

INTEGRATED RESOURCE PLAN

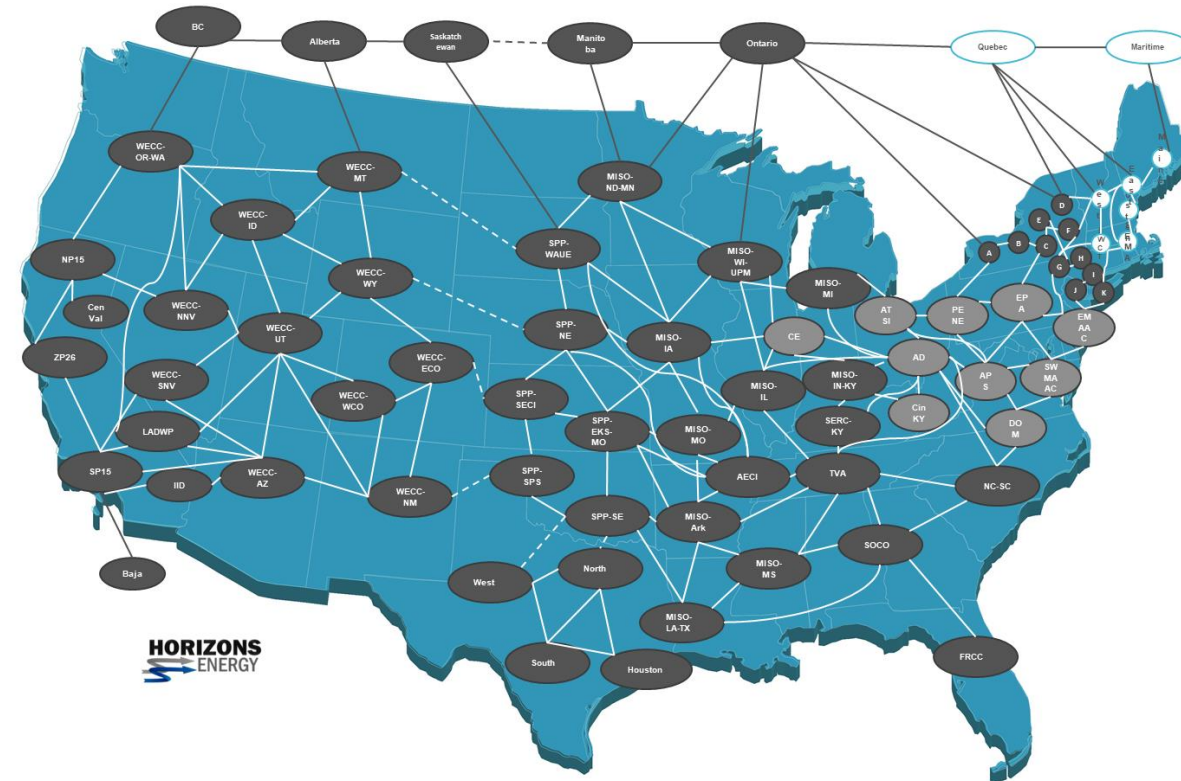
Lake Worth Beach Electric Utilities (LWBEU)

Presented By:
Horizons Energy
June 28, 2022

AGENDA

- Introduction
- Horizons Energy
- Integrated Resource Planning Process
- Lake Worth Beach 2022 IRP
- Conclusion and Question/Answer

- Established in 2016
- Credentials:
 - Average 25 years of experience in power market analytics
 - Contributed to over 25 integrated resource plans
 - Over 30 national clients (developers, banks, utilities)
- Services:
 - EnCompass National Database
 - North American Advisory Outlook
 - Consulting
- Utilizes the EnCompass Power Planning model from Anchor Power Solutions





Greg Turk
Principal/Project Manager

- 30+ years of power planning methods, consulting, product and project management



Kathy Jones
Executive Consultant

- 30+ years of analytic data development, resource screening, scenario creation, and study simulations

Relevant Engagements Last 2 Years:

- ✓ 2022 AES Indiana IRP
- ✓ 2021 NMPP IRP
- ✓ 2021 PNM IRP
- ✓ 2021 AECC Uncertainty Analysis
- ✓ 2020 PNM San Juan Replacement
- ✓ 2020 PCWA Hydro Stochastic Analysis
- ✓ 2020 KYMEA IRP

Relevant Experience:

- ✓ Southeast U.S. Lead 2006-2017
- ✓ Renewables Lead 2013-2017
- ✓ 25 years IRP experience
- ✓ Performed \$ billions in asset valuation
- ✓ Horizons advisory and market assessments
- ✓ Environmental compliance planning
- ✓ Uncertainty and risk assessment

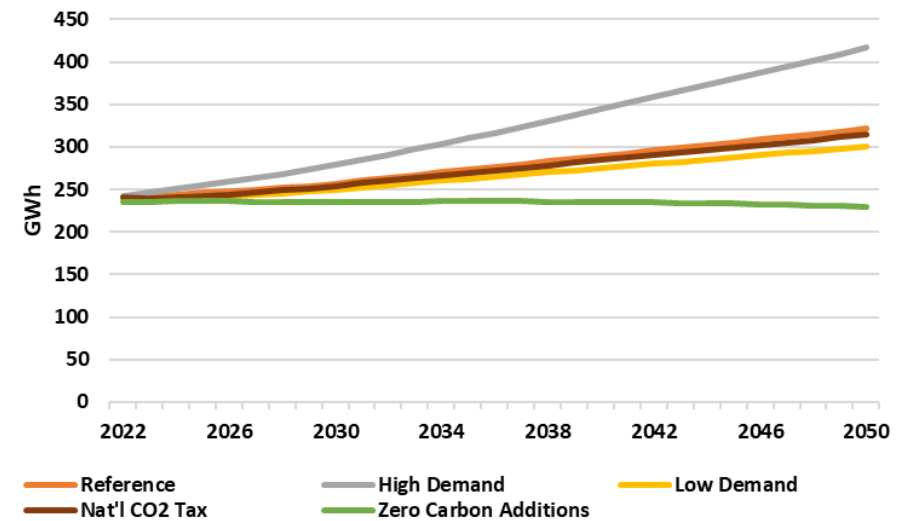
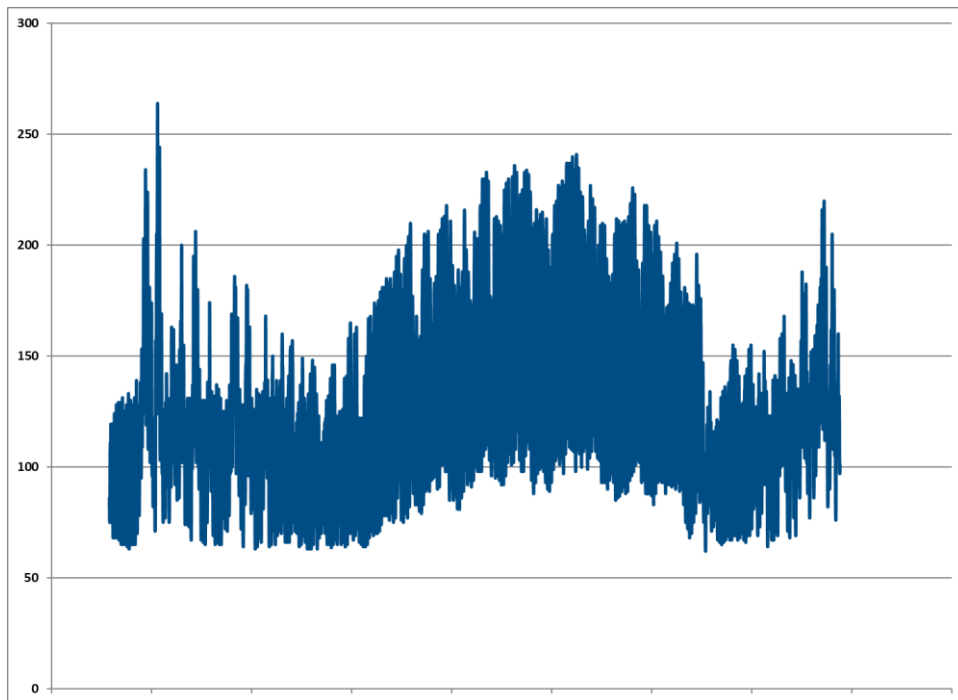
WHAT WE DO

- EnCompass National Database
- North American Advisory Outlook
 - Fundamental forecast of energy markets
 - Nine scenarios
 - Interactive dashboard of results
- Custom Scenarios
- Consulting

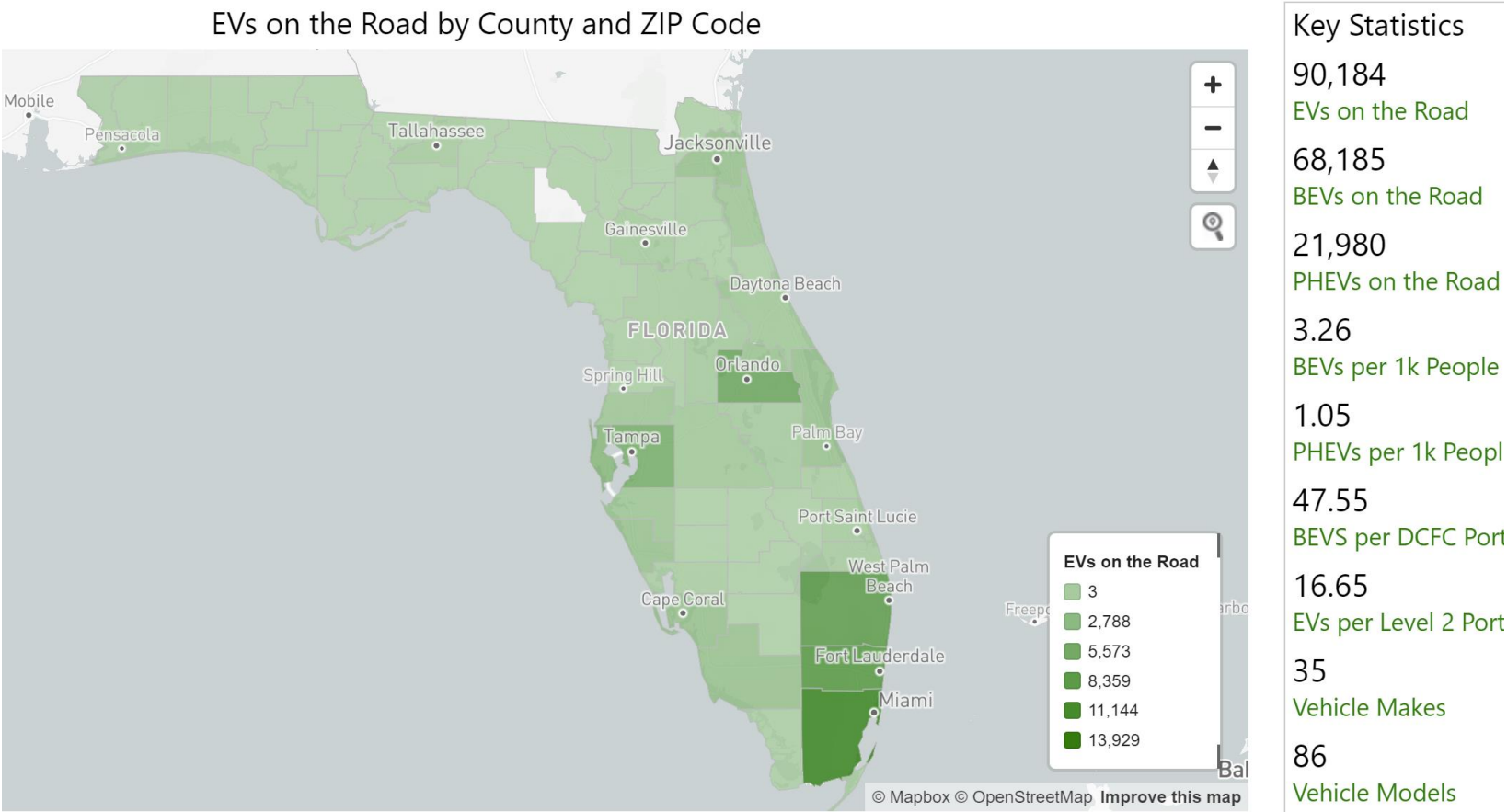
- Integrated Resource Planning or IRP is the process by which supply- and demand-side options are consistently planned, implemented, and evaluated to provide energy services at a cost that appropriately balances the interests of stakeholders
- Develop plan for LWBEU to reach its goals of low-cost, reliable and low carbon service
- Horizons Energy uses the EnCompass power planning model by Anchor Power Solutions which performs a mixed integer linear programming algorithm which:
 - Develops an outlook for supply- and demand-side options that minimize cost as well as reach carbon emission targets and maintain reliability

DEMAND FORECAST

- Represent electricity customer demand
 - Hourly
 - Monthly
 - Annually



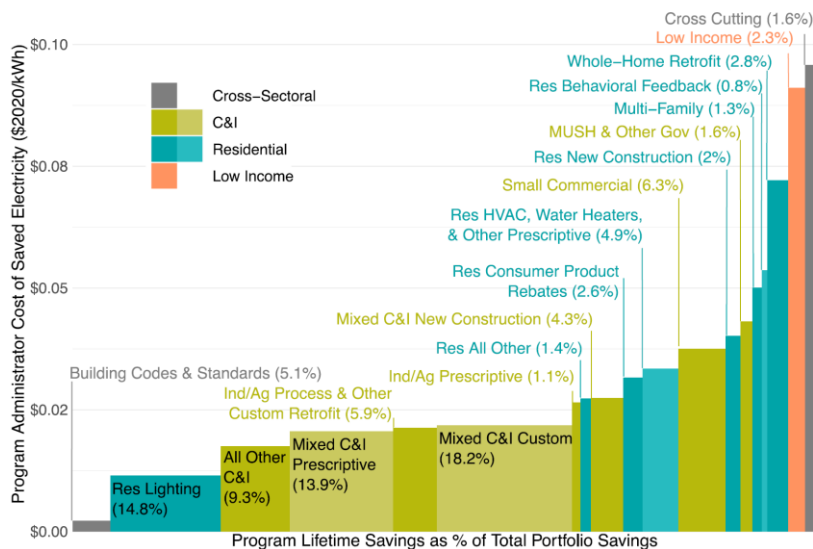
ELECTRIC VEHICLE OUTLOOK



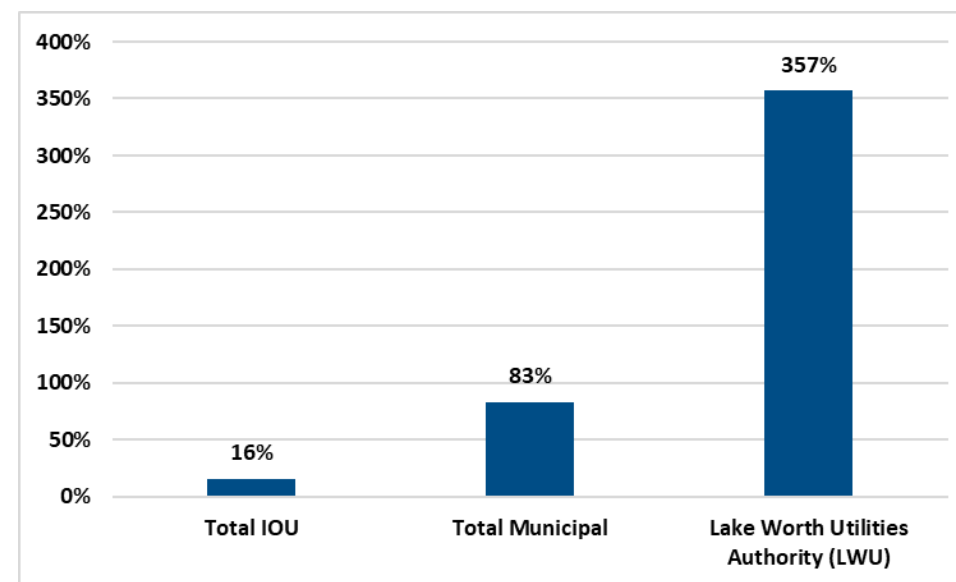
RESOURCES: DEMAND SIDE OPTIONS

- Demand response
- Energy efficiency
- Behind the meter

Composite Cost Curve for Energy Savings From Electric Efficiency Programs: 2010-2018



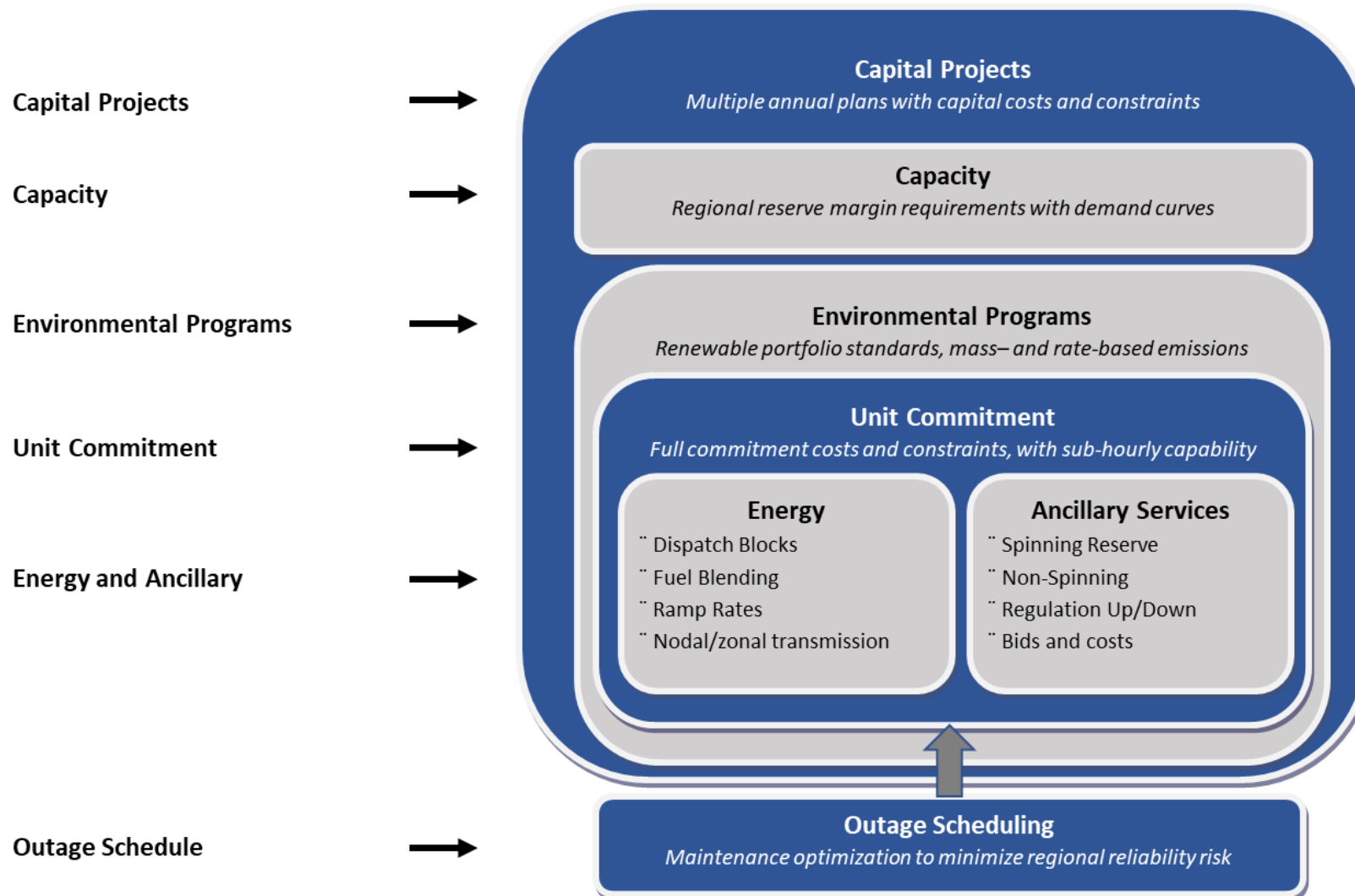
Percent change in BTM Generation since 2017



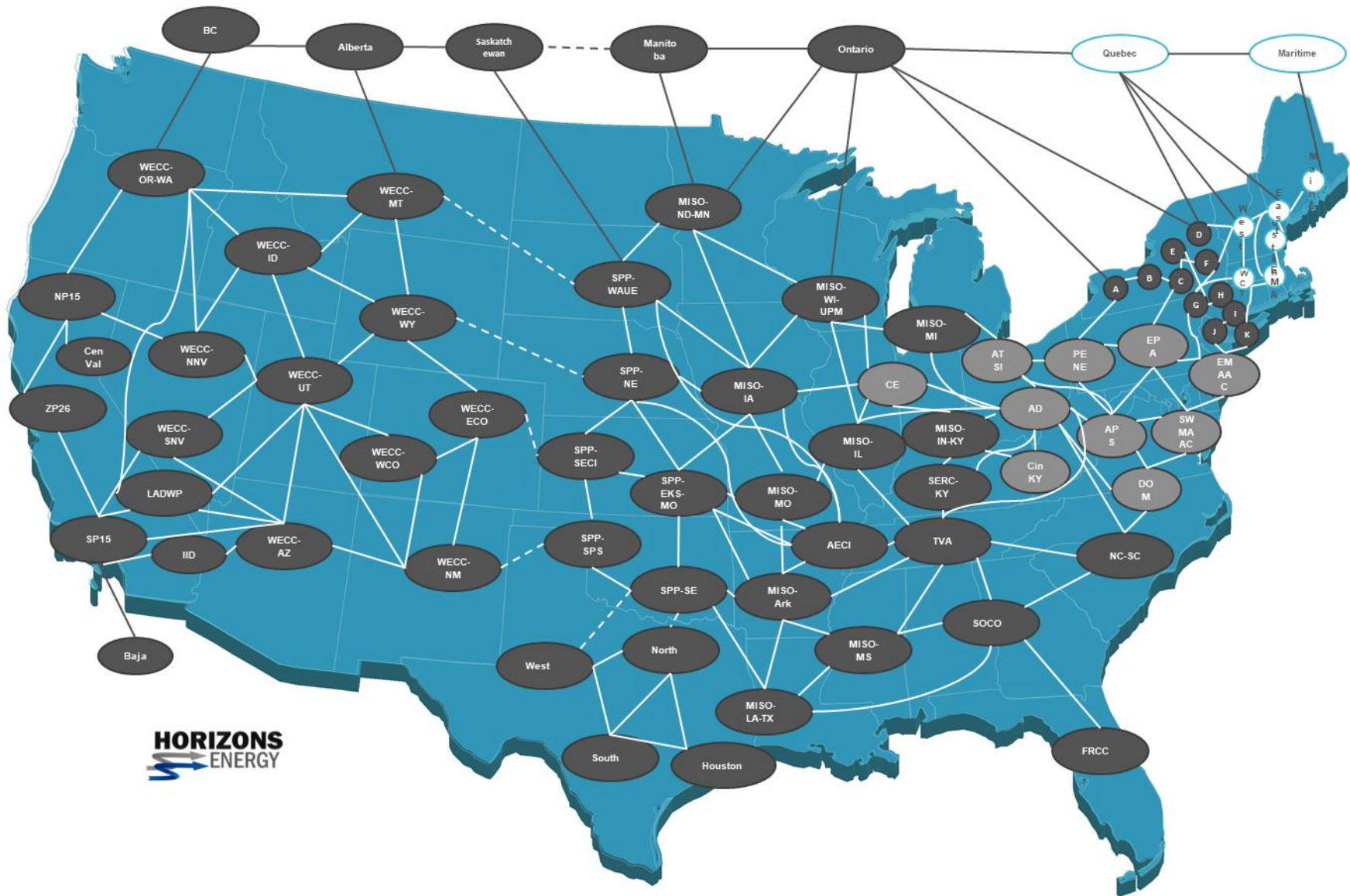
RESOURCES: SUPPLY SIDE OPTIONS

- Existing generation and contracts
 - Tom G. Smith
 - Stanton
 - St. Lucie
 - Solar
- New options
 - Solar
 - Batteries
 - Combustion turbines
 - Purchase power agreements (PPA)

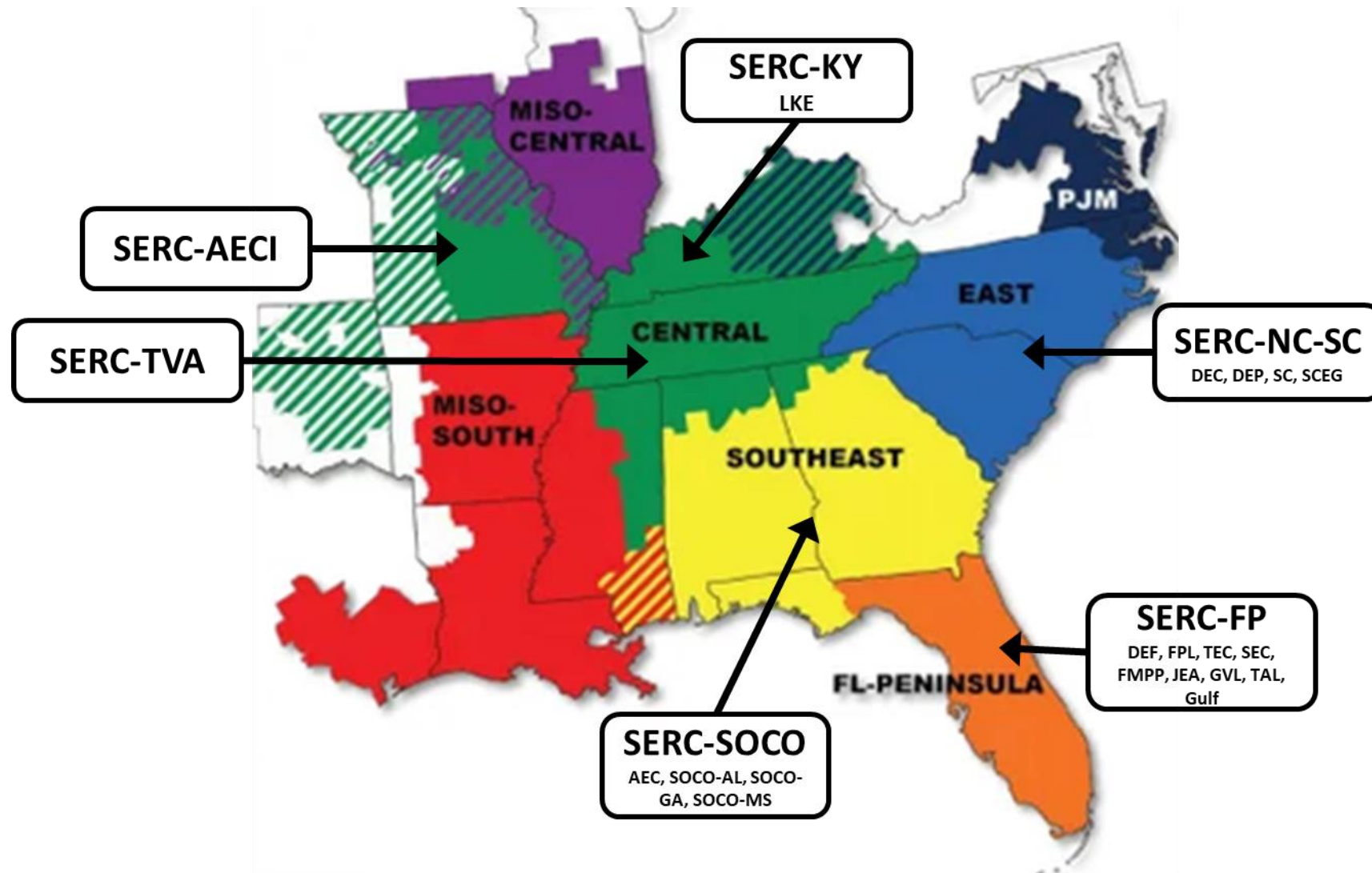
ENCOMPASS POWER PLANNING MODEL



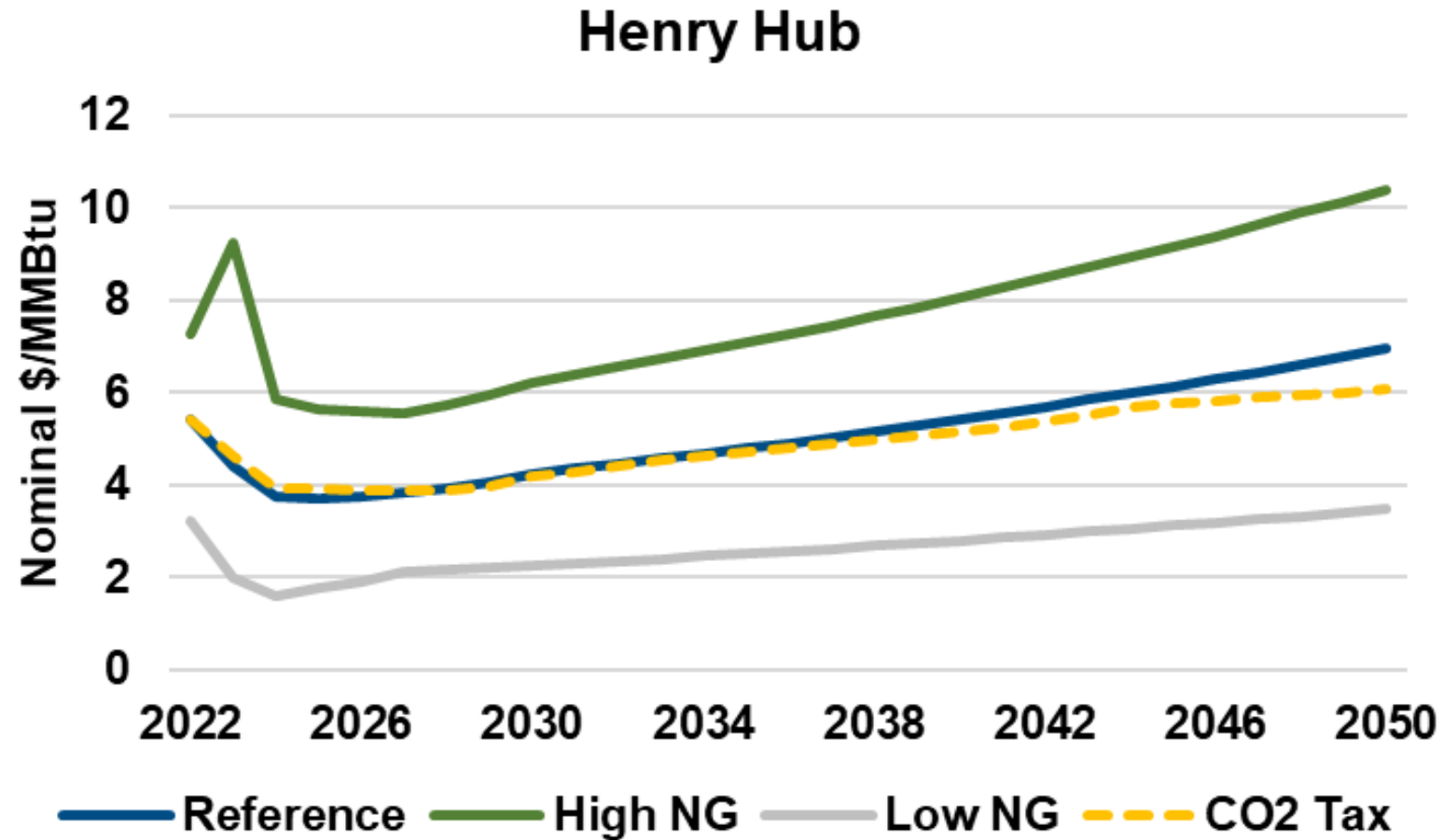
MARKET AREAS



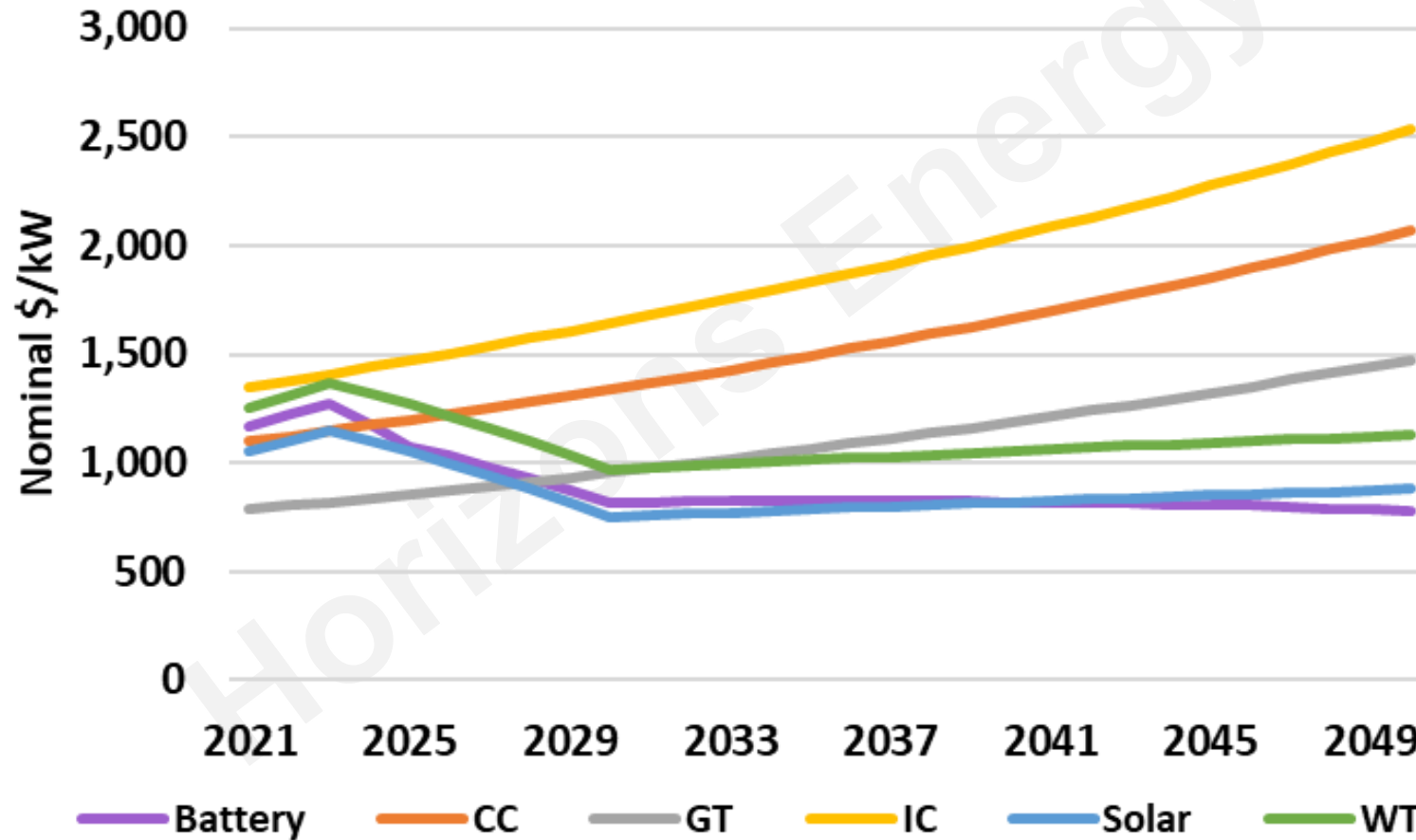
SERC/FLORIDA



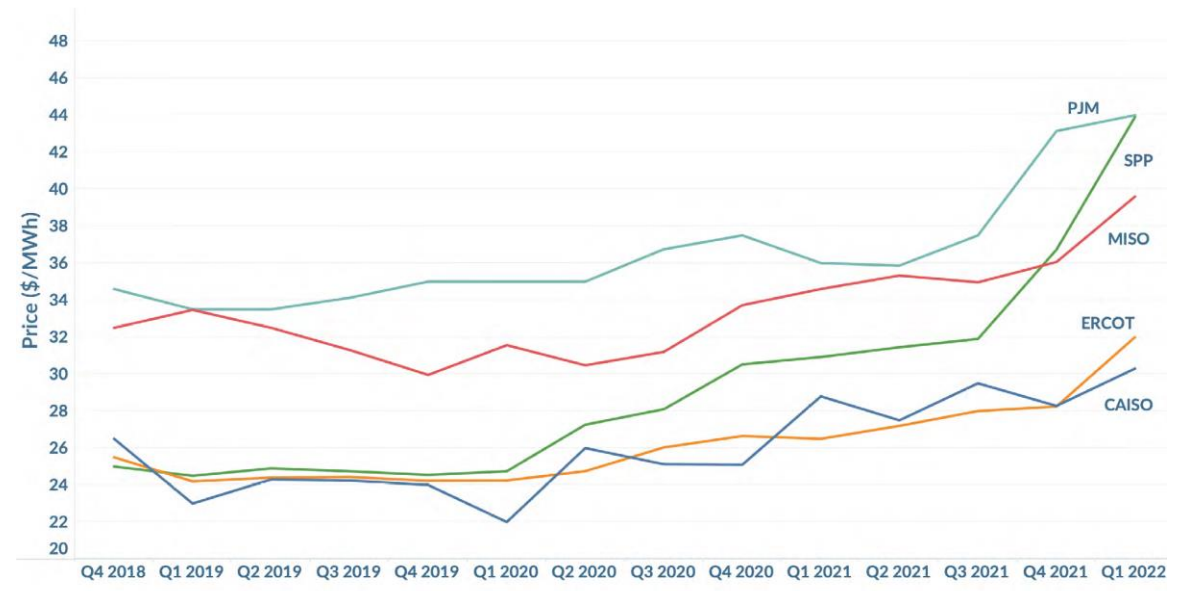
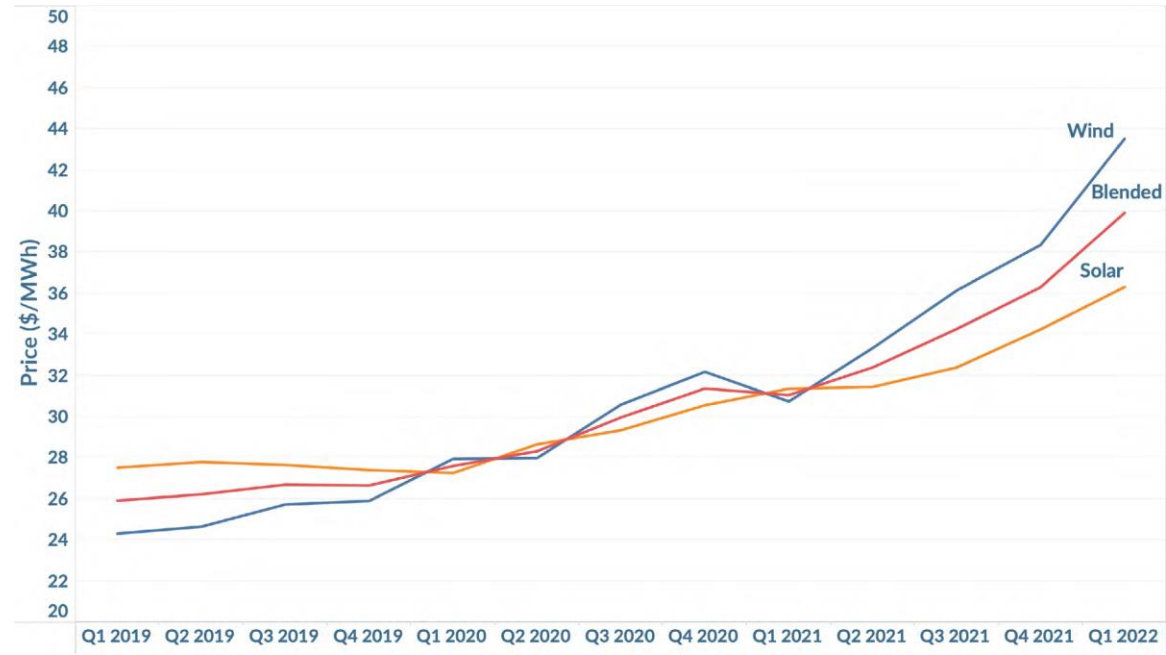
NATURAL GAS PRICES



OVERNIGHT CAPITAL COST



PPA PRICES



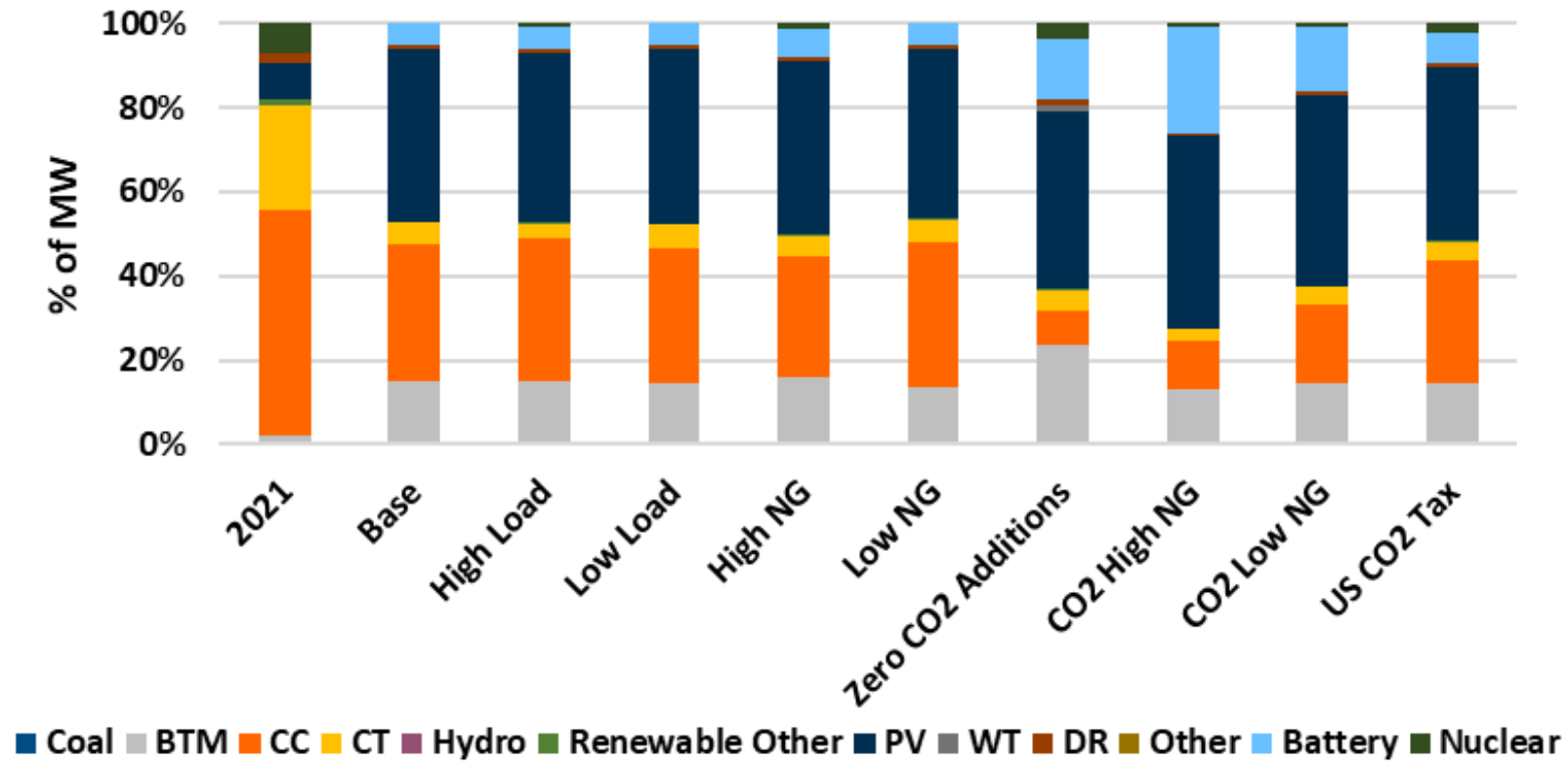
Source: LEVELTEN ENERGY Q1 2022 PPA PRICE INDEX NA

- Base
- High Natural Gas
- Low Natural Gas
- High Demand
- Low Demand
- Carbon Limit with High Natural Gas
- Carbon Limit with Low Natural Gas
- National Carbon Tax
- Zero Carbon Additions Only (equivalent of Cheap Renewables)

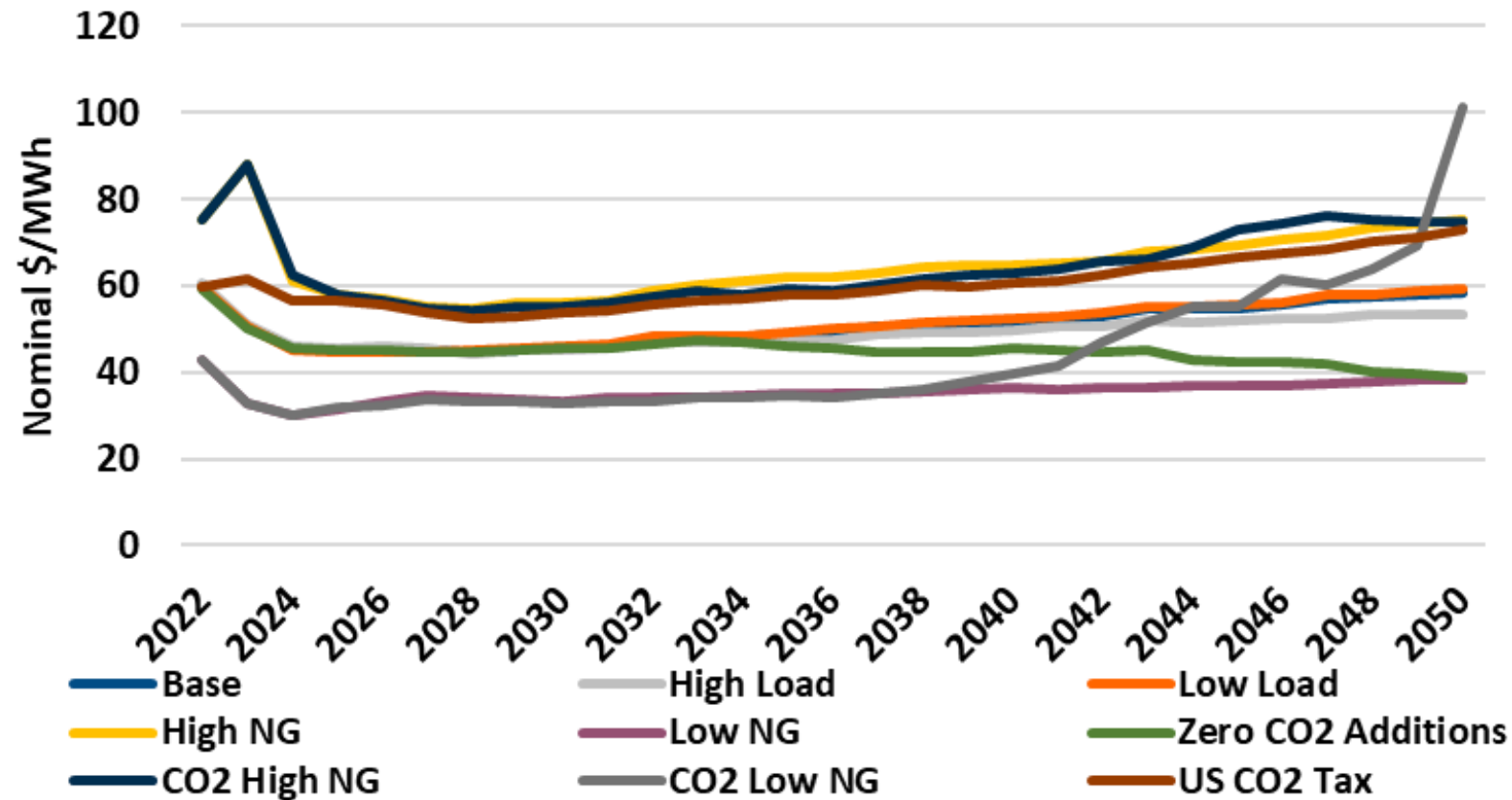
SCENARIO MATRIX

		Scenarios									
		Reference	High NG	Low NG	High Demand	Low Demand	Nat'l CO2 Tax	CO2 Limit High NG	CO2 Limit Low NG	Zero Carbon Additions	
Market Drivers	Load	➡	➡	➡	⬆	⬇	➡	➡	➡	⬇	
	Natural Gas Price	➡	⬆	⬇	➡	➡	➡	⬆	⬇	➡	
	Coal Price	➡	⬆	⬇	➡	➡	⬆	⬆	⬇	➡	
	Technologies										
	Nuclear Economic Retirements	Staggered beg. 2024					None				
	Nuclear License	60 Years					80 Years	60 Years		80 Years	
	Coal Economic Retirements	Staggered beg. 2024					All eligible beg. 2024			Unlimited	
	Natural Gas Additions	CA, DE, MD, NM, OR, VA Limited						Limited after 2030		Limited	
	Natural Gas Retirements	Staggered beg. 2024					All eligible beg. 2023	All eligible beg. 2024		Unlimited	
	Hydro	Existing									
	Geothermal	Existing									
	Other Renewables	Existing									
	Carbon	60% reduction from 2019 no carbon price except State/Province					Tax	Limit	Limit	State/Province	
Builds	% of Generation Additions										
	Solar	45.4% ➡	45% ➡	44% ⬇	40% ⬆	48% ⬇	46% ⬆	48% ⬆	47% ⬆	48% ⬆	
	Wind	23.2% ⬆	25% ⬇	22% ⬇	23% ⬇	23% ⬆	25% ⬆	24% ⬆	26% ⬆	26% ⬆	
	GT	3.8% ➡	4% ⬆	4% ⬆	7% ➡	3% ⬆	5% ⬇	0% ⬇	2% ⬇	0% ⬇	
	CC	13.1% ➡	9% ⬆	18% ⬆	15% ⬆	12% ➡	8% ⬇	2% ⬇	4% ⬇	0% ⬇	
	IC	1.3% ➡	1% ⬆	1% ⬆	2% ➡	1% ➡	1% ⬇	0% ⬇	0% ⬇	0% ⬇	
	Storage	13.2% ⬇	16% ⬇	11% ⬇	13% ⬇	13% ⬇	16% ⬆	25% ⬆	21% ⬆	25% ⬆	
	Distributed Generation	➡	⬆	⬇	⬆	⬇	⬆	⬆	⬆	⬆	
	Transmission Additions	Known/under construction additions								Economic	

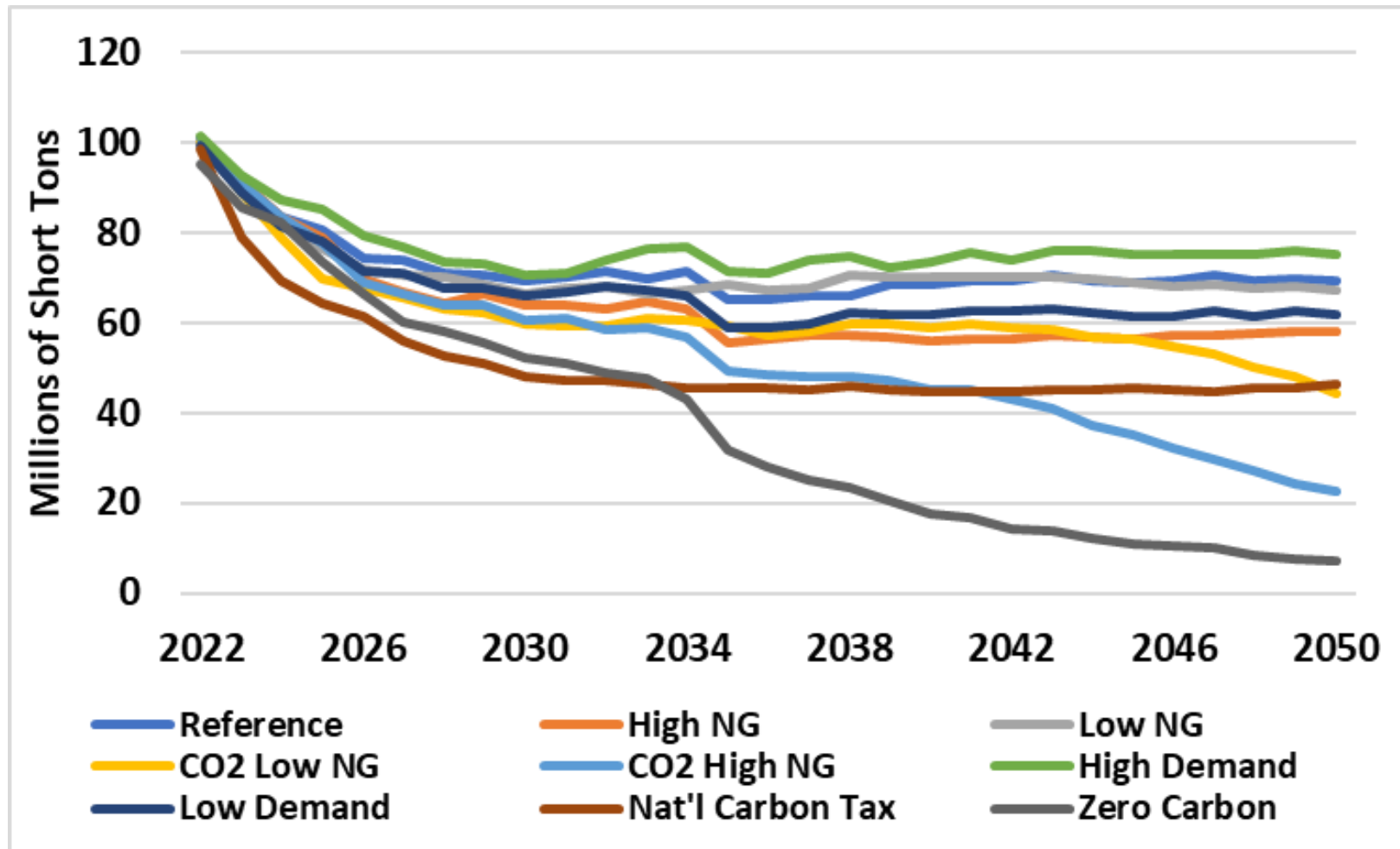
HORIZONS FLORIDA RESOURCE MIX - 2050



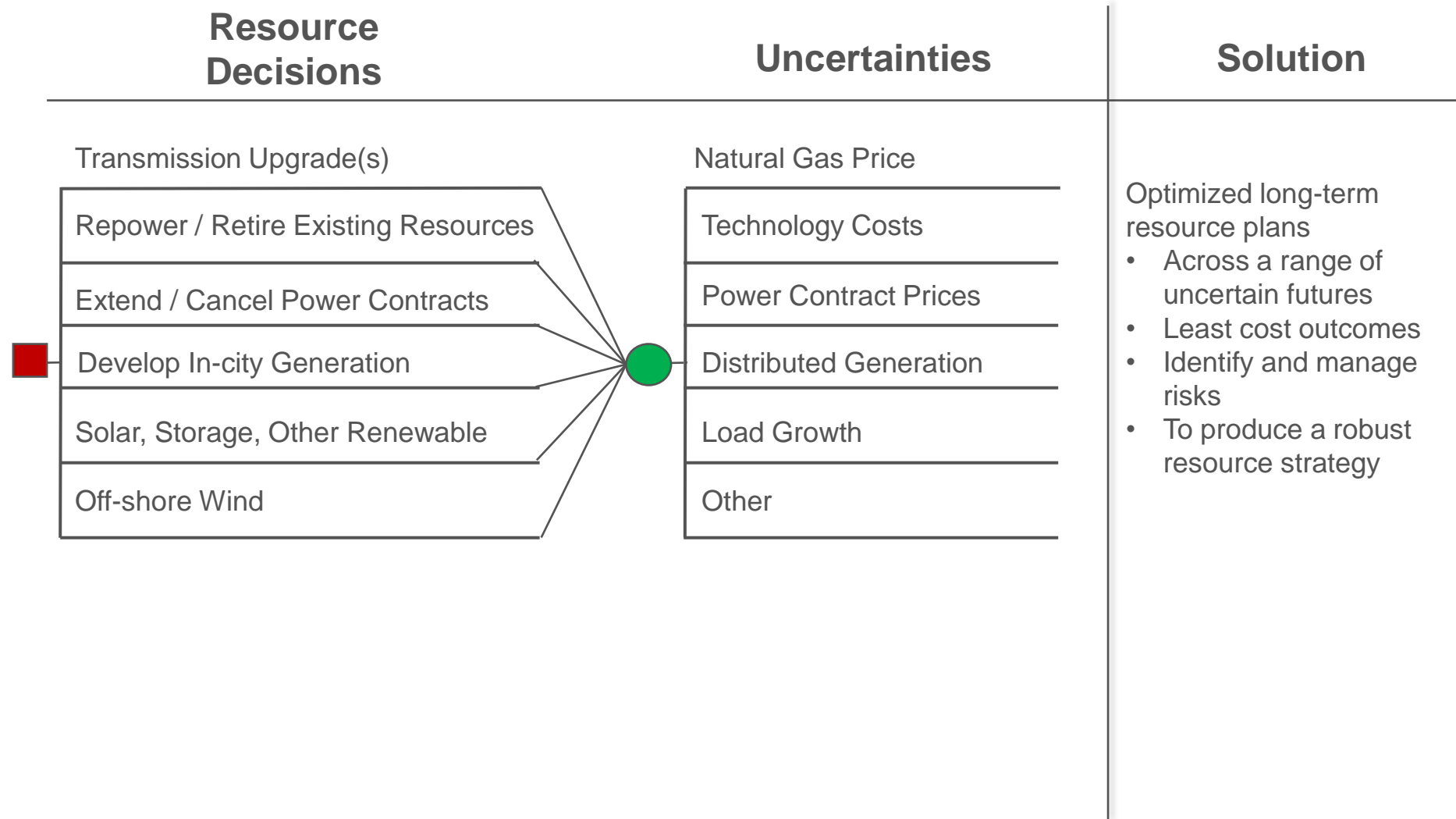
FLORIDA ENERGY PRICES



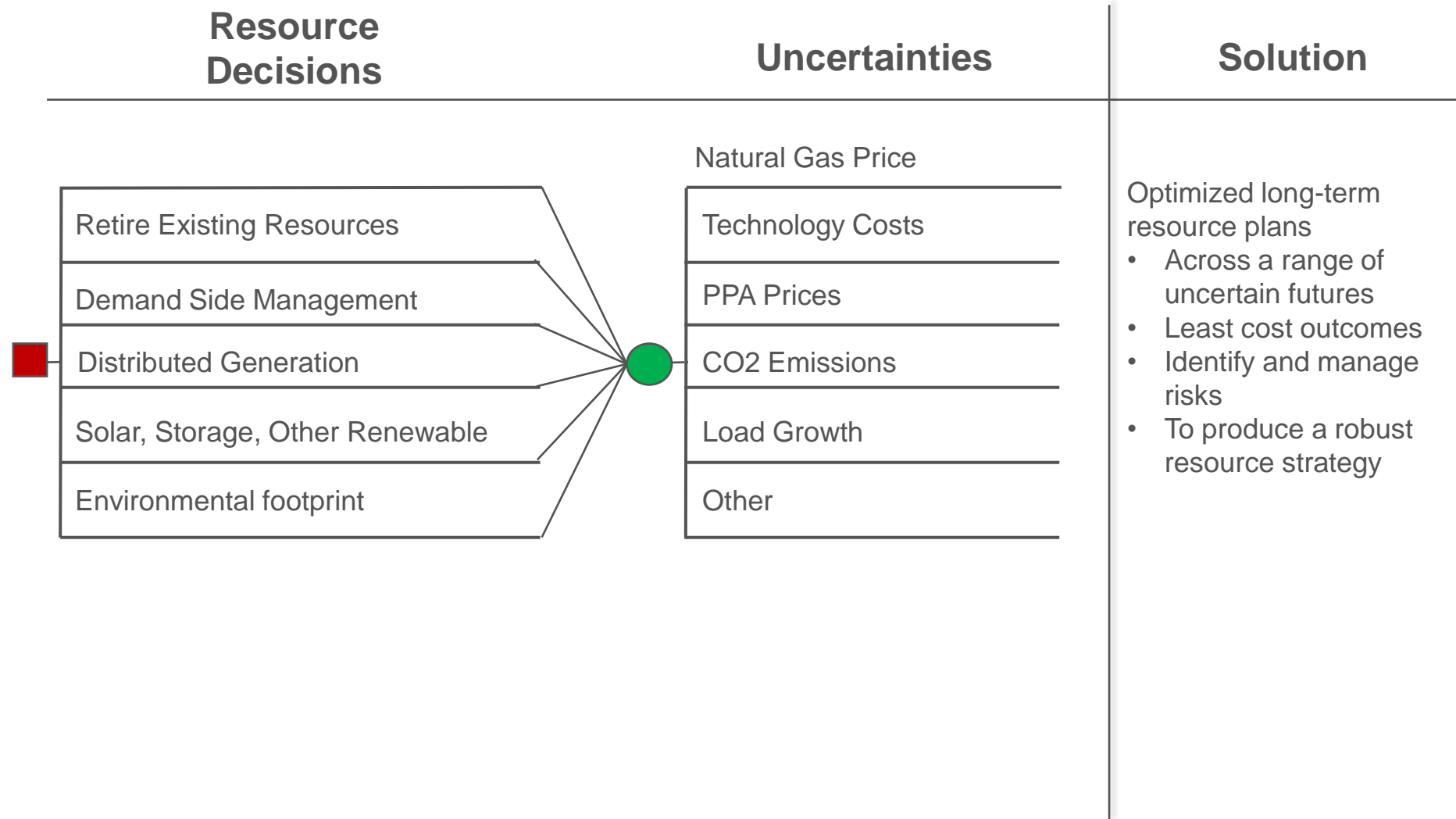
FLORIDA CARBON EMISSIONS



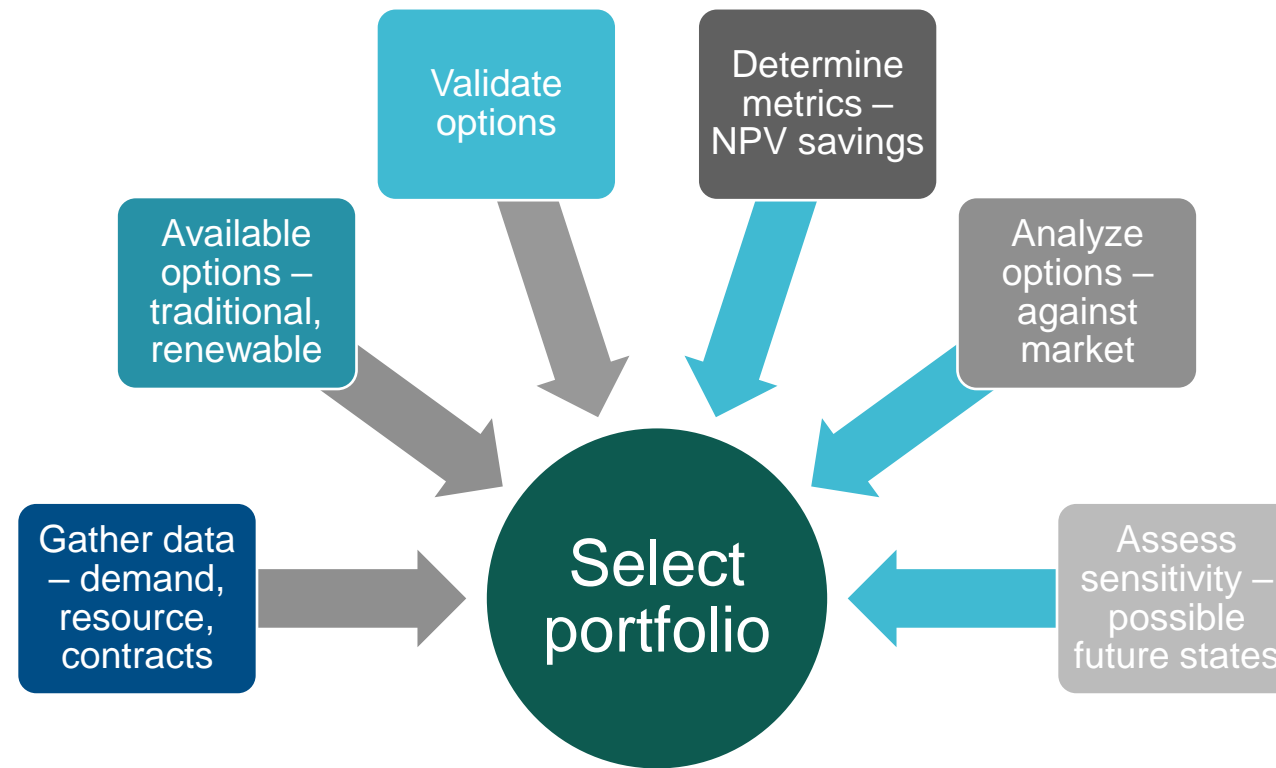
2018 PLANNING EFFORT



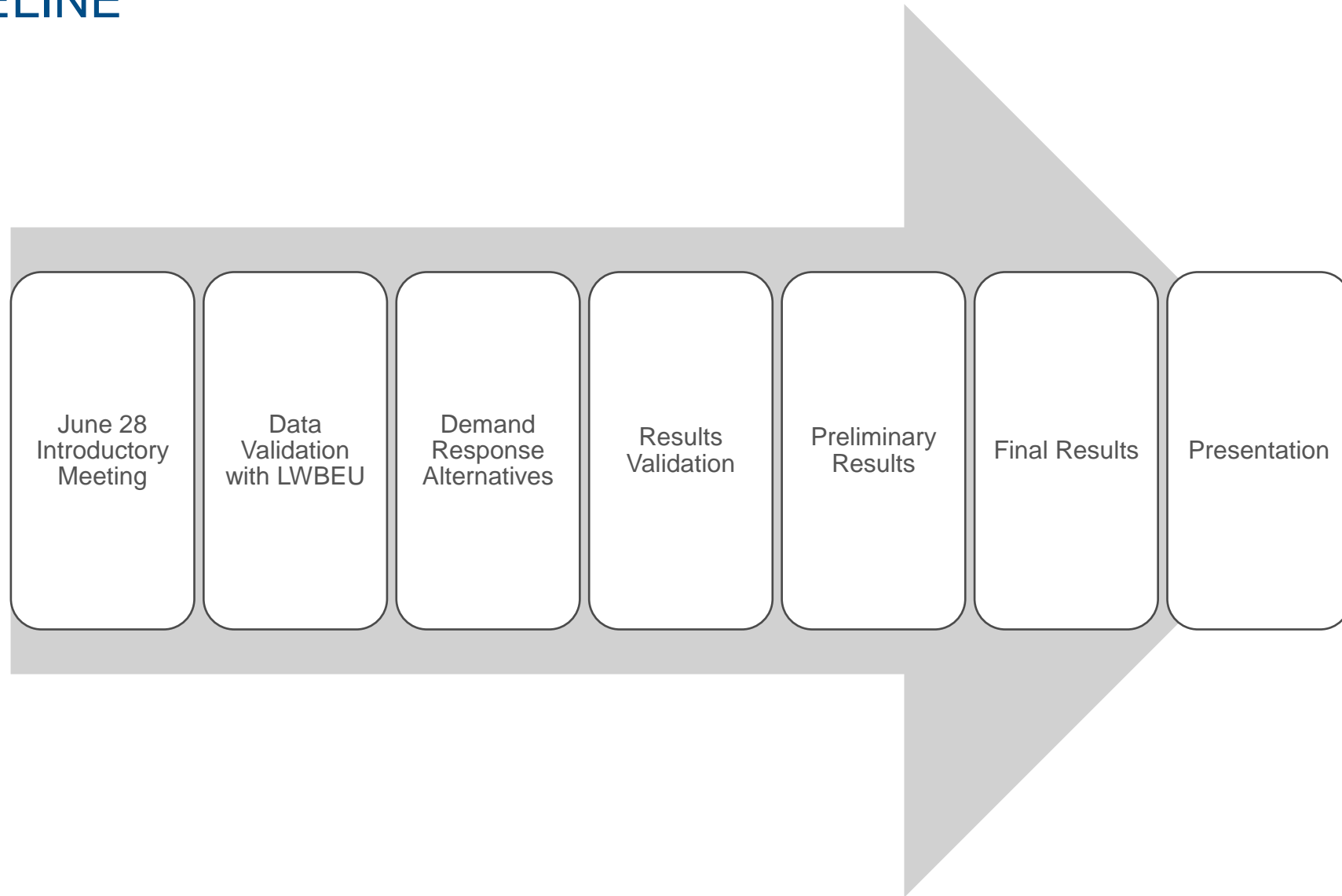
2022 PLANNING EFFORT



PROCESS



TIMELINE



QUESTIONS?