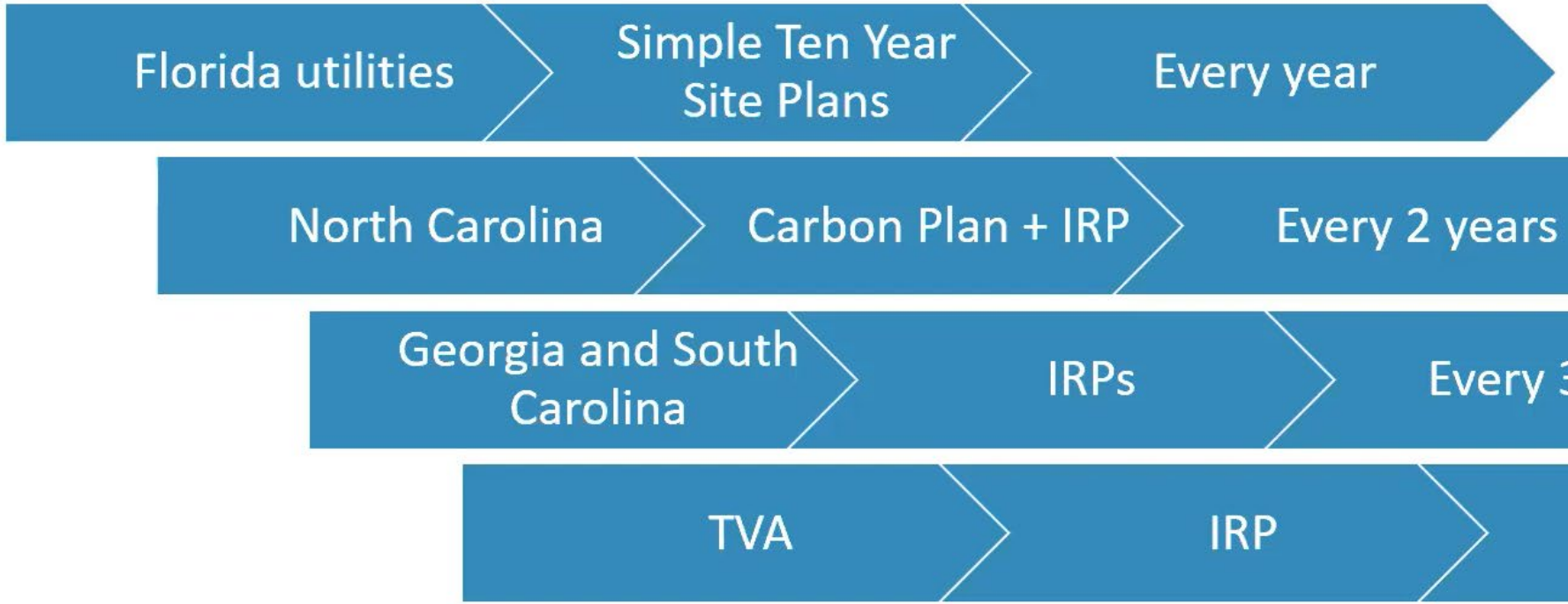


US capacity additions 2023, operating and under construction
GW



Date compiled September, 2023
Notes: reflects resources with 2023 planned operation dates from EIA's July 860M; Other includes Alaska and Hawaii; solar and battery totals do not include behind-the-meter capacity
Source: S&P Global Commodity Insights, EIA

IRP - TIMELINE



IRPs:
JEA-2023
GRU- 2023/24
FMPA- 2023

Duke- 2023

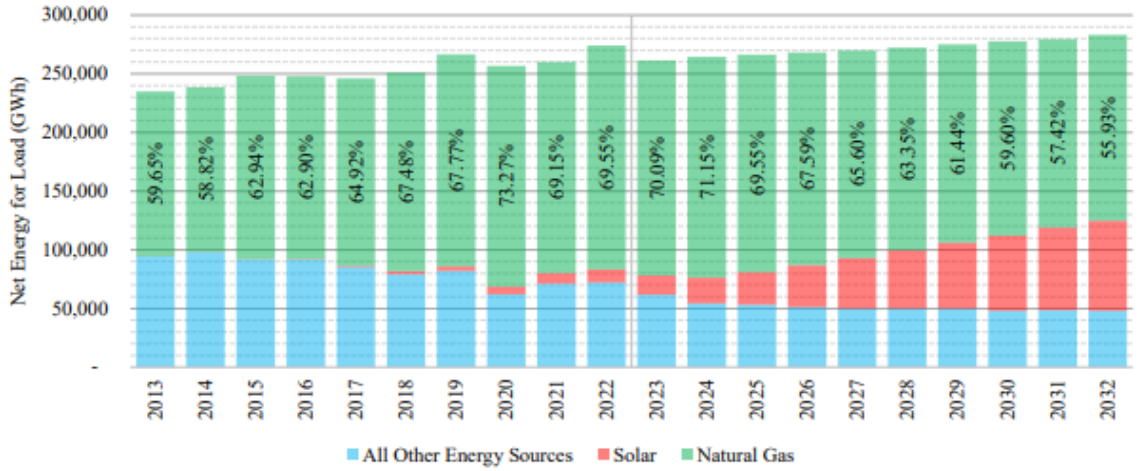
Santee Cooper- 2023
MEAG-2023/4
Georgia Power- 2022

TVA-2024

FLORIDA 10-YEAR SITE PLANS

- Annual review of demand and supply side management to meet environmental and government mandates
- Update load forecast
- Provide generation expectations with site proposals for the next 10 years
- Calculate reserve margins and generation mix

Figure 2: State of Florida - Electricity Generation Sources



Source: FRCC 2014-2023 Regional Load and Resource Plans

Table 1: State of Florida - Renewable Energy Generation

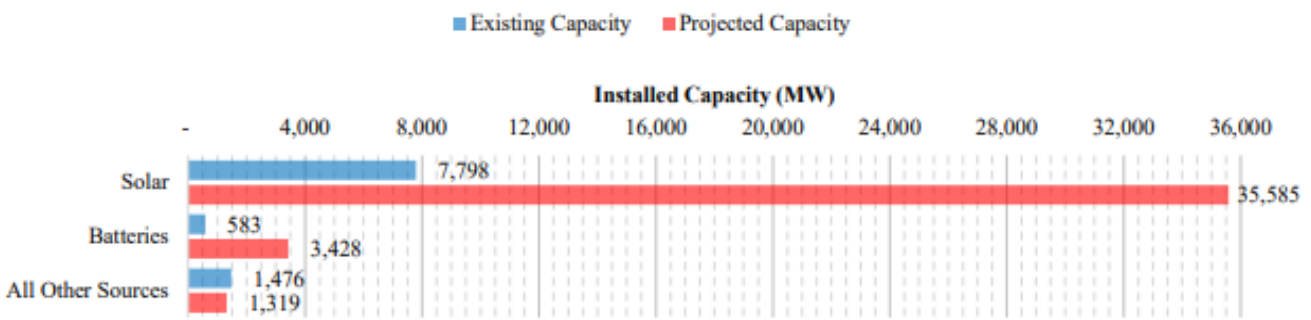
Utility	2022 Actual			2032 Projected		
	NEL	Renewables		NEL	Renewables	
	GWh	GWh	% NEL	GWh	GWh	% NEL
FPL	147,131	8,660	5.9%	152,225	54,303	35.7%
DEF	46,141	2,225	4.8%	44,705	10,973	7.2%
TECO	21,572	1,492	6.9%	22,822	4,535	19.9%
FMPA	7,097	148	2.1%	6,802	764	11.2%
GRU	1,895	622	32.8%	1,952	881	45.1%
JEA	12,930	150	1.2%	13,765	3,298	24.0%
LAK	3,406	17	0.5%	3,740	180	4.8%
OUC	7,764	346	4.5%	8,077	3,198	39.6%
TAL	2,611	114	4.4%	3,018	115	3.8%
SEC	16,330	463	2.8%	18,233	740	4.1%
State of Florida	274,025	15,786	5.8%	283,094	79,134	28.0%

Source: FRCC 2023 Regional Load and Resource Plan & TYSP Utilities' Data Responses

FLORIDA 10-YEAR SITE PLANS

- **Load growth: ~1.1%**
- **FPL:**
  - All of FPL's coal-fired generation is retired by the end of the 10- year reporting period
  - FPL plans on adding ~20,000 MW of solar and ~2,000 MW of battery storage over the 10- year period
- **Duke Energy Florida:**
  - Adding 4,000 MW of solar and battery units in the next 10 years
- **JEA**
  - Adding 550 MW of Combined Cycle (by 2030) and 1275 MW of solar (by 2030)

Figure 11: State of Florida - Current and Projected Renewable Resources



Source: FRCC 2023 Regional Load and Resource Plan & TYSP Utilities' Data Responses

DUKE AND TVA IRP SUMMARIES

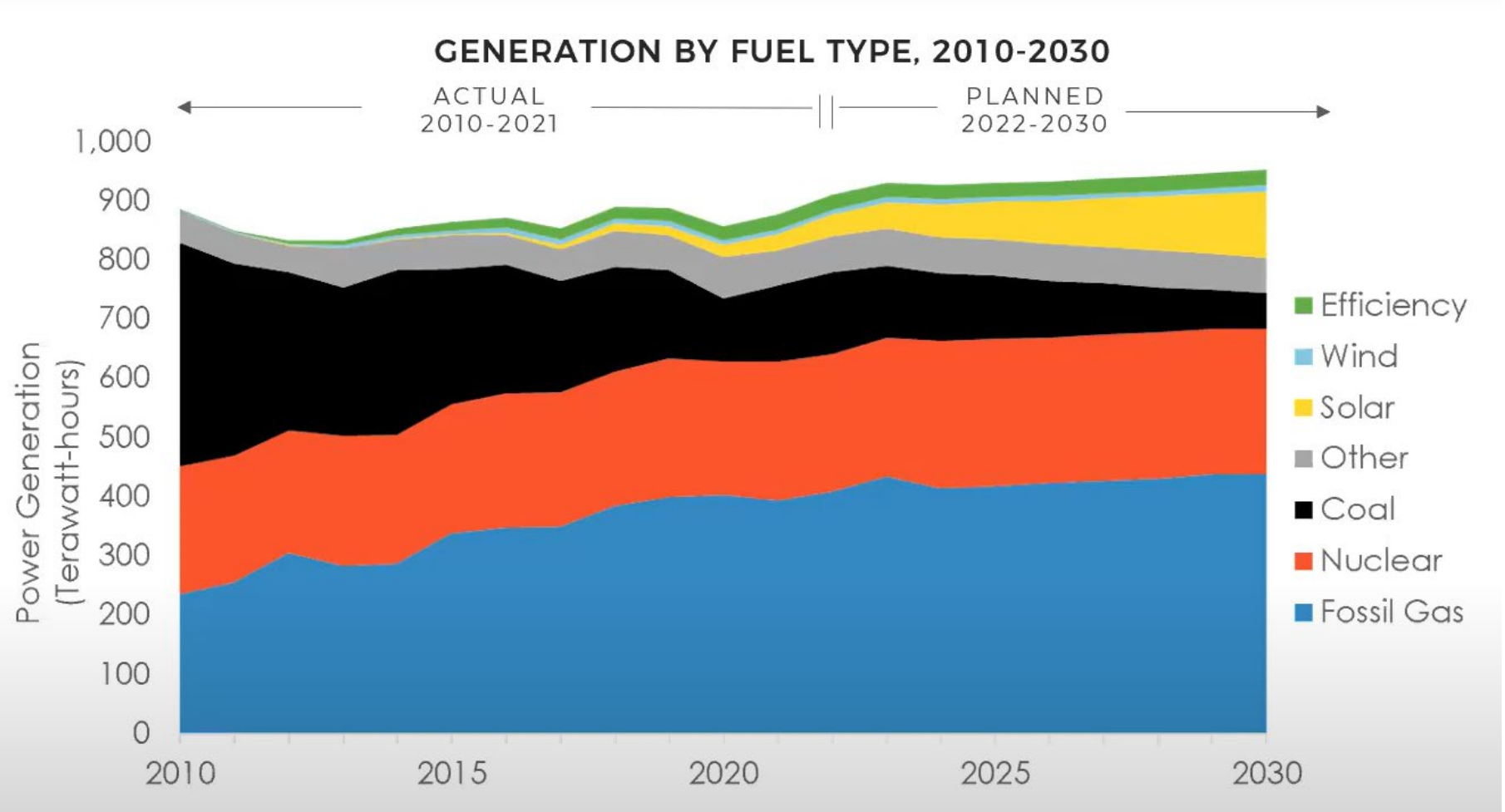
DUKE:

- IRP recently released .....update from previous Carbon Plan
- Larger load growth than previously forecasted - "Large site developments" – between now and 2030 - Industrial, manufacturing, commercial, institutional customer
- Increasing planning reserve margin from 17% to 22%
  - Winter capacity risk, increase in load forecast error, increase in unit outages and lower reliance on neighboring utilities
    - 6,000 MW of solar and 2,700 MW battery storage additions by 2031
    - 5,800 MW of hydrogen-capable gas capacity by 2032
    - Retiring Roxboro and Marshall coal plants
    - 1,200 MW of onshore wind by 2033 (some offshore wind)
    - 1,700 MW of pumped-storage hydro by 2034

TVA:

- TVA board recently approved $15 billion for system improvements and investments in new generation
- Forecasting roughly 30% load growth in the next 10 years
- Among new resources planned or under consideration:
  - 10,000 MW of solar to be online by 2035
  - Up to 1,200 MW of potential small modular nuclear reactors
  - And a 1,400 MW combined cycle natural gas plant to replace the retiring coal fired Cumberland Fossil Plant.

SOUTHEAST GENERATION

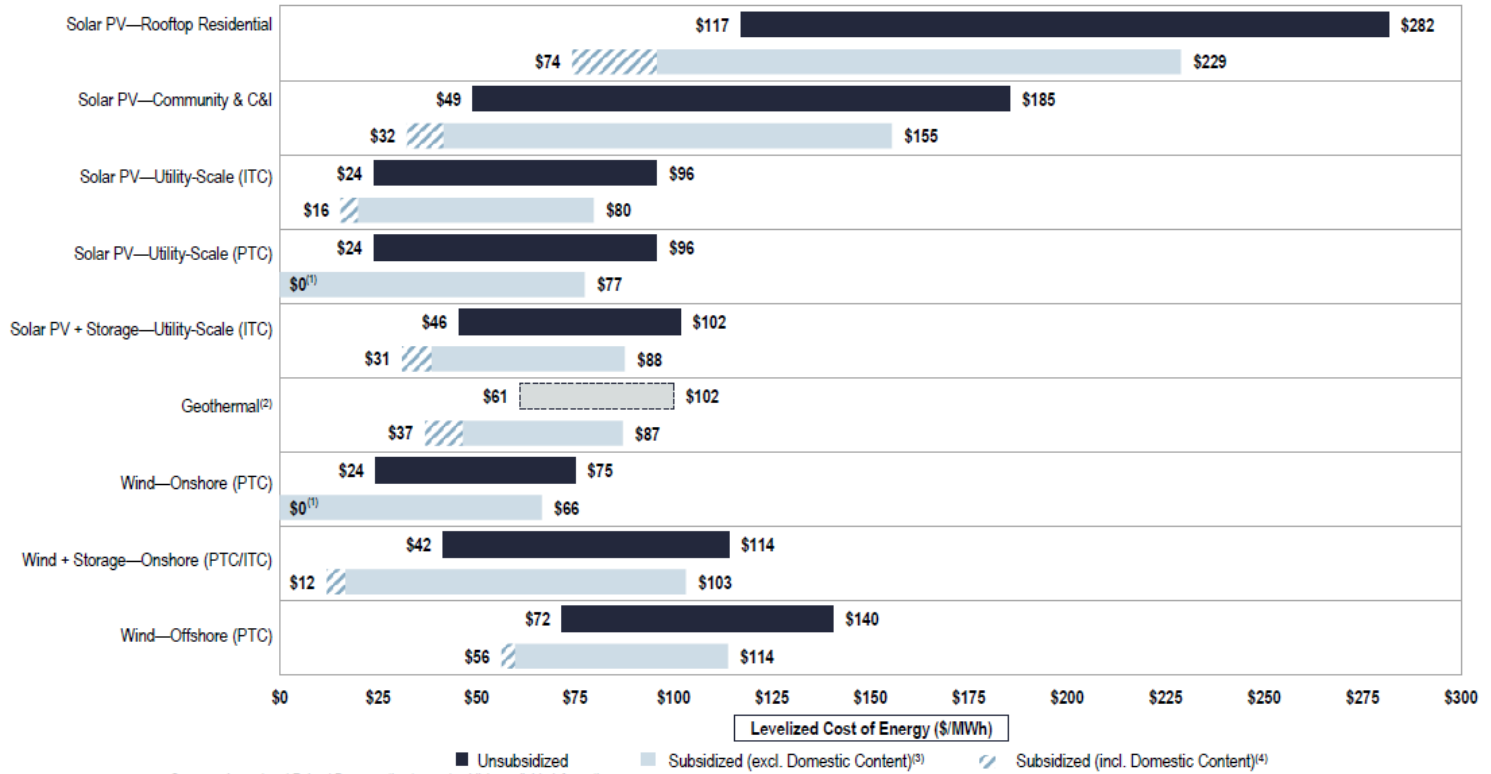


APPENDIX

Current prices for Wind and Solar Are Up 34% (66% according to Lazard)-But Inflation Reduction Act Will likely Have Prices Falling Again

Levelized Cost of Energy Comparison—Sensitivity to U.S. Federal Tax Subsidies

The Investment Tax Credit ("ITC"), Production Tax Credit ("PTC") and domestic content adder, among other provisions in the IRA, are important components of the levelized cost of renewable energy generation technologies



Source: *Lazard and Roland Berger estimates and publicly available information.*

Note: Unless otherwise indicated, this analysis does not include other state or federal subsidies (e.g., energy community adder, etc.). The IRA is comprehensive legislation that is still being implemented and remains subject to interpretation—important elements of the IRA are not included in our analysis and could impact outcomes.

(1) Results at this level are driven by Lazard's approach to calculating the LCOE and selected inputs (see Appendix for further details). Lazard's Unsubsidized LCOE analysis assumes, for year-over-year reference purposes, 60% debt at an 8% interest rate and 40% equity at a 12% cost (together implying an after-tax IRR/WACC of 7.7%). Implied IRRs at this level for Solar PV—Utility-Scale (PTC) equals 17% (excl. Domestic Content) and 22% (incl. Domestic Content) and implied IRRs at this level for Wind—Onshore (PTC) equals 17% (excl. Domestic Content) and 25% (incl. Domestic Content).

(2) Given the limited public and/or observable data set available for new-build geothermal projects, the LCOE presented herein represents Lazard's LCOE v15.0 results adjustment for inflation.

(3) This sensitivity analysis assumes that projects qualify for the full ITC/PTC and have a capital structure that includes sponsor equity, debt and tax equity.

(4) This sensitivity analysis assumes the above and also includes a 10% domestic content adder.

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Source: 2023 Levelized Cost Of Energy+ (lazard.com)

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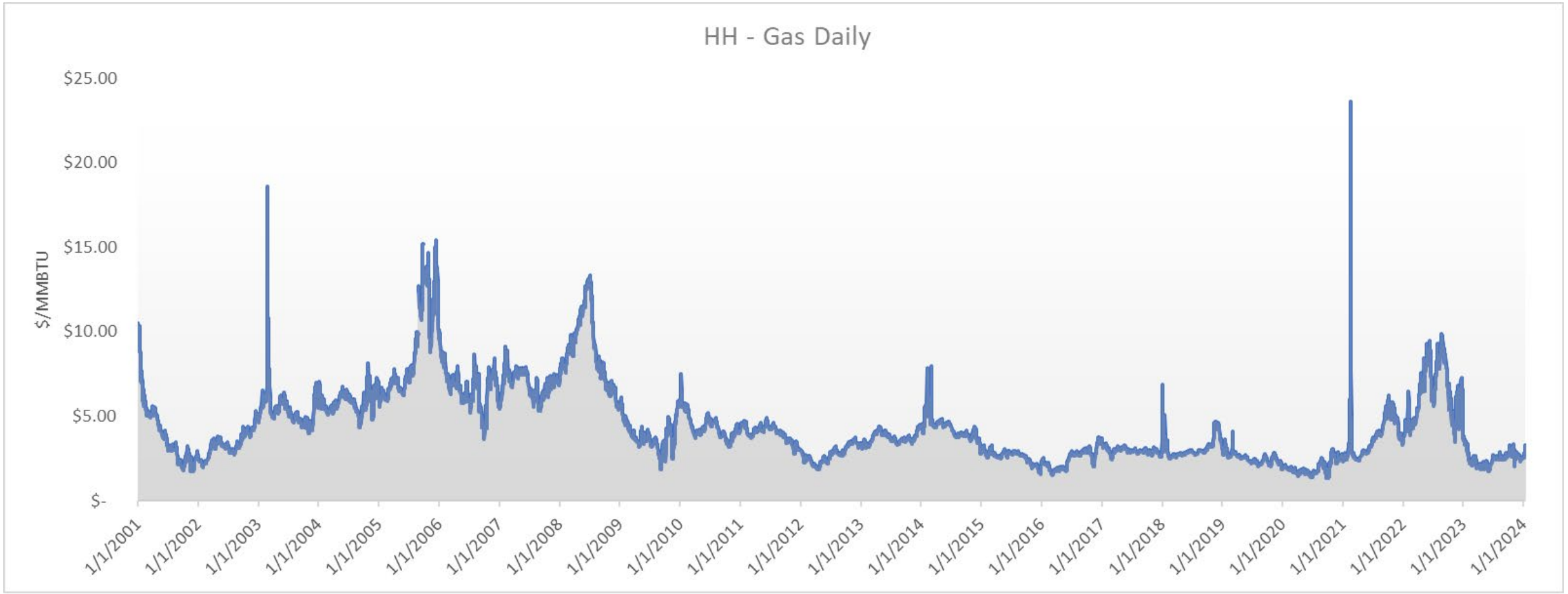
NATURAL GAS PRICING



RICE AND SOLAR PPA COST COMPARISON