

June 28th Study Committee Meeting

PRESENTED BY

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JUNE 28, 2022

PRESENTED FOR

South Carolina Market
Reform Study Committee



Agenda

1

Discuss Potential Guest Speakers for Future Meetings

2

Impact of Market Reform Options on System Operations and Planning

3

Governance and Regulation Under Market Reform Options

Potential Speakers at Future Study Committee Meetings

We have discussed potentially bringing in speakers to share their experience with wholesale markets. The Brattle team has thought about people the Study Committee might be interested in hearing from, such as:

- A state commissioner from a SPP/MISO state
- A state commissioner from a PJM state
- Staff from the RTOs
 - For example, SPP staff could share their experience expanding into the West (“Markets+” initiative)
 - PJM staff would like offer to share their experience
 - We can connect with staff at other RTOs as well (MISO, CAISO, NYISO, etc.)
- Executive at large electric cooperative in MISO to discuss their experience joining MISO
- Executive at investor-owned utility in the western U.S. to discuss the evolution of markets in that region of the country

If the Study Committee or Advisors have other people in mind, we’re happy to reach out to them and invite them to a future meeting

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Governance and Regulation Under Market Reform Options

Key Functions, Responsibilities, and Players

Although utilities are the main parties responsible for wholesale and retail functions in SC, regulators, lawmakers, unregulated companies, and non-governmental agencies oversee and influence outcomes:

- **Utilities**: own and operate regulated generation, transmission, and distribution (with regulated cost recovery), conduct near-term operations and long-term generation and transmission planning, administer generation interconnection, charge FERC-regulated transmission rates for inter-utility trading, purchase or sell wholesale power bilaterally with neighboring utilities, perform distribution system planning and operation, serve retail customers
- **Independent Power Producers (IPPs)**: own and operate unregulated generation (no regulated cost recovery), need to apply to interconnect to the transmission system through the utility-administered process.
- **Qualifying Facilities (QFs)**: small-scale generation resources owned by IPPs that qualify under PURPA for state-regulated rates based on avoided costs, and must be included by utilities in their resource mix
- **South Carolina Government**: establishes energy policy for the state, including incentives for certain types of generation assets
- **SC Public Service Commission (PSC)**: approves long-term planning efforts (Integrated Resource Plans), approves return on investment for investor-owned utilities (IOUs), regulates investments in the distribution system, establishes retail rates charged to customers
- **Federal Government**: establishes federal energy policy (e.g., tax credits for renewables, PURPA, emissions regulations)
- **Federal Energy Regulatory Commission (FERC)**: mandates open access transmission, regulates transmission rates for inter-utility (and any unbundled) usage of the grid
- **North American Electric Reliability Council (NERC)**: sets reliability criteria that govern near-term operations and long-term planning of generation and transmission to ensure that utilities maintain an adequate and reliable system

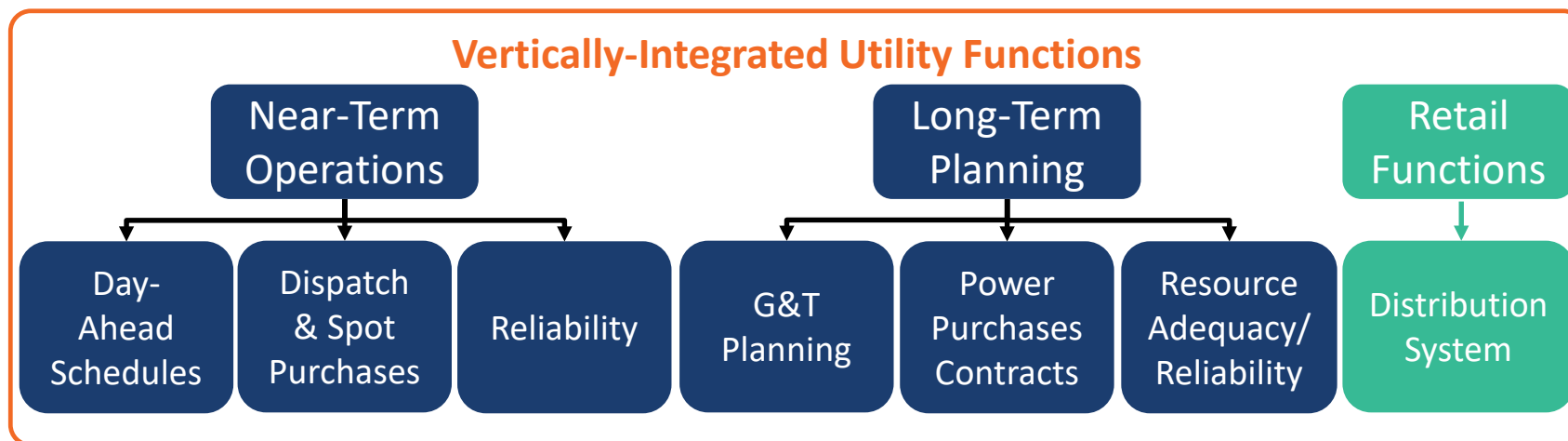
Impact of Market Reform Options

The market reform options listed in Act 187 have the potential to change how the various functions are provided to customers, including:

- Which entities are responsible for providing the described functions
- What drives operational and investment decisions
- Who bears the risks of fluctuating market prices and inefficient operational and investment decisions

The state may choose to pursue several market reform options without changing the:

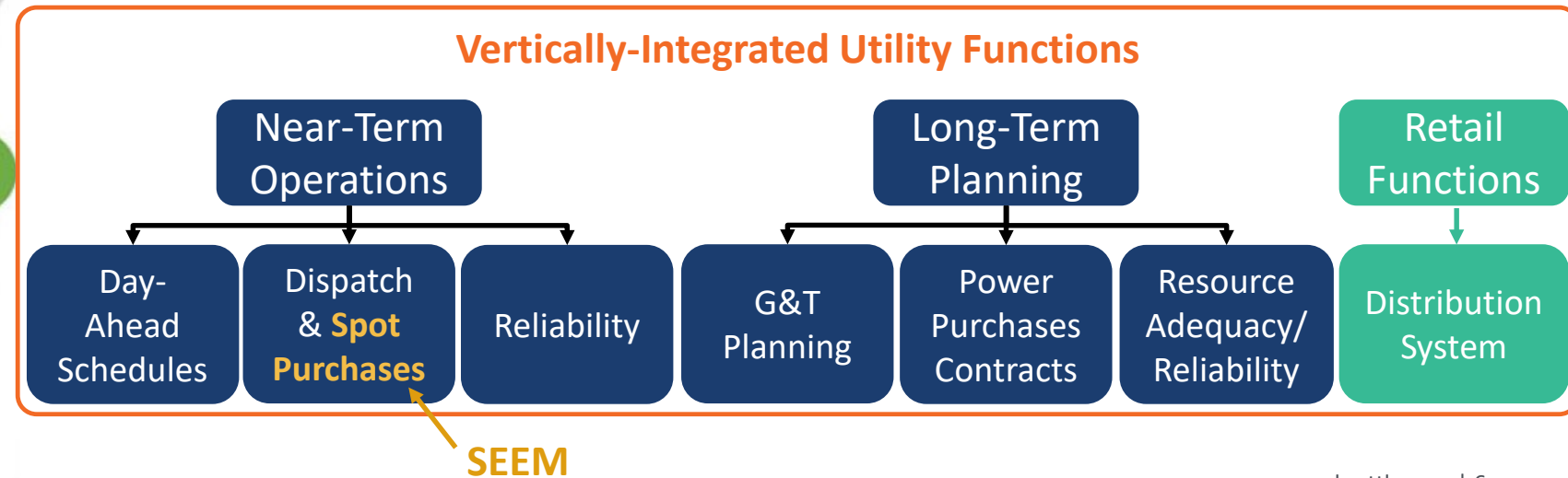
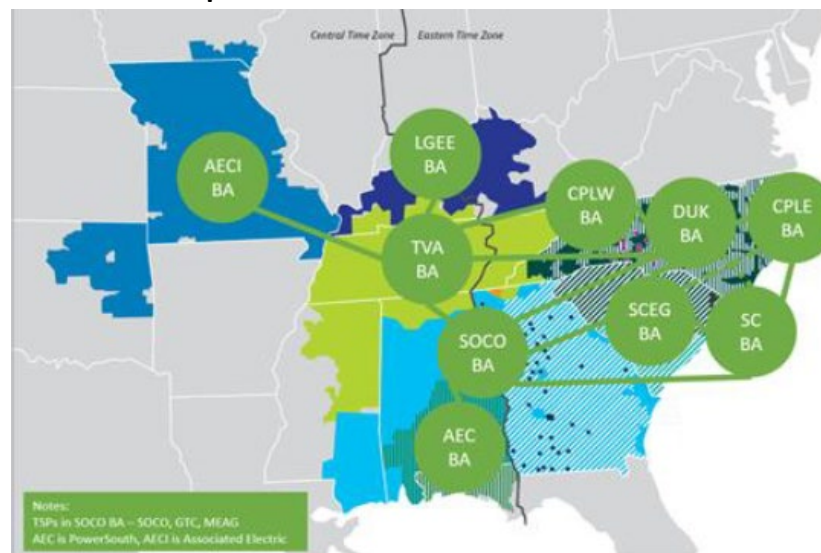
- The ability of the state government to (a) set state energy policy, (b) implement retail choice (or not) and (c) decide industry structure (e.g., whether to retain vertically-integrated utilities)
- The ability of the PSC to establish retail rates (*retail choice would reduce the PSC's scope of setting rates*)



The Southeast Energy Exchange Market (SEEM)

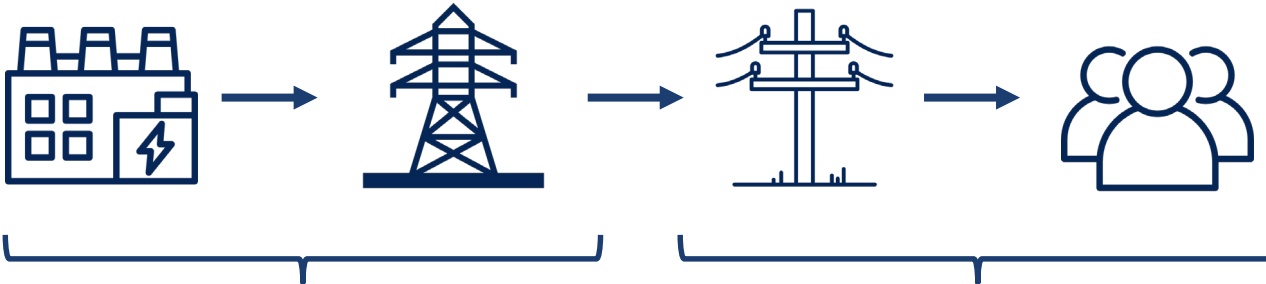
The SEEM will facilitate bilateral spot trades between utilities on spare transmission after day-ahead & intra-day trades are completed

- The SEEM will create a bilateral spot trading platform that helps (1) match buyers and sellers of power and (2) find unused transmission capability to execute transactions
- The SEEM will not change which entities are responsible for the different functions discussed (the utilities in SC)
- SEEM does not rely on “nodal” markets used by ISO/RTO and Energy Imbalance Markets (EIM) or footprint-wide optimized unit commitment and dispatch



Wholesale vs. Retail Market Reform

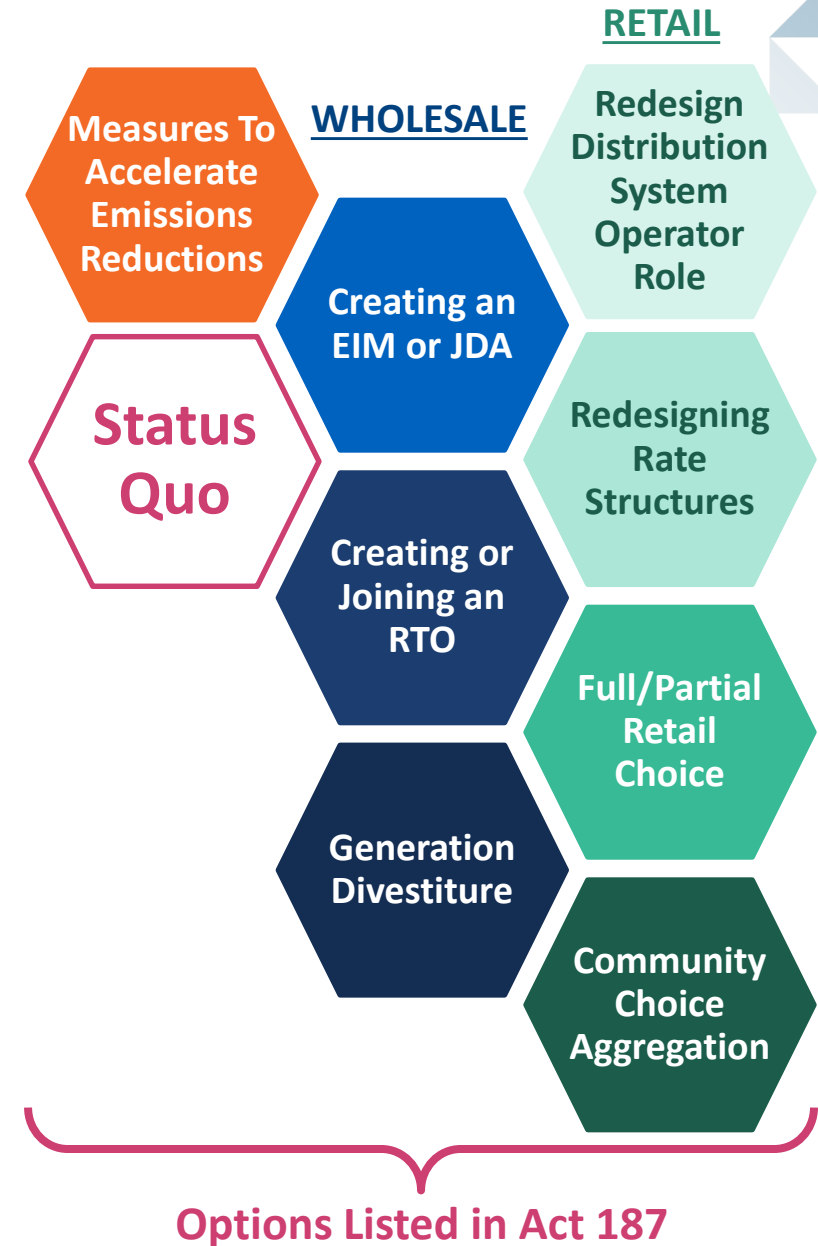
South Carolina's proposed market reform options target either the wholesale or retail electricity markets.



Wholesale Market Reform affects how electricity is generated and transported over the bulk power system to the distribution system.

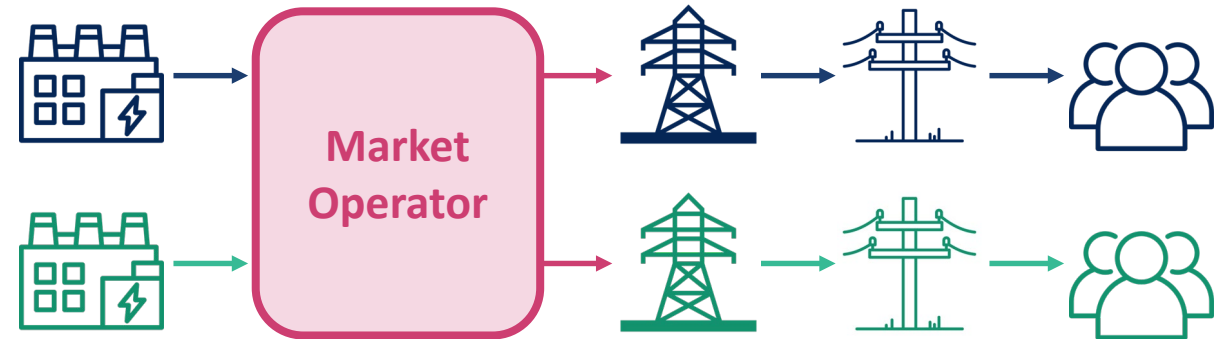
Retail Market Reform affects how electricity is sold to consumers.

Some of the reform options listed in Act 187 are policy measures that South Carolina can pursue without market reform

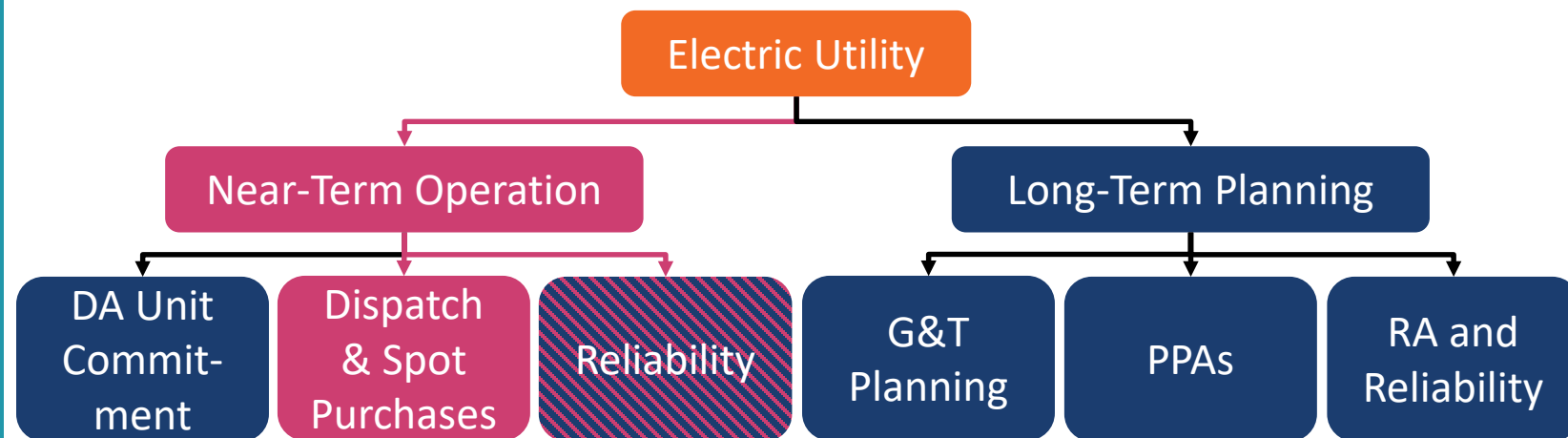


In EIM/JDA, Utilities Pool Resources During Real-Time Operations

Ownership and Operational Impacts



Functional Impacts



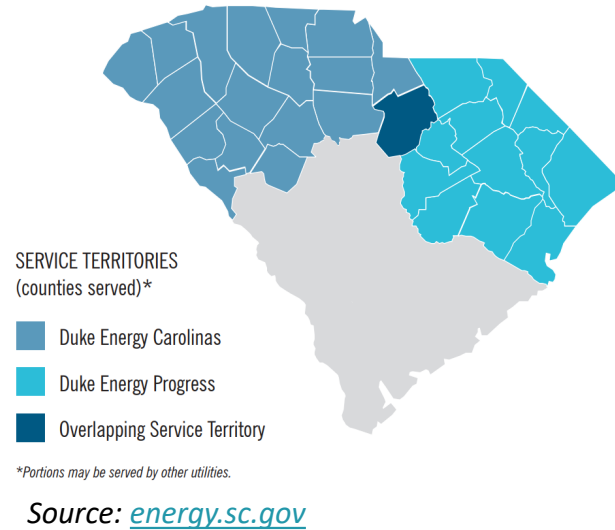
- Market operator optimizes real-time (RT) dispatch to serve demand with lowest-cost resources available (EIM also optimizes “nodal” transmission limits)
- Available transmission used in RT without fees
- Day-ahead operations and planning activities remain the same
- Transparent RT EIM prices provide clear operational and investment signals

EIM and JDA Examples

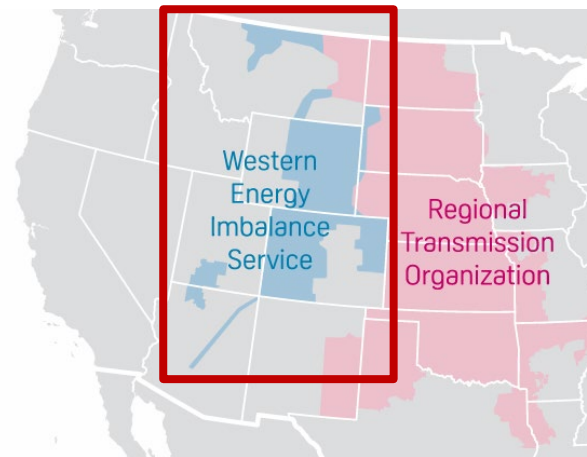
Duke Energy Carolinas and Progress Energy Operate a JDA in the Carolinas.

The SPP-administered WEIS and the CAISO-administered WEIM are two nodally-optimized imbalance markets in the western U.S.

Duke Energy JDA in South Carolina

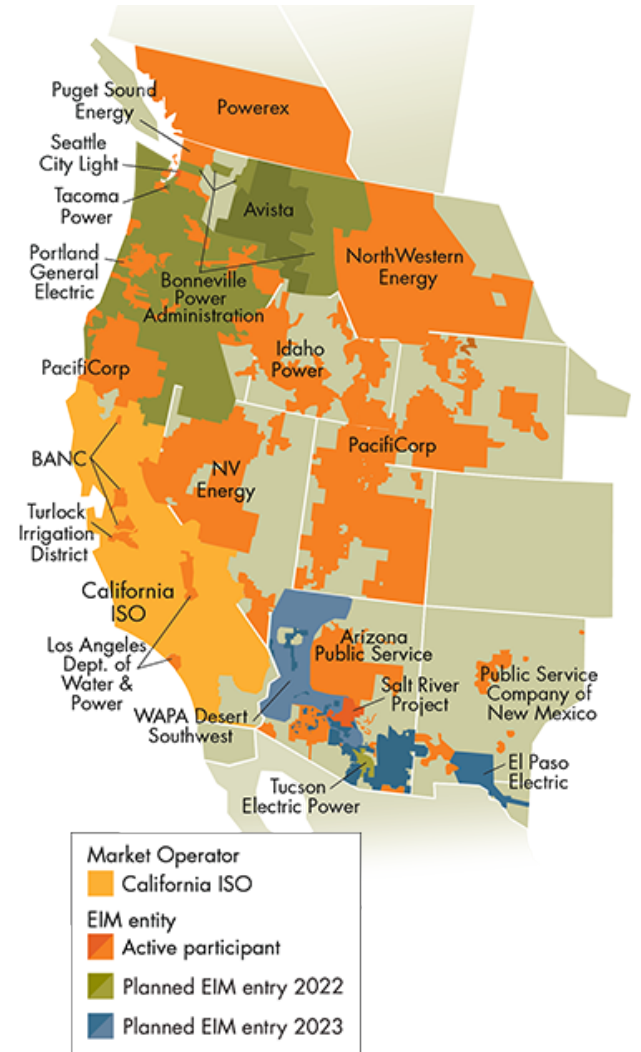


SPP Western Energy Imbalance Service (WEIS)



Source: S&P Global

Western Energy Imbalance Market (WEIM)

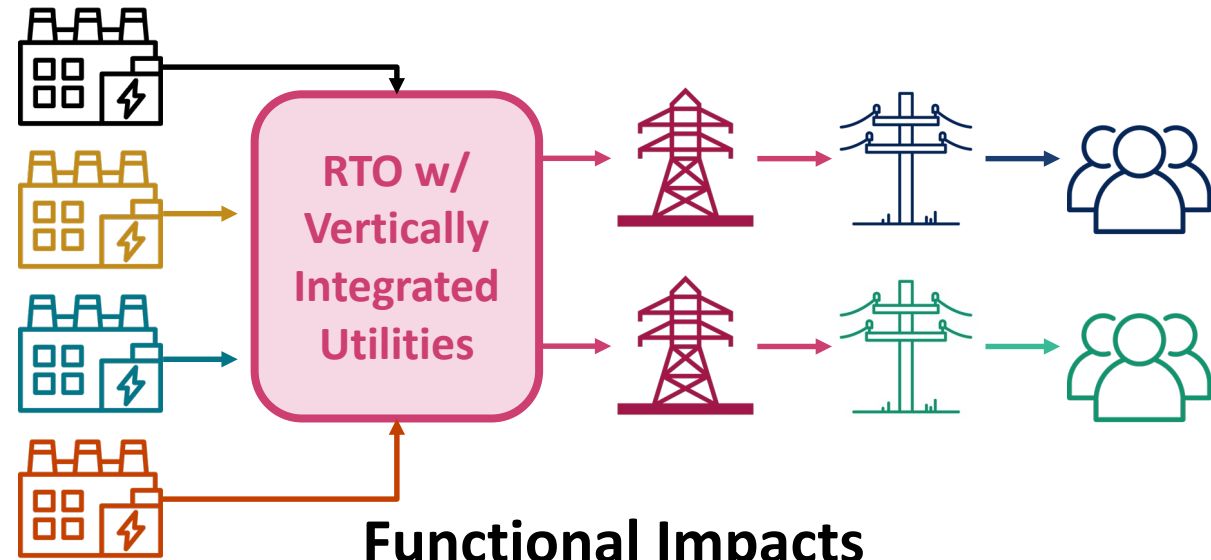


Source: westerneim.com

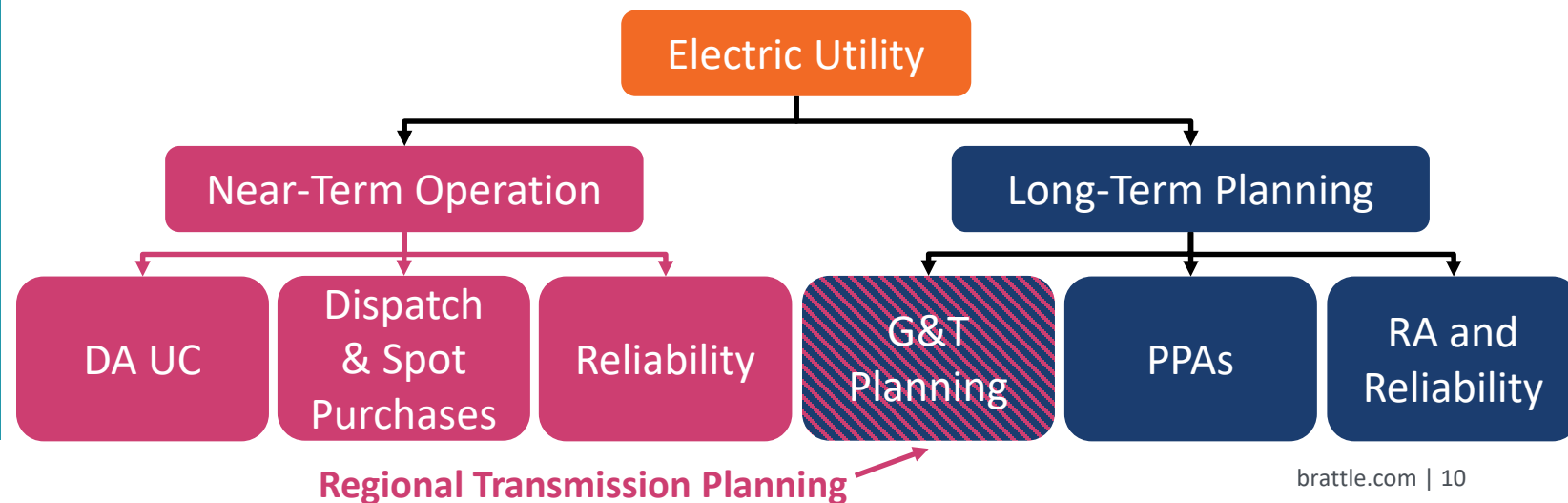
RTOs Regionally Optimize Generation and Transmission Usage

- Unit commitment, dispatch, and transmission fully optimized across day-ahead (DA) and RT
- Joint transmission tariff between members
- Transparent market pricing in DA and RT sends clear operational and investment signal
- Regionally-planned transmission investment

Ownership and Operational Impacts



Functional Impacts



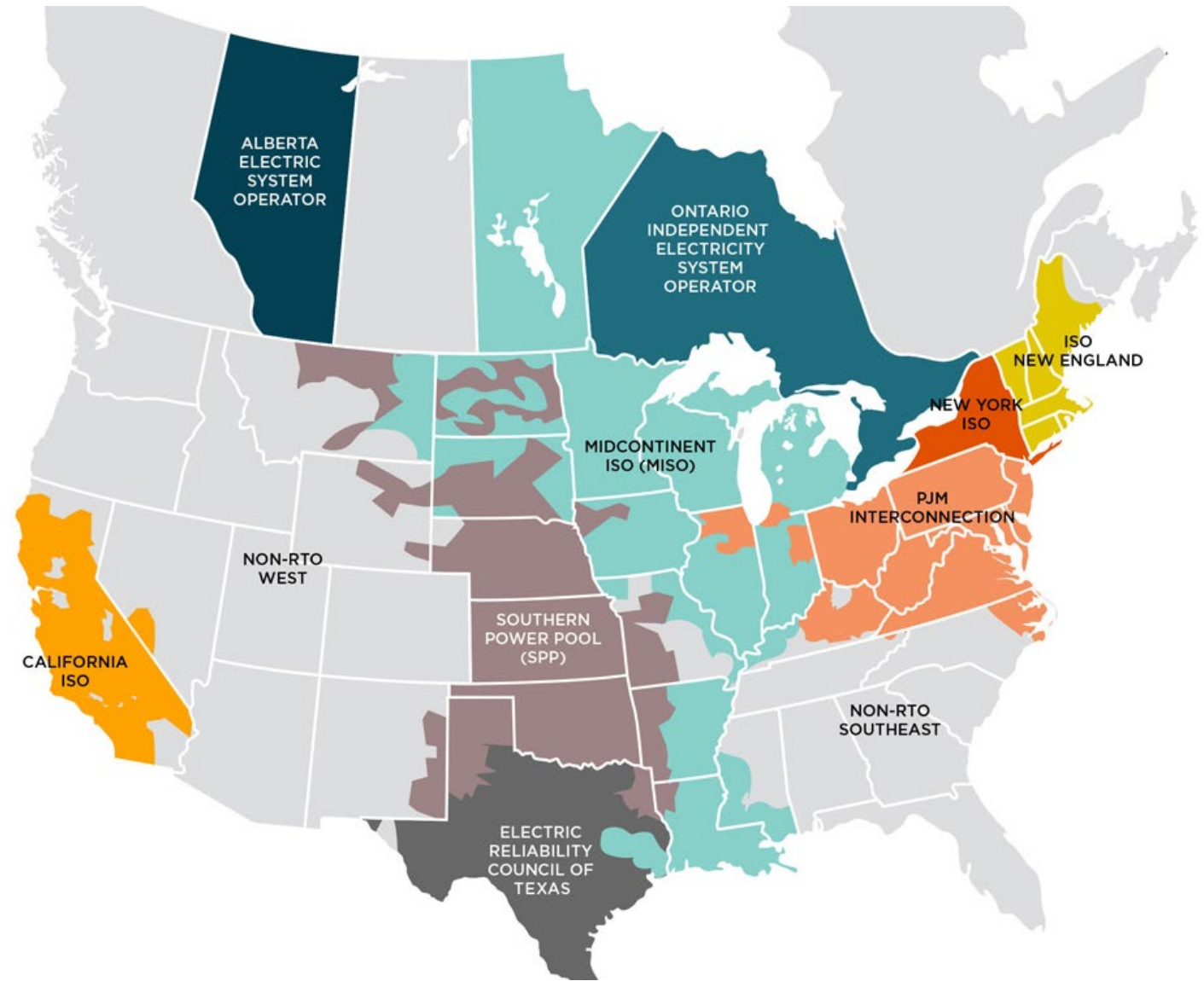
North American RTOs

Most of the North American grid is operated by RTOs

SPP and MISO are the U.S. RTOs with mostly vertically-integrated utilities

PJM, NYISO, ISO-NE include states with retail access and divested generation

In California generation is contracted based on long-term planning conducted by the state commission

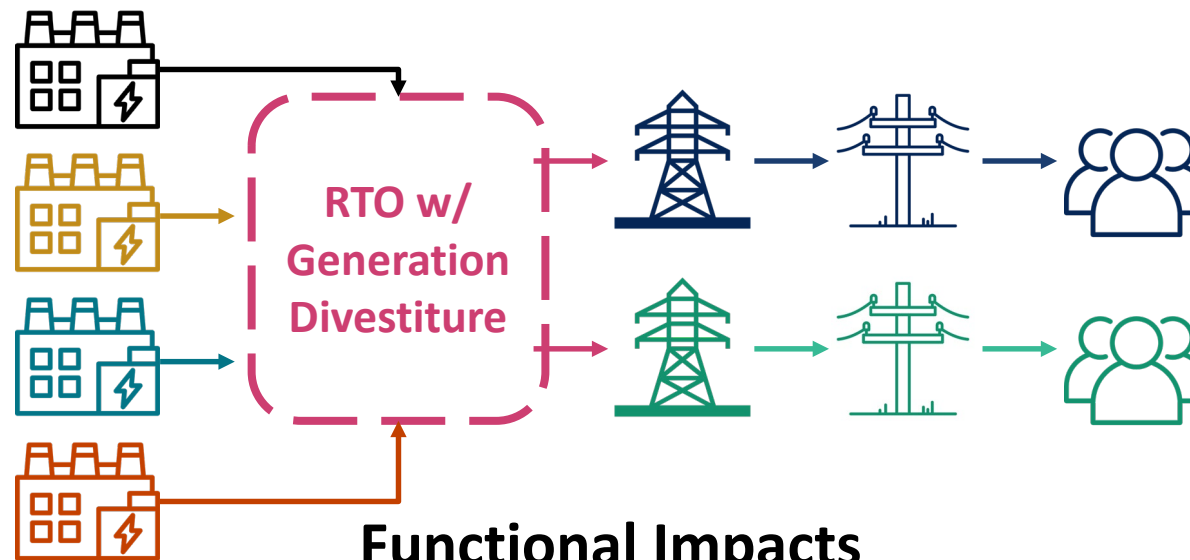


Source: FERC

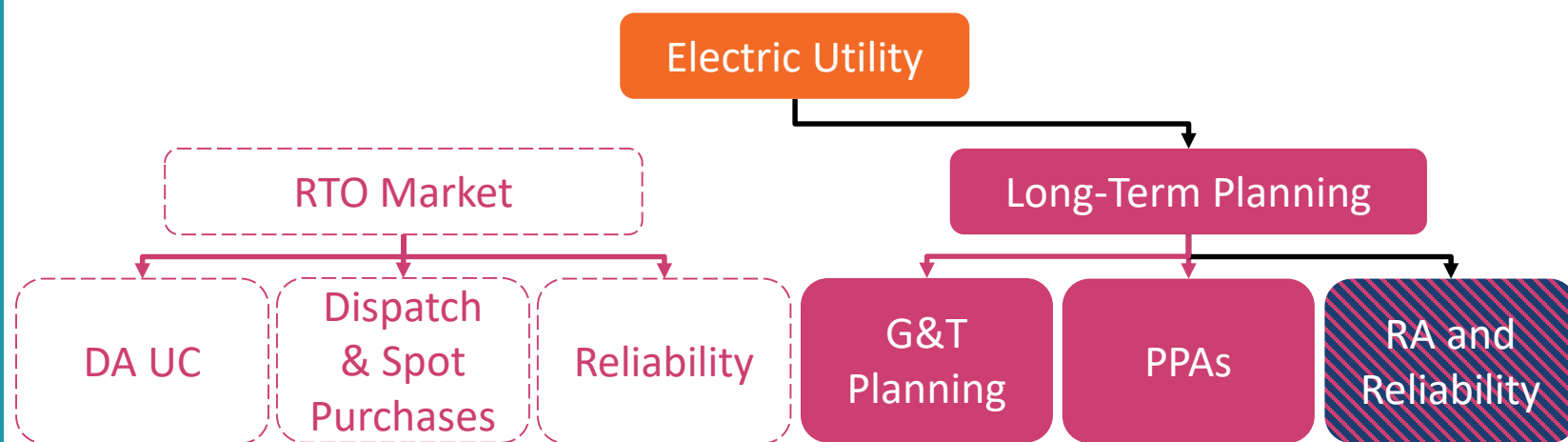
Generation Divestiture Changes Ownership

- Generators sell some or all of their generation assets and become “wires” companies
- IPPs own and operate generation, bidding it into RTO markets
- IPPs profit (or not) based on market prices
- Market forces incentivize entry/exit of generation resources (with Resource Adequacy impacts)

Ownership and Operational Impacts



Functional Impacts

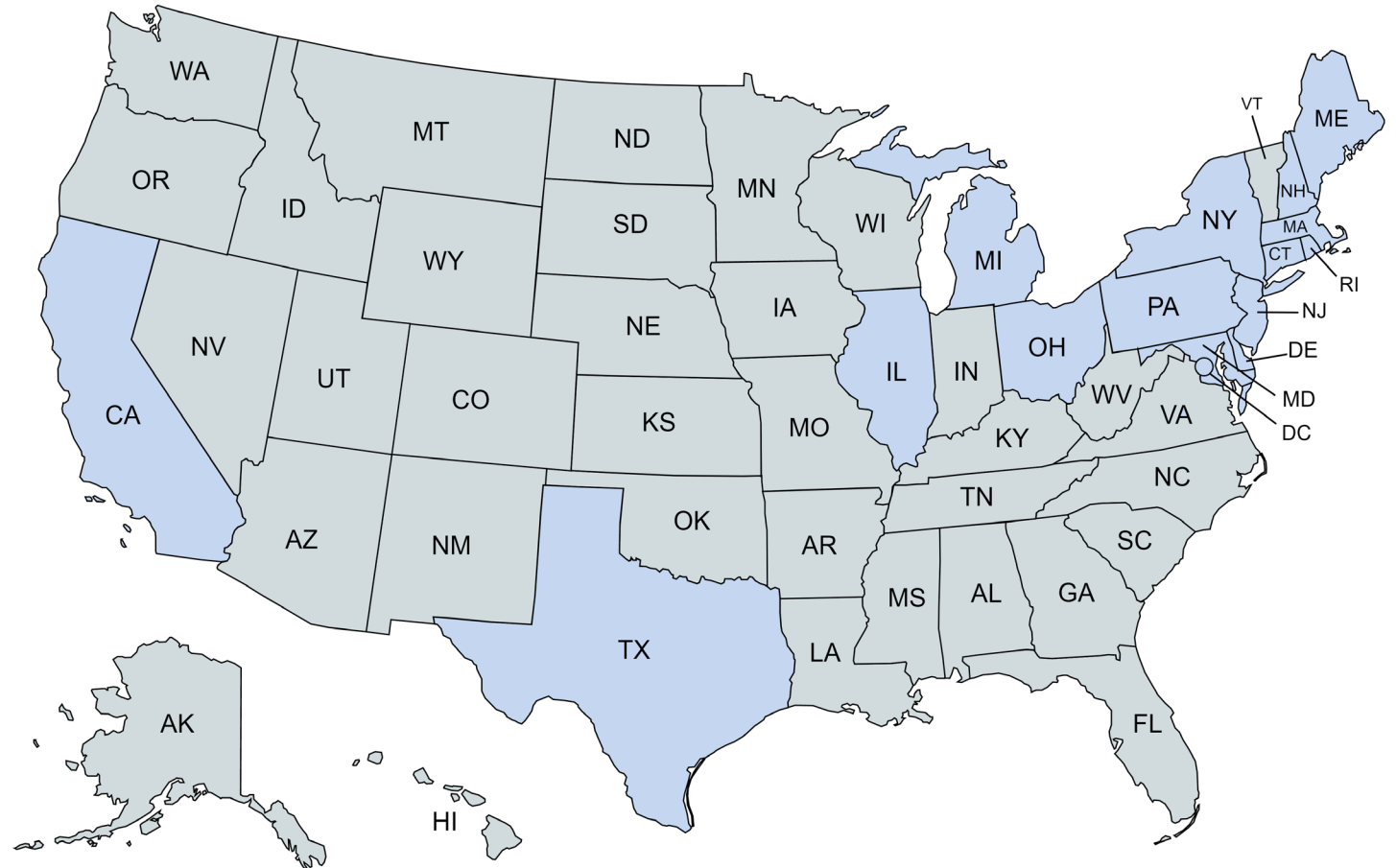


States With Generation Divestiture

Many states participating in regions with capacity markets (PJM, NYISO, ISO-NE) have divested generation.

In all states, except for TX and CA, that have divested generation also have capacity markets

States With Generation Divestiture

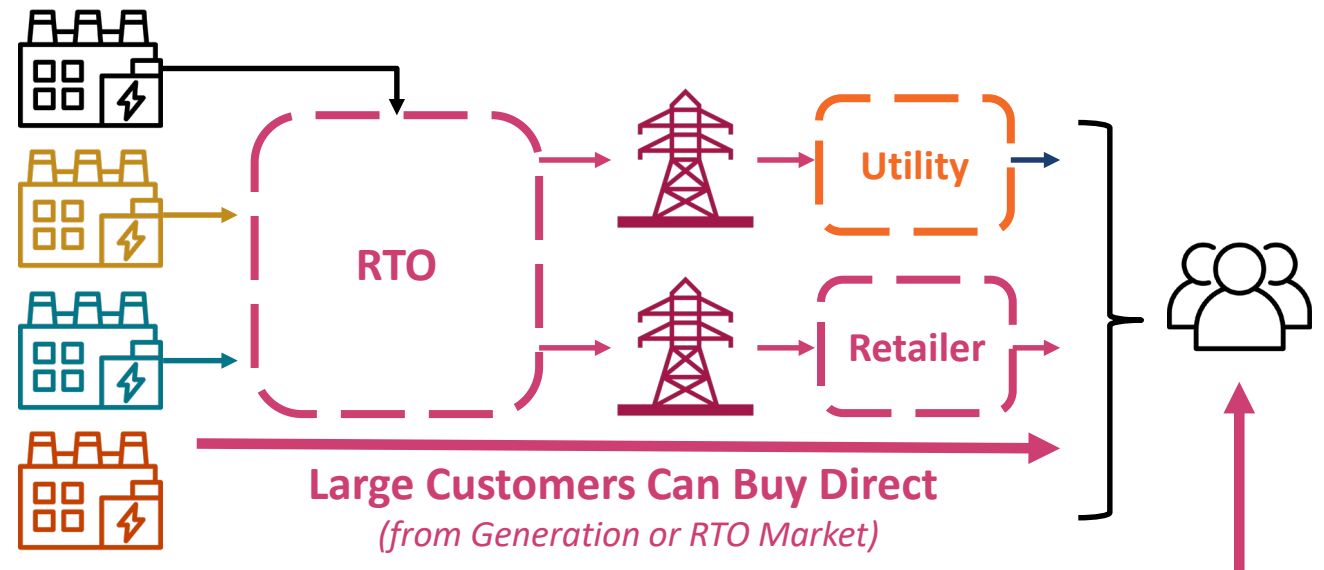


Source: [Harvard Electricity Policy Group](#)

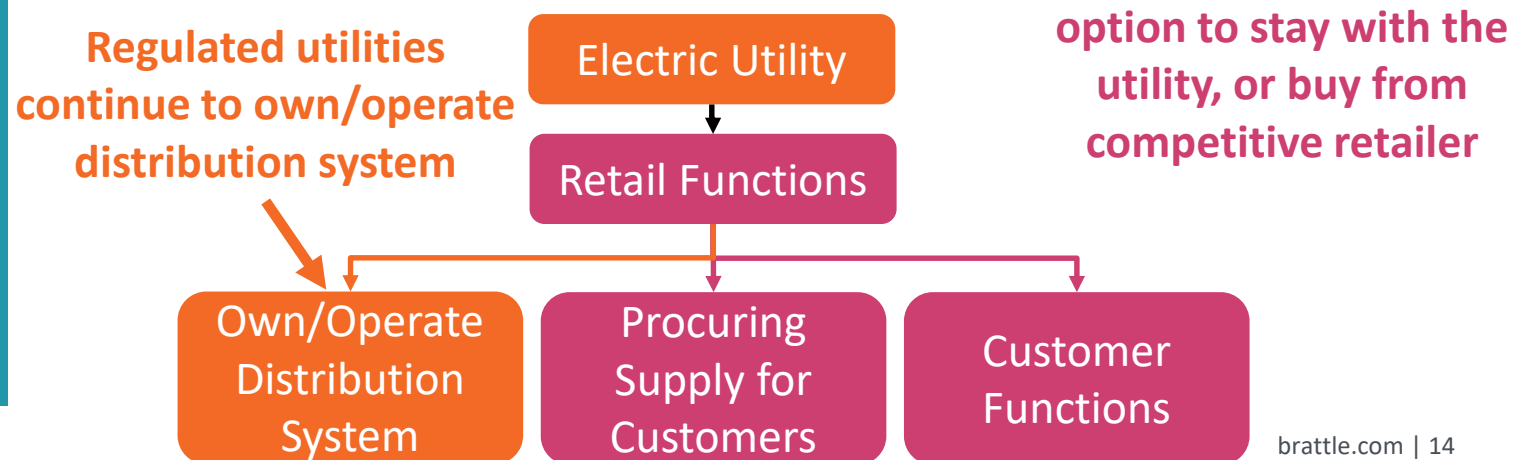
Under Retail Choice, Customers Choose Their Providers

- Full retail choice allows all types of customers to choose a competitive retail supplier; partial retail choice applies only to large C&I customers
- Utilities are “backup” providers of last resort
- Potential savings, but exposure to volatility
- RTO markets not necessary for partial retail choice; full retail choice requires a wholesale market

Ownership and Operational Impacts



Functional Impacts



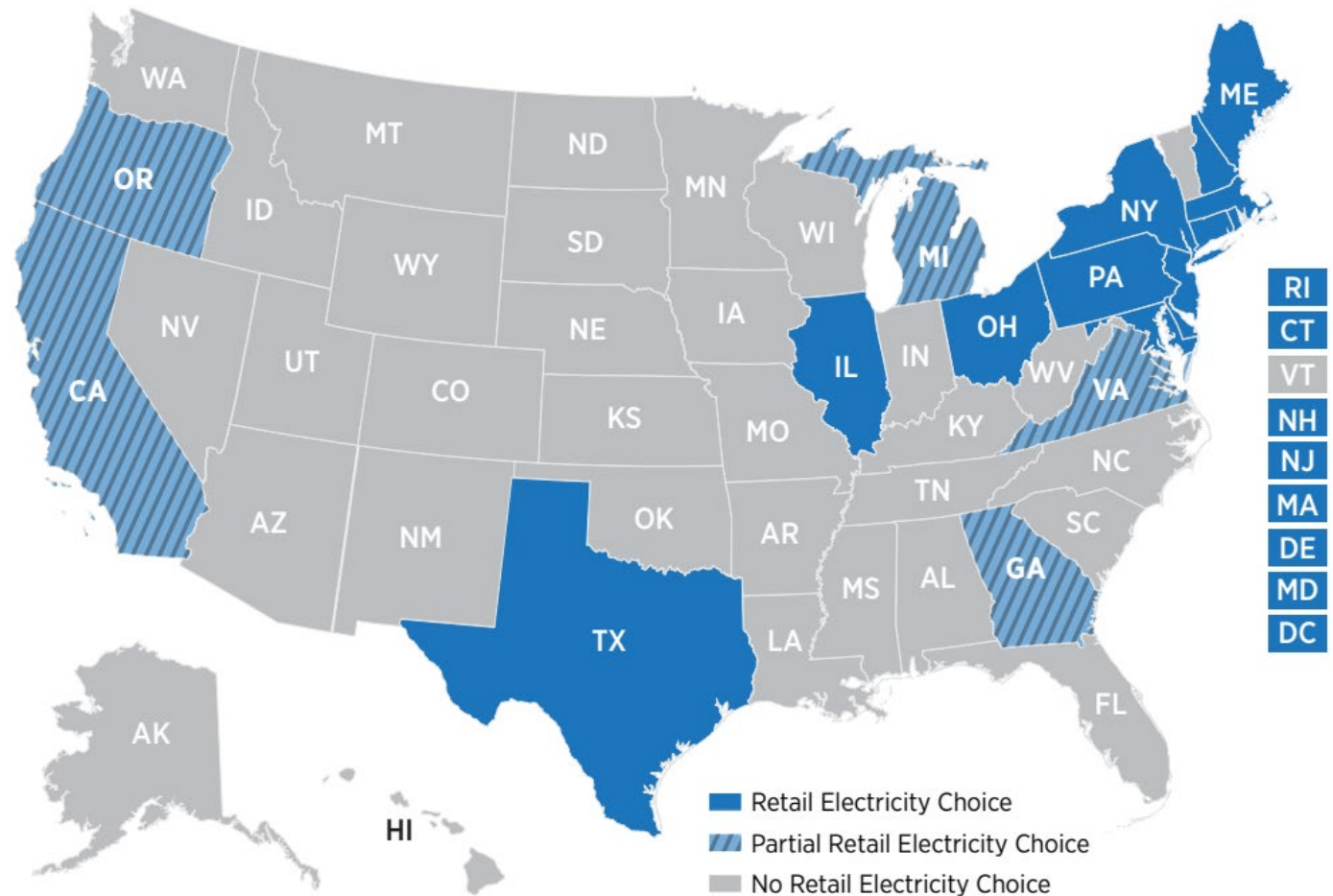
Examples of Areas With Full or Partial Retail Choice

States with full retail choice all participate in a RTO markets

Some states with very limited retail choice are not in RTO markets (e.g., GA and OR), but this is uncommon

Many states without retail choice participate in ISO/RTO or EIM markets

States With Retail Choice

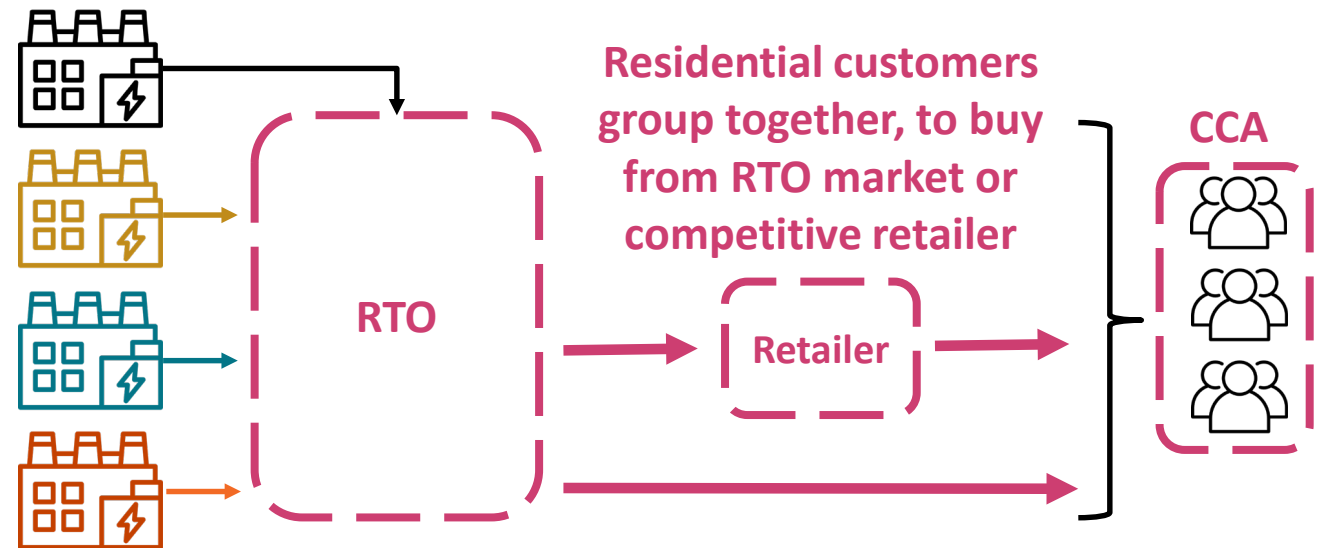


Source: [NREL](#)

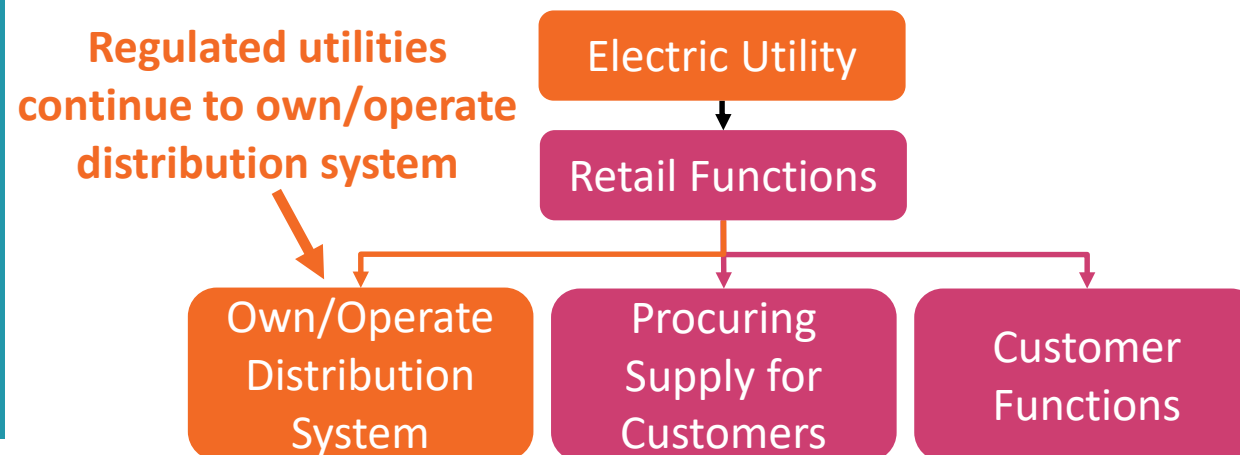
Under Community Choice Aggregation, Customers Group Together

- Customers group together to obtain bargaining power with competitive suppliers, or buy directly from the market
- Typically, residential communities or municipalities offer CCA programs to their residents
- CCAs are frequently used to purchase renewable energy from competitive suppliers

Ownership and Operational Impacts



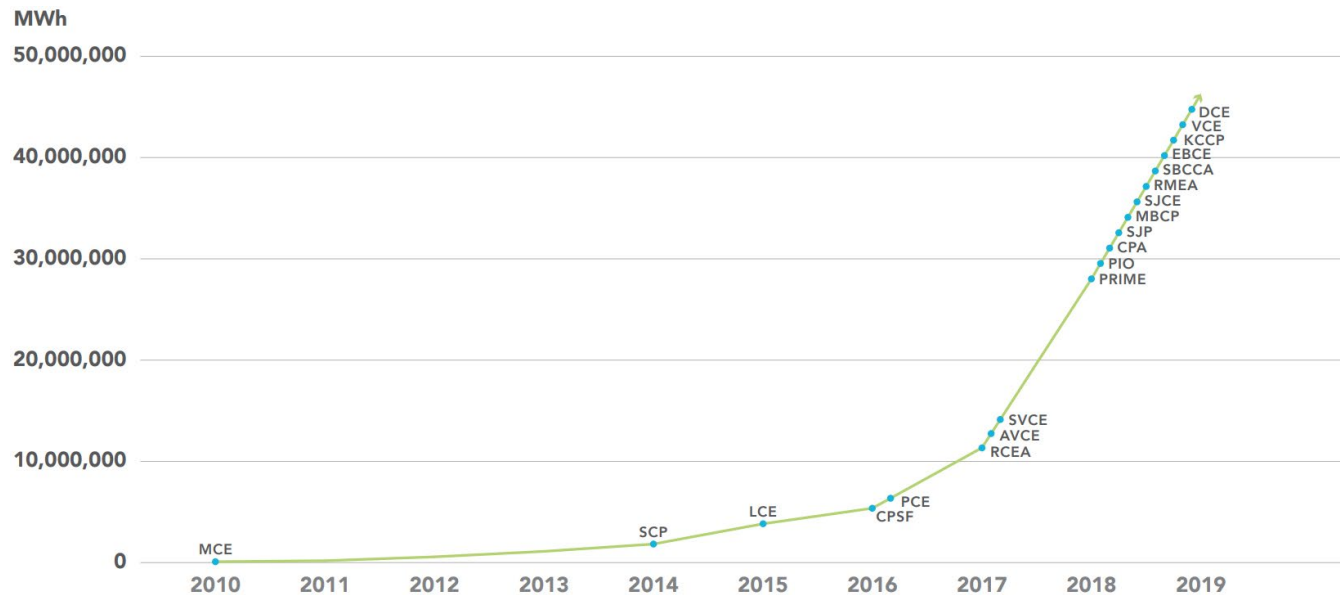
Functional Impacts



California CCA Programs

200 cities and communities, accounting for about 25% of California retail sales, participate in CCA programs (as alternative to legislatively-restricted retail choice for individual customers).

California CCA Load Growth



Source: [Next 10](#)



Source: [CalCCA](#), [S&P Global](#)

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Key Players and Roles



Electric Utilities

- Plan generation, transmission, distribution
- Propose transmission and retail rates
- File all regulatory proceedings
- Make operational decisions

Other stakeholders

- Review and respond to utility rate cases
- Participate in regulatory proceedings

FERC



- Review and approve NERC reliability standards for generation and transmission
- Regulate bilateral (inter-utility) power transactions
- Regulate wholesale transmission rates

State Regulator



- Review and approve generation and T&D plans
- Regulate T&D retail rates
- Ensures utilities are planning to NERC standards

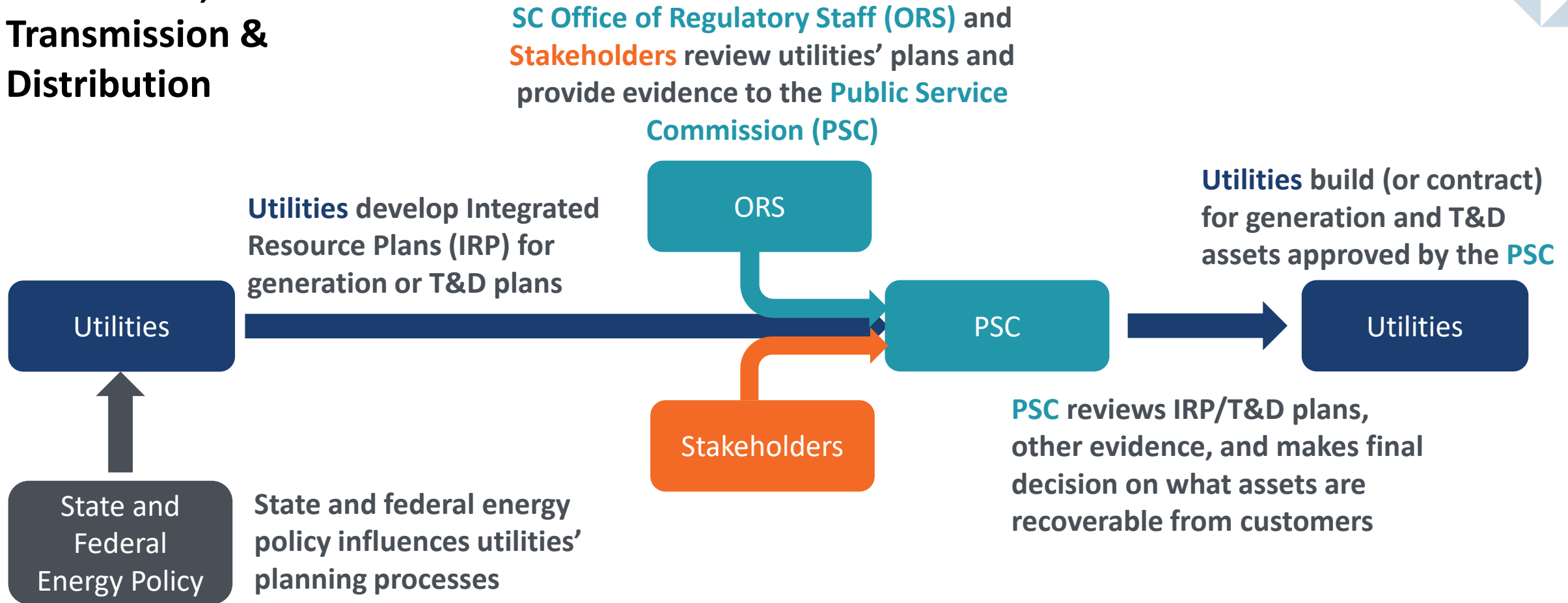
State Public Advocate



- Inspect, audit, and examine public utilities
- Represent consumer interests in rate cases and proceedings

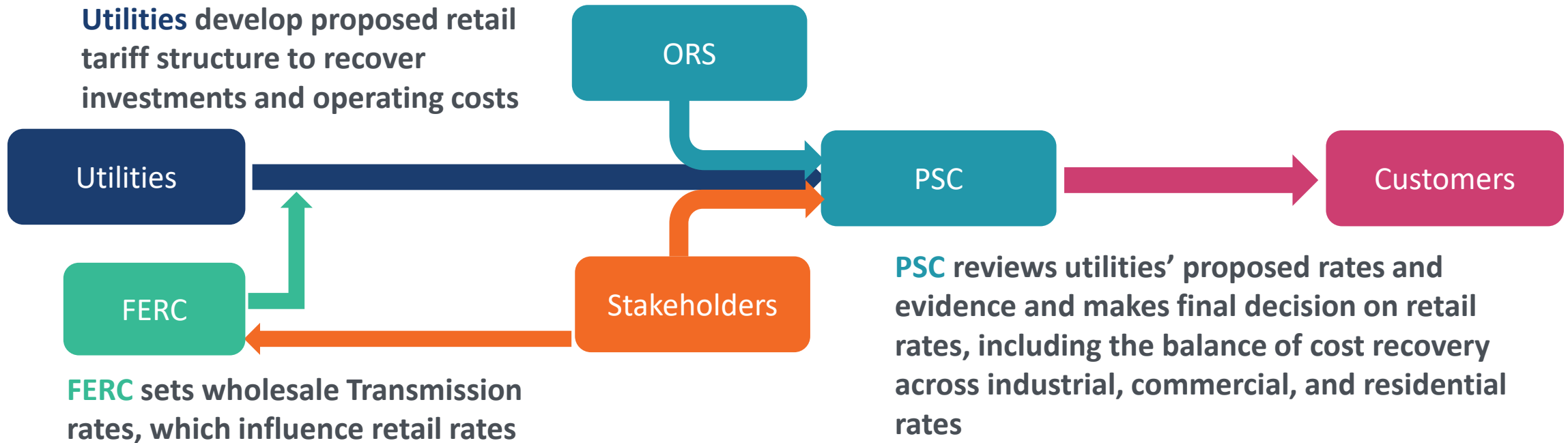
Investment Decision-making

Generation, Transmission & Distribution



Retail Rate Making

ORS and Stakeholders review utilities' plans and provide evidence to the PSC



Rate Making: IRP Example



DEC PORTFOLIO RESULTS TABLE

PORTFOLIO	Base without Carbon Policy		Base with Carbon Policy		Earliest Practicable Coal Retirements		70% CO ₂ Reduction: High Wind		70% CO ₂ Reduction: High SMR		No New Gas Generation	
	A	B	C	D	E	F						
System CO ₂ Reduction (2030 2035) ¹	56% 53%	59% 62%	64% 64%	70% 73%	71% 74%	65% 73%						
Average Monthly Residential Bill Impact for a Household Using 1000kWh (by 2030 by 2035) ²	\$7 \$23	\$8 \$25	\$13 \$25	\$26 \$47	\$24 \$45	\$12 \$45						
Average Annual Percentage Change in Residential Bills (through 2030 through 2035) ²	0.7% 1.3%	0.8% 1.5%	1.3% 1.4%	2.3% 2.5%	2.2% 2.5%	1.1% 2.4%						
Present Value Revenue Requirement (PVRR) [\$B] ³	\$44.4	\$46.8	\$46.8	\$56.1	\$53.6	\$56.0						
Estimated Transmission Investment Required [\$B] ⁴	\$0.6	\$1.0	\$0.7	\$4.3	\$2.1	\$2.7						
Total Solar [MW] ^{5, 6} by 2035	3,700	5,950	5,950	8,450	8,450	8,450						
Incremental Onshore Wind [MW] ⁵ by 2035	0	150	0	1,100	1,100	1,400						
Incremental Offshore Wind [MW] ⁵ by 2035	0	0	0	1,350	150	150						
Incremental SMR Capacity [MW] ⁵ by 2035	0	0	0	0	700	700						
Incremental Storage [MW] ^{5, 7} by 2035	350	600	600	2,400	2,400	2,400						
Incremental Gas [MW] ⁵ by 2035	4,300	3,050	5,650	4,300	3,950	0						
Total Contribution from Energy Efficiency and Demand Response Initiatives [MW] ⁸ by 2035	1,225	1,225	1,225	1,850	1,850	1,850						
Remaining Dual Fuel Coal Capacity [MW] ^{5, 9} by 2035	3,050	3,050	0	0	0	2,200						
Coal Retirements	Most Economic	Most Economic	Earliest Practicable	Earliest Practicable ¹⁰	Earliest Practicable ¹⁰	Most Economic						
Dependency on Technology & Policy Advancement												

Source: Duke Energy Carolinas, [2020 Integrated Resource Plan](#), p. 16.

Regulation of Wholesale Markets



Key Players and Roles in Wholesale Market Setting



Electric Utilities

- Plan generation, transmission, distribution
- Propose transmission and retail rates
- File all regulatory proceedings
- Make operational decisions

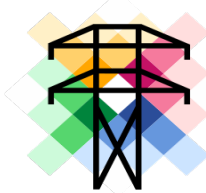
Other Stakeholders

- Review and respond to utility rate cases
- Participate in regulatory proceedings

FERC



- Review and approve NERC reliability standards for generation and transmission
- Regulate bilateral (inter-utility) power transactions
- Regulate wholesale Tx rates
- Regulate market rules**



Market Administrator

- Design market rules**
- Submit FERC filings**
- Wholesale market operations**

State Regulator



- Review and approve generation and T&D plans
- Regulate T&D retail rates
- Ensures utilities are planning to NERC standards

State Public Advocate



- Inspect, audit, and examine public utilities
- Represent consumer interests in rate cases and proceedings

FERC's Role Across Different Wholesale Market Options

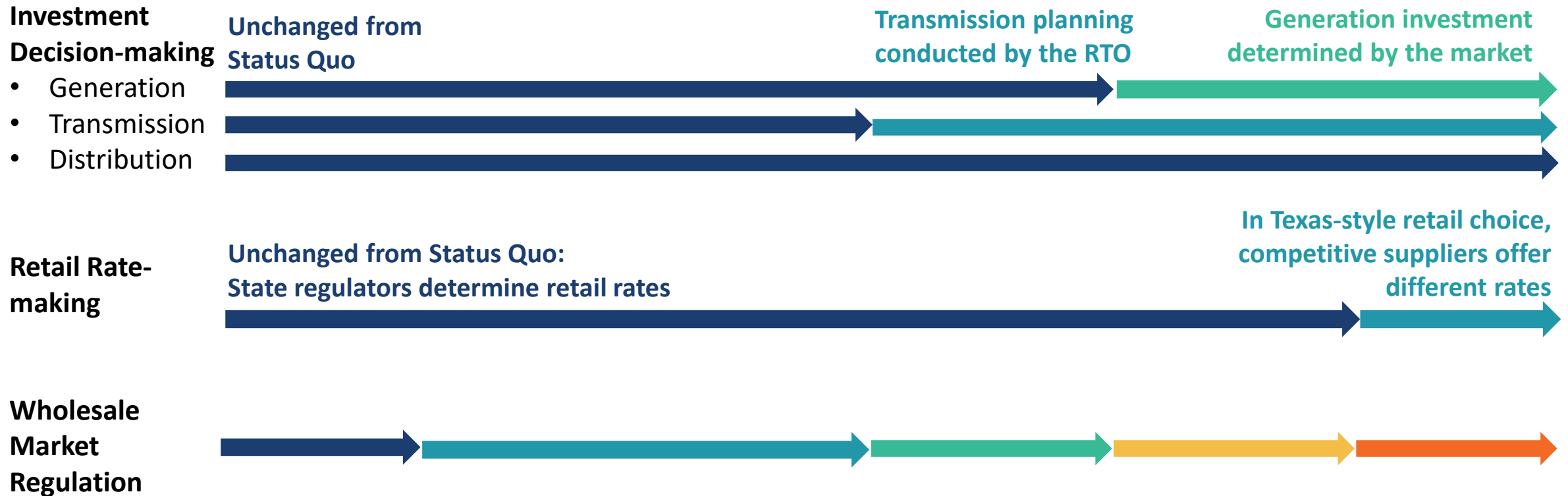
Bilateral Market	Enhanced Bilateral Market	Joint Dispatch	Imbalance Market	RTO w/ Vertically Intergrated Utilities	RTO w/ Generation Divestiture	RTO w/ Retail Choice
SC Today	SC w/ SEEM	Duke JDA	Western EIM	SPP/MISO/PJM*	ISO-NE/NYISO/PJM*	
<ul style="list-style-type: none"> Regulates inter-utility sales and tests for market power Regulates transmission tariffs and wholesale rates Through NERC, sets standards for Tx and Gx reliability 	Same as previous plus: <ul style="list-style-type: none"> Reviews and approves market rules 	Same as previous		Same as previous plus: <ul style="list-style-type: none"> Approves RTO transmission tariff and planning process Approves RTO market rules, rule changes, and access tariffs Resolves disputes 	Same as previous plus: <ul style="list-style-type: none"> Reviews and approves capacity market rules 	Same as previous



*PJM contains a mix of vertically integrated states and restructured states

Summary of Changes in Market Reform Options

Bilateral Market	Enhanced Bilateral Market	Joint Dispatch	Imbalance Market	RTO w/ Vertically Intergrated Utilities	RTO w/ Generation Divestiture	RTO w/ Retail Choice
SC Today	SC w/ SEEM	Duke JDA	Western EIM	SPP/MISO/PJM*	ISO-NE/NYISO/PJM*	



*PJM contains a mix of vertically integrated states and restructured states

RTO Governance Overview



Key Entities in RTO Governance



The **RTO** serves **stakeholders** by operating the power system according to the RTO **board** guidance

RTO Staff execute all **RTO** functions, including operations and planning



The **RTO Board of Directors**:

- Determines mission, purpose, and strategy
- Appoints, supports, reviews key executives
- Independent of the **RTO** and **stakeholders**

Standing Committees oversee functions like legal, finance, and HR



Advisory Committees receive, review, and filter **stakeholder** recommendations and concerns for presentation to the **board**

State Governments strongly influence single-state **RTOs**. In other cases, the group of state regulators participate in the **stakeholder** processes, governance committees, and **board** meetings



End-Use Customers



Generation Owners



Transmission Owners



Marketers and Brokers



Public Power Entities



Consumer Advocates



Environmental Groups

Stakeholders (“interveners”), grouped into sectors, meet regularly to discuss **RTO** issues pertaining to their interests and develop proposals for the **board**

RTO Boards Have Some Differences










Board composition is largely similar across RTOs:

- 10 members
- Member independence
- 3-4 year terms

Boards are usually nominated by committee, and elected by sitting board members

Usually, meetings are quarterly with varying amounts of advance notice required and there are 1-2 meetings with market participants annually

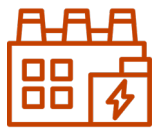
		 ISO-NE	 NYISO	 PJM	 MISO	 SPP	 ERCOT	 CAISO
Composition	Number	10 9 + CEO <i>ex officio</i>	10 9 + CEO <i>ex officio</i>	10 9 + CEO <i>ex officio</i>	10 9 + CEO <i>ex officio</i>	10 9 + CEO <i>ex officio</i>	16 (TX PUC Chair non-voting)	5
	Term	3 years	4 years	3 years	3 years	3 years	3 years (Unaffiliated dir.) 1 year (Segment directors)	3 years
	Term Limits	3 full terms (waivable by JNC)	3 terms	5 terms	3 successive terms (4 th with Board waiver)	none	3 terms (Unaffiliated dir.) none (Segment directors)	none
	Other Limits • Independence from Members • Age (when elected/re-elected)	• Independent • ≤ 70	• Independent • < 75	• Independent • < 75	• Independent • none	• Independent • none	• <i>Hybrid</i> 5 Unaffiliated, 9 Segment, 1 PUC Chair, 1 OPUC Pub Counsel • none	• Independent • none
Selection	How Identified	Joint Nominating Committee (JNC) • 6 Indep. Directors (not from class under consideration) • 6 Sector Reps (1/Sector) • 1 NECPUC Comm.	Management Committee • recommends candidates	Nominating Committee • 3 Indep. Directors (one non-voting) • 5 Sector Reps (1/Sector)	Board assisted by <i>Nominating Comm.</i> • 3 Indep. Directors • 2 Advisory Comm. Reps	Corporate Governance Comm. • SPP Pres (Chair) • Board Chair or Vice-Chair • 9 Organization Group Reps (1/Group)	Nominating Committee (for Unaffiliated directors) • All voting directors	Board Nominee Review Committee • 36 member-class reps (6/class)
	How Elected	By Slate • Members endorse slate • Sitting Board Members elect slate	Individually • Sitting Board Members elect	Individually • Members (MC) elect	Individually • Members elect	Individually • Members elect	Individually <i>Unaffiliated Directors</i> • Members elect • TX PUC approves <i>Segment Directors</i> • Segment elects	Individually • CA Governor appoints • CA Senate confirms
Meetings	Frequency – Full Board Meetings • Minimum Req. • 2019 Scheduled (each Board has multiple Committees that also meet regularly)	• Quarterly • 6	• Quarterly • 5	• Quarterly • 4	• Quarterly • 4	• 3 • 6	• Quarterly • 6	• Quarterly • 8
	Min. Notice Req.	5 days	7 days	5 days	7 days	15 days	7 days	4 days
	Meetings with Market Participants (Boards also have mtgs separately with State Representatives)	• 2x / year (by Sector) • NPC meetings (individual members on occasion)	• 1x / year • Liaison Comm. monthly	• 2x/year Gen. Session • Liaison Comm. 4-5x/yr • Trial 1x/yr by Sector • Enhanced Liaison Comm. • 2 Bd members at monthly MRC/MC mtgs	• 1x/year (Annual Stakeholder Meeting) • Advisory Comm.	• 1x / year • Indiv. Members attend meetings on occasion	• Nothing structured	• Nothing structured Attend / participate in stakeholder symposiums, not ISO stakeholder mtgs

Stakeholder Process For Rule Changes

1

Stakeholders or the RTO develop proposed rule changes and send them to the relevant board subcommittee for review.

In certain markets, such as SPP, stakeholders have a larger role in developing rules, proposals, etc.



Generation
Owners



Transmission
Owners



End-Use
Customers



Marketers
and Brokers



Public Power
Entities



Consumer
Advocates



Environmental
Groups

Stakeholder Process For Rule Changes

1

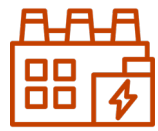
Stakeholders or the RTO develop proposed rule changes and send them to the relevant board subcommittee for review.

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2

Stakeholder/RTO proposals get voted on, refined, and developed as it moves to the Advisory Committee.

Votes can be sector-weighted or unweighted, with varying majorities needed to pass.



Generation Owners



Transmission Owners



End-Use Customers



Marketers and Brokers



Public Power Entities



Consumer Advocates



Environmental Groups



Sub-committees

Final Level:
Advisory Committee

Stakeholder Process For Rule Changes

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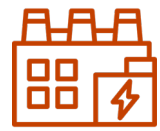
2

Stakeholder/RTO proposals get voted on, refined, and developed as it moves to the Advisory Committee.

Votes can be sector-weighted or unweighted, with varying majorities needed to pass.

3

The board discusses the proposal with state and federal regulators. If the board has authority to file with the relevant regulators, it either approves and files or strikes it down. If it does not have authority to file, it submits the proposal to the relevant regulators, with an optional endorsement.



Generation Owners



Transmission Owners



End-Use Customers



Marketers and Brokers



Public Power Entities



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Environmental Groups



Sub-committees

Final Level:
Advisory Committee



Stakeholder Voting Rights on Advisory and Standing Committees

Typical voting structures vary by committee level

At lower levels:

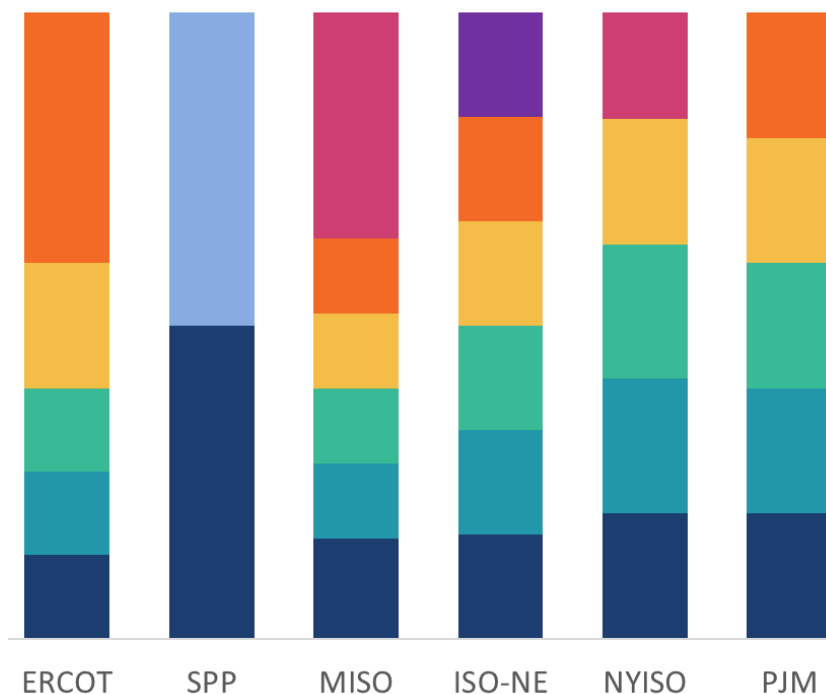
- Popular votes
- Simple majority requirements
- Allow new or small Members' concerns to be heard

At higher levels:

- Sector-weighted voting
- Supermajority requirements
- Larger members may have greater weight in decision making

Committee Voting Rights Allocation

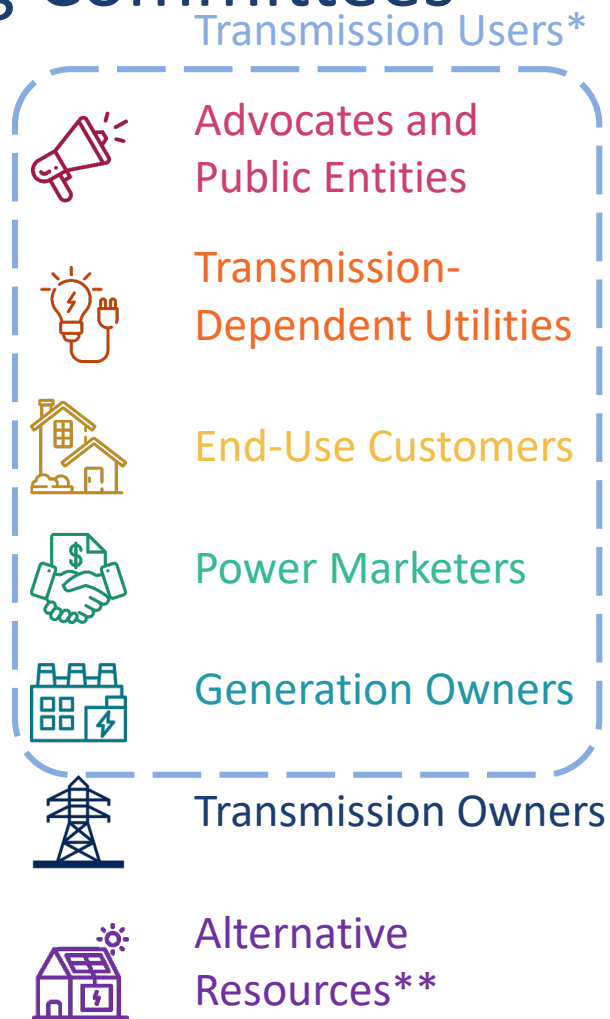
By Sector



Source: Exeter Associates, [Report for NESCOE Energy Vision](#) (Feb. 2021)

* Transmission users are defined as entities not having placed over 500 miles of non-radial transmission lines operated at or above 60 kV. Stakeholders meeting this criterion are considered "transmission owners" in the stakeholder process.

** ISO-NE considers renewable generation, distributed generation, and load response as "alternative resources." Other RTOs include these resources in Generation Owner or End-Use Customer segments.



Regulatory Process After The Stakeholders Develop Rules

RTOs must file tariff changes, governance changes, and planning documents with FERC for regulatory approval

Initial filing is done under Federal Power Act §205:

- Filing party demonstrates that proposed changes are just and reasonable
- Relatively low legal hurdle
- §205 rights can vary by entity and region

After filing, FERC has 60 days to:

- Approve the filing
- Amend and approve the filing
- Reject the filing
- Call for a hearing or settlement

FERC must accept filings shown to be just and reasonable, even if an alternative is more optimal

FERC approval results in an order

Filings are automatically accepted after 60 days, but no order is issued

After a FERC order is issued, parties can file challenges under Federal Power Act §206:

- Filing party demonstrates that the filing is unjust, unreasonable, unduly preferential, or discriminatory
- High legal hurdle makes change difficult
- Tariffs accepted without an order cannot be challenged

State Influence on Governance

Table ES-1. Role of States in ISO/RTO Governance and Practices						
AREA	CAISO	ISO-NE	MISO	NYISO	PJM	SPP
<i>State Commission / State Committee</i>	<ul style="list-style-type: none"> CPUC CEC 	<ul style="list-style-type: none"> NESCOE NECPUC 	OMS	<ul style="list-style-type: none"> PSC NY DPS 	OPSI	RSC
<i>Sponsor Issues/Proposals in Stakeholder Process?</i>	Yes	NESCOE only	Yes	Yes	Yes	Yes
<i>Role in Stakeholder Process</i>	Non-voting	<u>Non-voting</u>	Voting	<u>Non-voting</u>	<u>Non-voting</u>	<u>Non-voting</u>
<i>Board Nomination Role</i>	<u>None</u>	NECPUC: 1 seat on Nomination Committee	State Regulatory Authorities or Public Consumer Advocates sector member ^[1]	<u>None</u>	<u>None</u>	<u>None</u>
<i>Board Engagement</i>	None	<ul style="list-style-type: none"> State official meetings (2 per year) <u>Board liaison meeting with State Commission (1 per year)</u> 	None	Liaison Subcommittee (~12 per year)	<ul style="list-style-type: none"> <u>OPSI annual meeting (1 per year)</u> General Sessions (2 per year) 	None
<i>Board Meeting Role</i>	Participant	None	Participant	Participant	None	Participant
<i>Form of Section 205 Filing Rights (where an entity files on their behalf)</i>	None	<ul style="list-style-type: none"> <u>NESCOE: Transmission Cost Allocation</u> NESCOE: Participants Committee Supported Proposal 	<u>Transmission Cost Allocation</u>	None	None	<ul style="list-style-type: none"> <u>Transmission Planning & Cost Allocation</u> <u>Resource Adequacy</u>

Source: Exeter Associates, [Report for NESCOE Energy Vision](#), February 2021;

See also Jennie Chen, Gabrielle Murnan, [State Participation in Resource Adequacy Decisions in Multistate Regional Transmission Organizations](#), March 2019.

Key Takeaways

Governance varies significantly depending on the type of market structure and the region

**There is no right answer or set governance structure:
South Carolina can choose the right structure for itself**