

South Carolina Market Reform Study Kickoff Meeting

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PRESENTED FOR

South Carolina Market
Reform Study Committee



Agenda

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Introductions

2

Discuss Scope of Engagement and Timeline

3

Begin Educational Workshops (Time Permitting)

About the Brattle team

The Brattle team assists policymakers, regulators, electric utilities, independent system operators, generation and transmission developers, and electricity customers with planning, regulatory, and market design challenges in the electricity industry. Relevant experience also includes addressing renewable integration challenges, power system simulations, applications of the SERVM simulation tool, and collaborations with national labs.



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Agenda

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Introductions

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Discuss Scope of Engagement and Timeline

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Review Proposed Workstreams

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Discuss and Revise Execution Plan

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Establish Timeline for Engagement

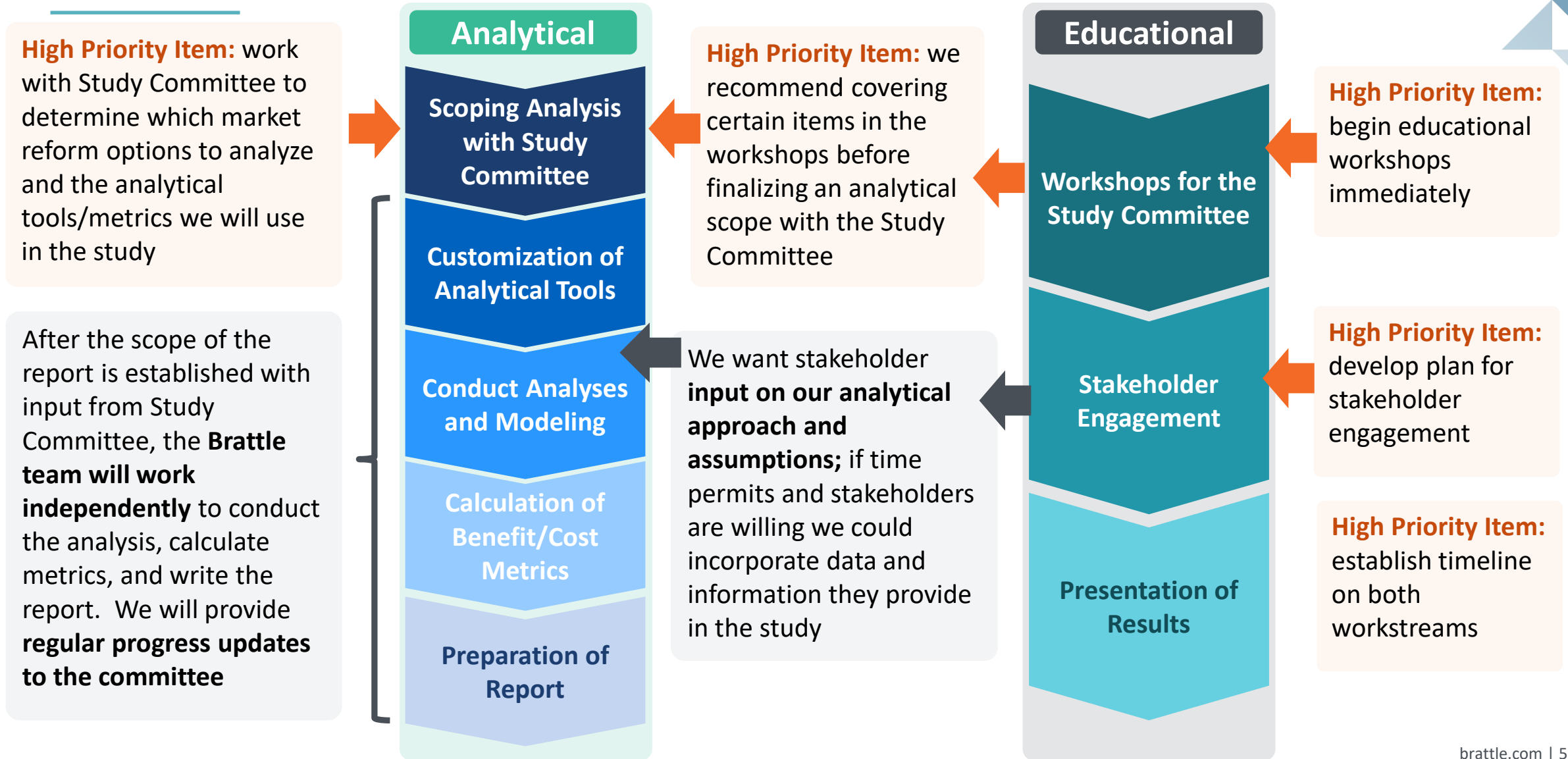
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Begin Educational Workshops

Two Proposed Workstreams: Educational and Analytical



Staging of Workstreams and Execution Plan



High Priority: Educational Workshops



We recommend establishing a schedule of workshops as soon as possible to cover the topics of interest for the Study Committee

- **Highest priority items** are the status quo of Electricity Regulation in South Carolina, the market reform options in Act 187, and developing the scope of the study
- We propose “guest” workshops from other folks in the industry that can contribute expertise on certain topics (e.g., regulators from states in RTO markets, attorneys with experience navigating market reform)
- We propose to conduct these workshops concurrent with stakeholder engagement and first stages of our modeling work

High Priority: Develop Plan for Stakeholder Engagement

We will develop a plan for stakeholder engagement consistent with the level of engagement desired by Study Committee

- **Key Questions for the Study Committee:**
 - Which stakeholders does the Study Committee want to include?
 - Should stakeholders be included in the same educational workshops we plan for the Study Committee?
- After we finalizing the scope with the Study Committee we will want feedback from stakeholders
- If the timeline permits and stakeholders are willing, we recommend asking stakeholders to contribute data and information for our analyses

Proposed Topics for Stakeholder Engagement

Communicate Scope and Market Reform Options to be Analyzed

Customize Analysis to South Carolina and the Southeast

Data and Information to Help Develop Assumptions

Feedback on Analytical Outcomes and Key Results

Feedback on Report

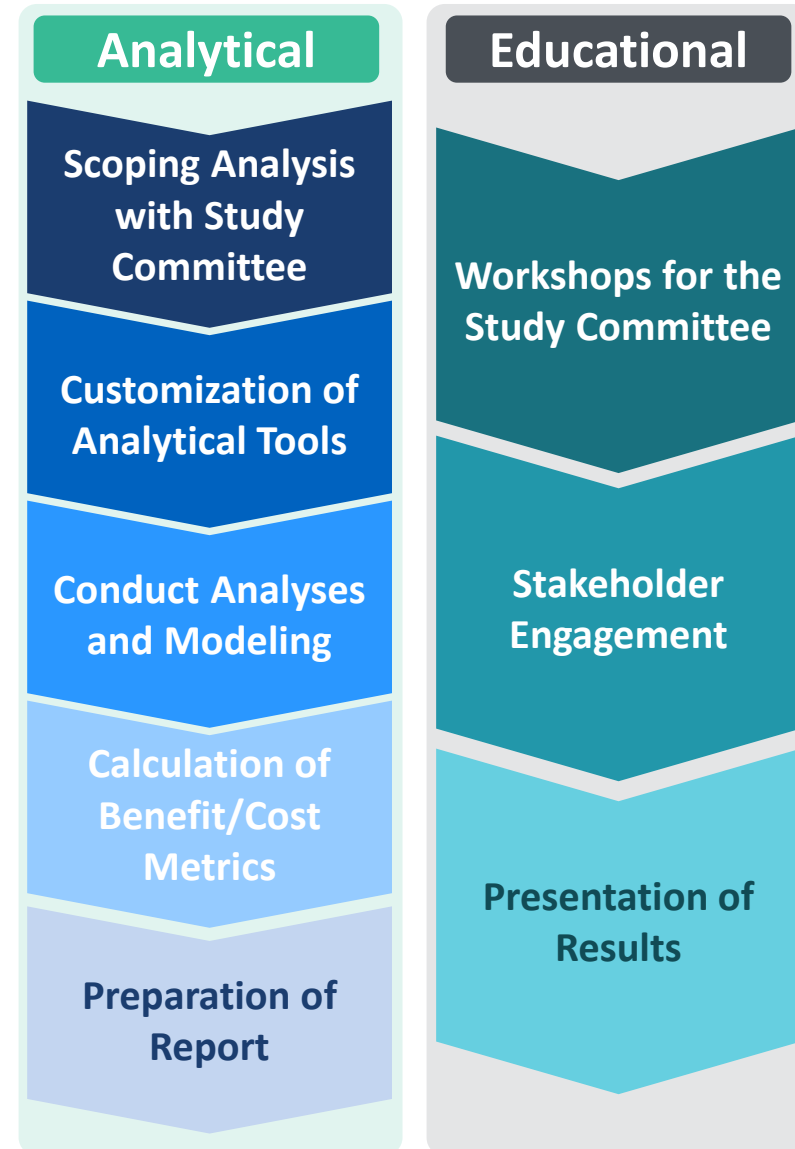
High Priority: Establish Timeline

While conducting both workstreams in parallel, we estimate a complete and detailed analysis and report will take *5 to 8 months* to complete

However, we will customize the study scope to fit a timeline that meets the needs of the Study Committee

Ways to reduce the time needed for the study include:

- Reduce the number of market options analyzed
- Analyze fewer future years
- Reduce the footprint analyzed (e.g., South Carolina vs. the Southeast)
- Use simplified or qualitative analytical approaches to for certain market reform options



Recap: High Priority Items that Need to Move Forward

- **Educational Workshops**

- Need to get started as soon as possible (today if time allows), because we should cover certain items before we decide which market reform options to analyze and what tools to use

- **Develop Plan for Stakeholder Engagement**

- We recommend getting input and feedback from stakeholders as soon as we develop a scope of the analysis with the Study Committee
- If time permits, we recommend asking stakeholders to contribute data to inform the assumptions used in our analyses

- **Establish Timeline**

- Determine what timeline works for the Study Committee and we will customize the scope of work to meet that timeline

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Status Quo in South Carolina

Educational Workshops: First Understand the Status Quo



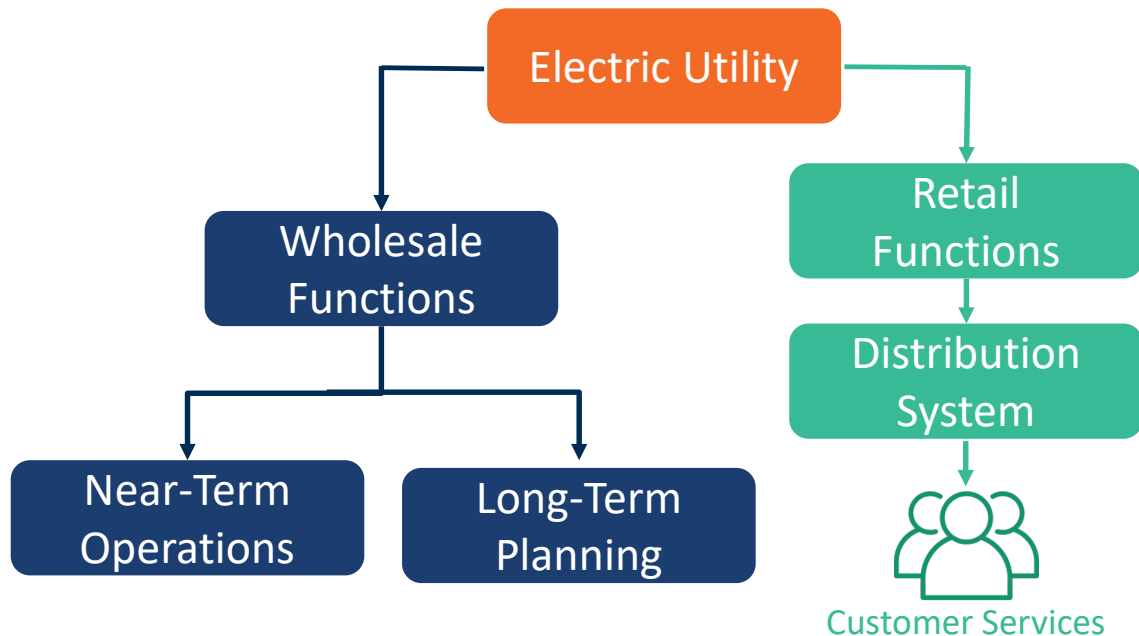
The best place to start is to understand is how the power system works today in South Carolina

- Key functions of utilities, state/federal regulators, state/federal governments, non-governmental agencies, and independent power producers
- Next we can analyze the market reform options listed in Act 187 and discuss how they would change current operations and responsibilities

Key Functions, Responsibilities, and Players

Key functions can be bucketed as:

- **Wholesale:**
 - **Near-term operations:** ensuring the lowest-cost generation is producing to meet current demand
 - **Long-term planning:** ensuring the lowest-cost power plants, transmission, and other infrastructure is built to meet future demand and achieve policy goals
- **Retail:** plan and operate the distribution network, and serve customers



The investor-owned utilities, public power authorities, and cooperatives are the main players responsible for conducting near-term operations and long-term planning in South Carolina today

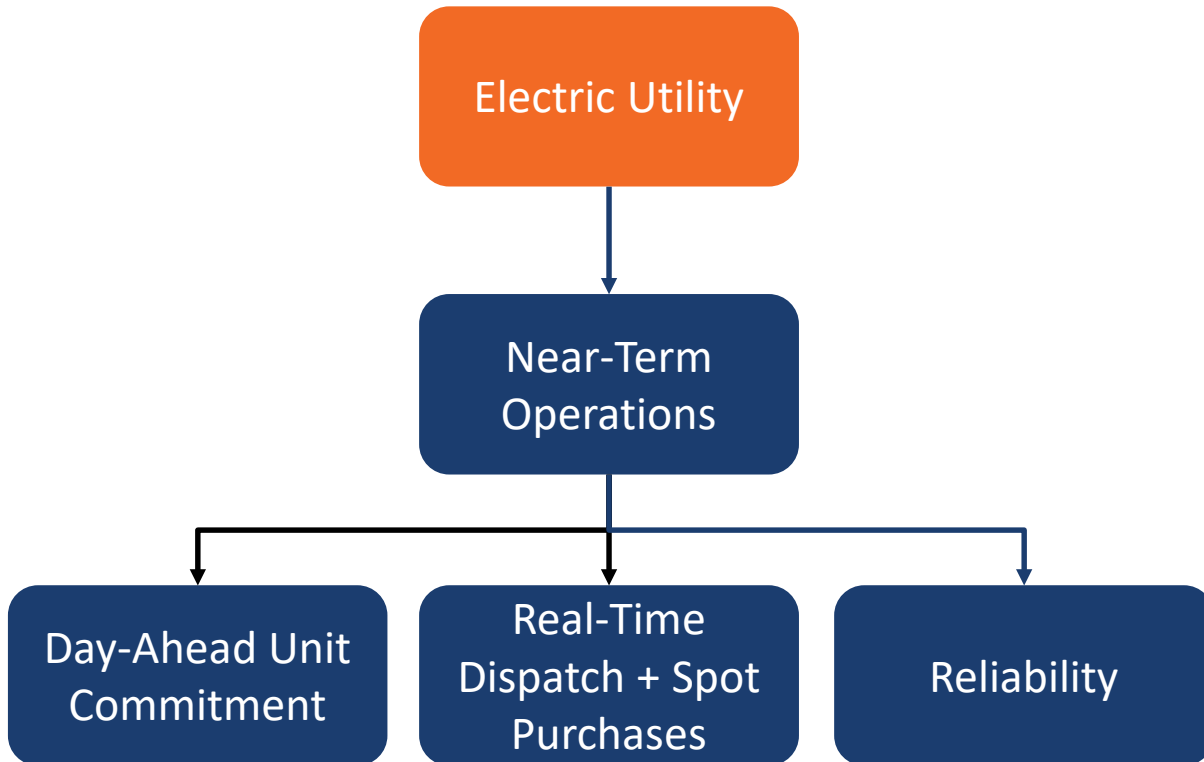
Key Functions, Responsibilities, and Players

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 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

Wholesale Functions: Near-Term Operations

In the Status Quo, the utilities are responsible for conducting day-to-day system operations to ensure customers are served

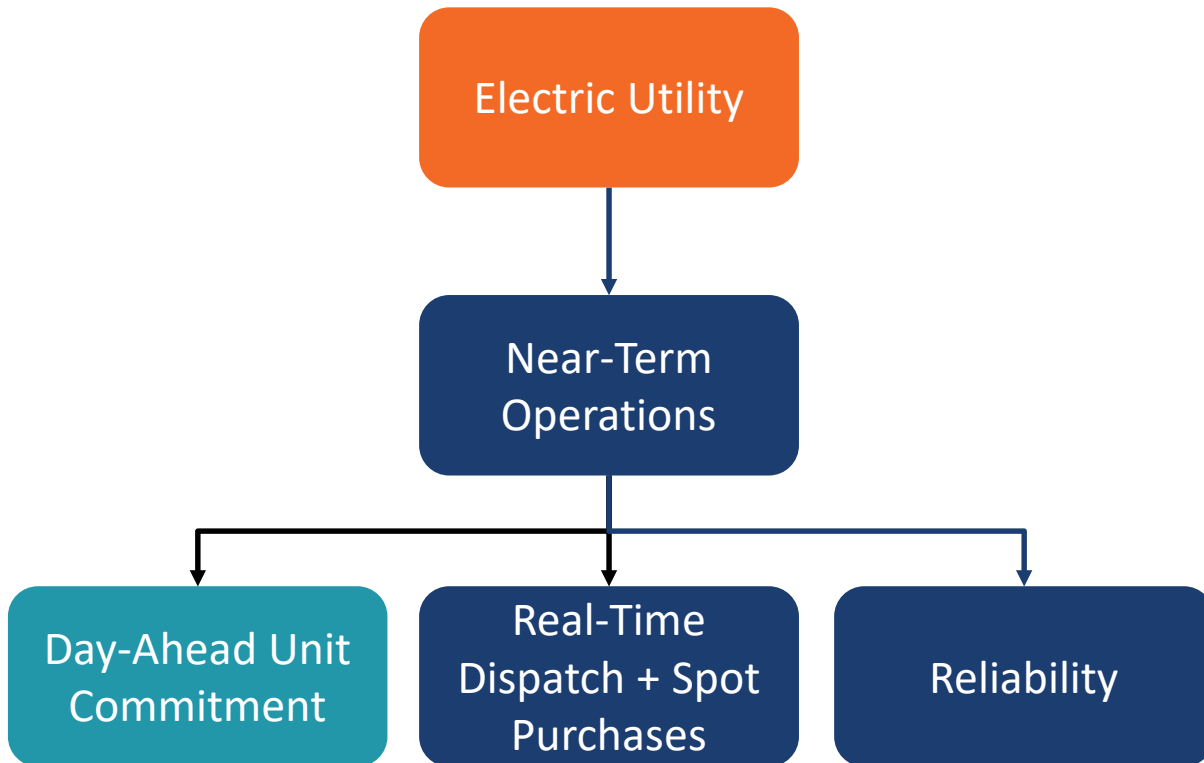


Near-term operations include:

- Forecasting demand for power starting days in advance up to minutes prior to real-time
- Forecasting generation from renewable resources days in advance up to minutes prior to real-time
- Scheduling the operation of generation resources and usage of transmission facilities days in advance
- Purchasing or selling power to neighboring utilities (bilateral transactions) when necessary to serve load, or when profitable

Wholesale Functions: Near-Term Operations (cont'd)

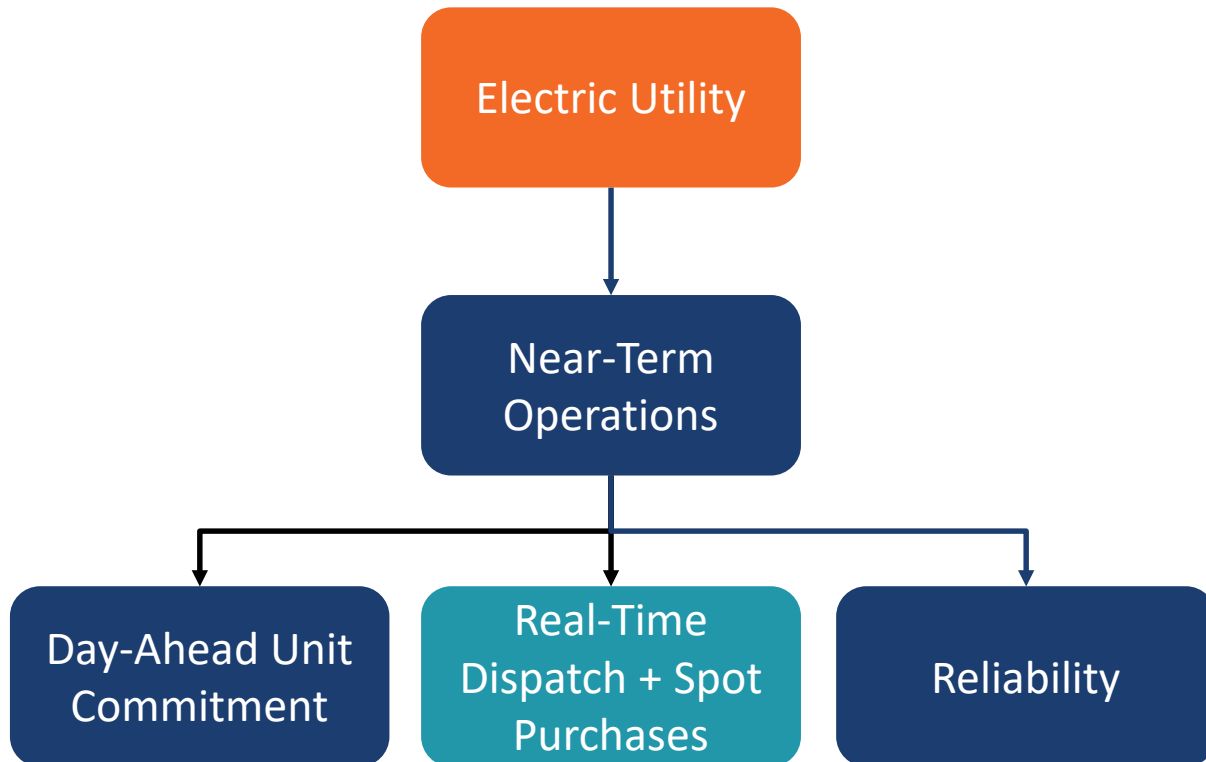
Utilities schedule generation resources to operate based on expected demand in the following day



- Day-ahead (or earlier) scheduling is essential for generation resources that require a long time to start up or shut down (e.g., nuclear, coal)
- Utilities maintain day-ahead (and earlier) forecasts of demand for electricity and renewable production
- Long-lead time resources are scheduled in advance based on their relative economics; shorter-lead time resources can be schedule closer to real-time
- The usage of transmission facilities are scheduled day-ahead, indicating the transmission capacity available for bilateral spot transactions
- Utilities ensure enough resources are committed to provide operational reserves in-line with NERC criteria

Wholesale Functions: Near-Term Operations (cont'd)

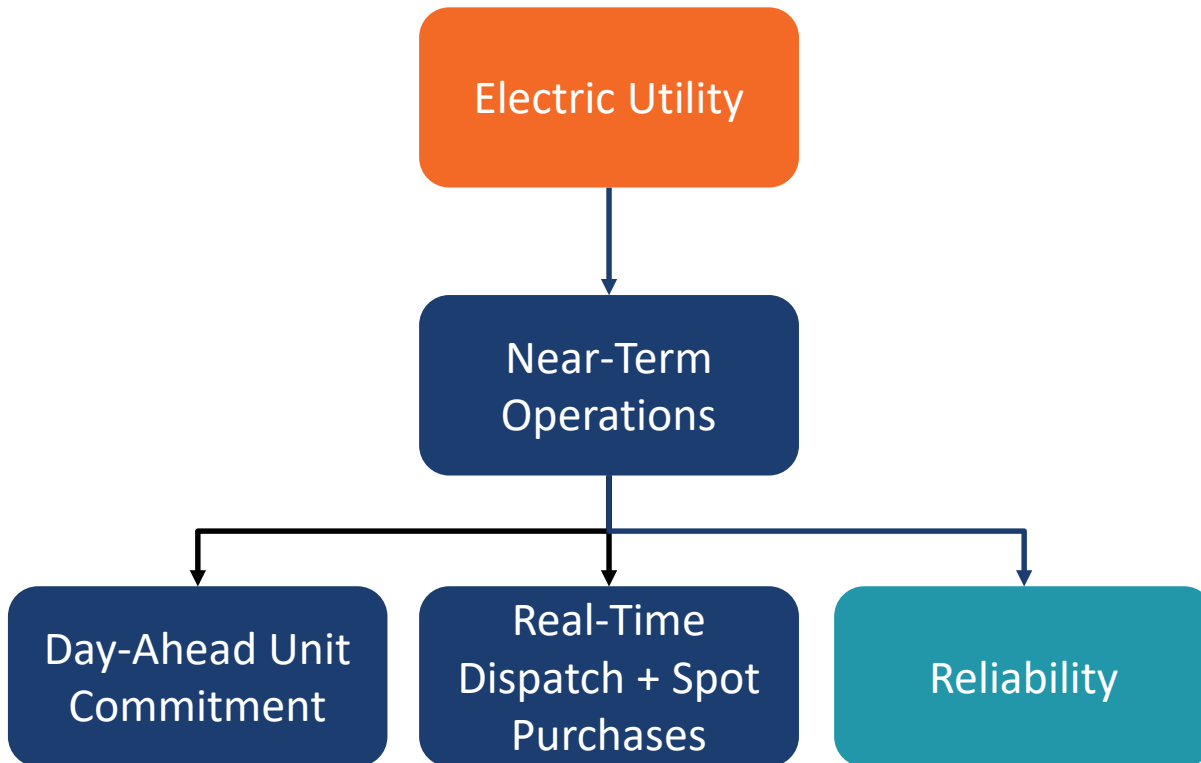
Minutes to an hour ahead of real-time, generation resources receive final dispatch instructions based on updated demand forecasts



- Utilities make last-minutes adjustments to the production levels of generation resources to account for unexpected deviations in demand and variable generation resources
- Fast-response resources (e.g., gas peakers, battery storage, hydro) can be deployed within minutes to balance supply and demand
- Bilateral purchases and sale from neighboring utilities can be executed (on a 15-min to hourly basis) to help balance the system, but are generally limited due to transmission fees, lack of a transparent market price, coordination inefficiencies, and lack of profit motivate for regulated utilities (e.g., utilities enjoy regulated cost recovery for fuel and power purchases)

Wholesale Functions: Near-Term Operations (cont'd)

System balancing with owned/contracted resources or spot purchases occurs close to real-time to ensure reliable service

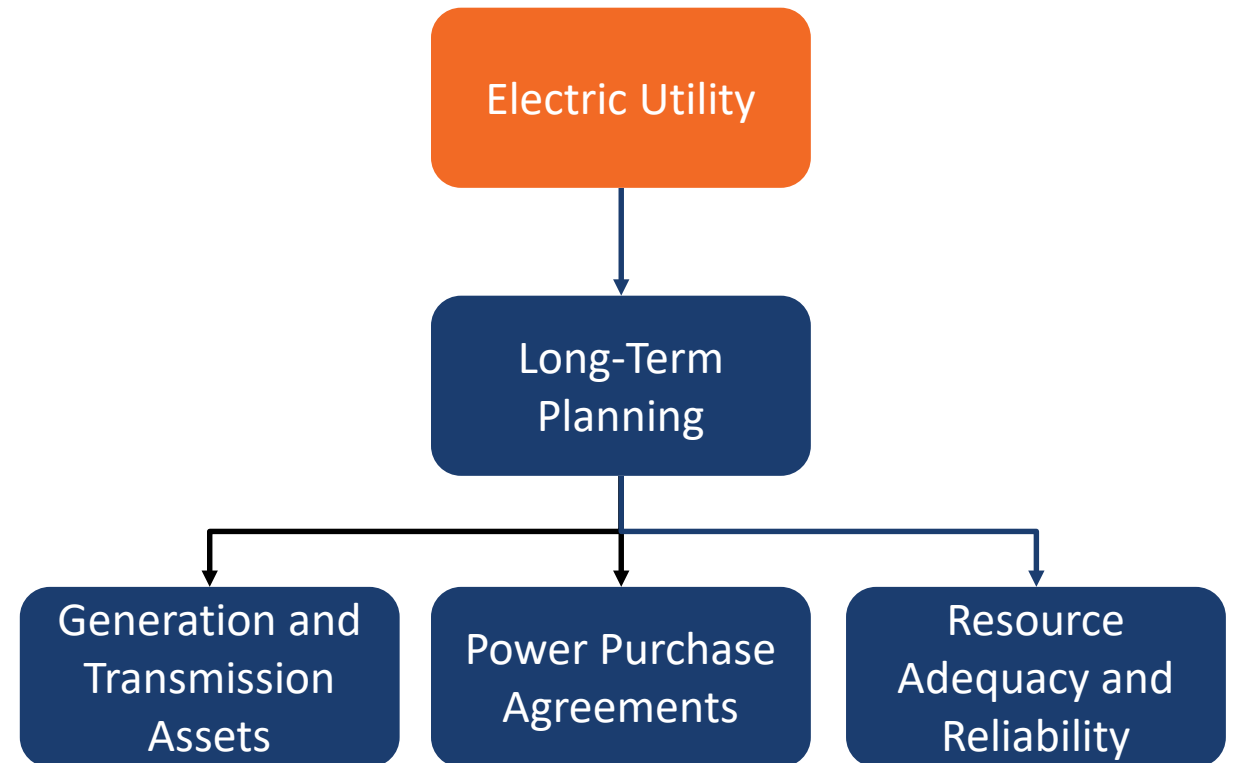


- Operational reliability is the responsibility of the Balancing Authority (BA); in South Carolina Duke, Dominion, and Santee Cooper are the BAs
- NERC requirements ensure BAs also schedule and dispatch resources to supply **operating reserves** (e.g., generation capacity in excess of expected demand)
- Reserves must come from qualified resources that can respond to dispatch instructions within a specific timeframe (e.g., 10-minutes, 30-minutes, etc)
- If necessary, operating reserves are deployed to make up any shortfalls in available generation
- BAs can attempt to buy from neighboring utilities and rely on “demand response” customers when operating reserves are not adequate

Wholesale Functions: Long-Term Planning

Utilities develop Integrated Resource Plans (IRPs) to determine needed generation and transmission plans to identify grid investments

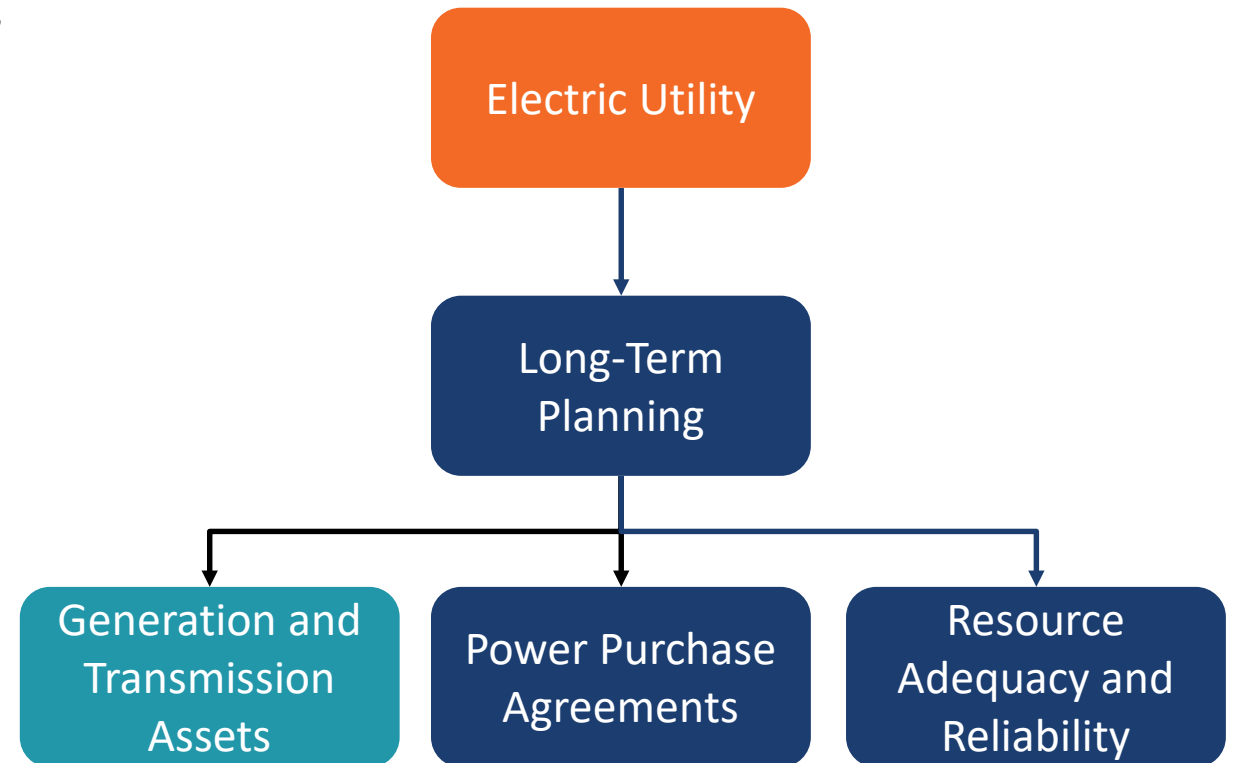
- Utilities forecast demand years into the future, plan for asset retirement, account for state/federal policies, forecast investment and operational costs for different resource types, and other assumptions about future system conditions
- The IRPs analyze different portfolios and select a generation resource investment plan
- Duke and Dominion's IRPs are approved by the PSC, Santee Cooper and cooperative plans are approved by their boards (Santee Cooper also files its plan with the SC Legislature)
- After approval, utilities recover costs (and approved ROI for IOUs) from customers



Wholesale Functions: Long-Term Planning (cont'd)

Utilities plan both generation and transmission assets to keep up with demand growth and comply with federal and state policies

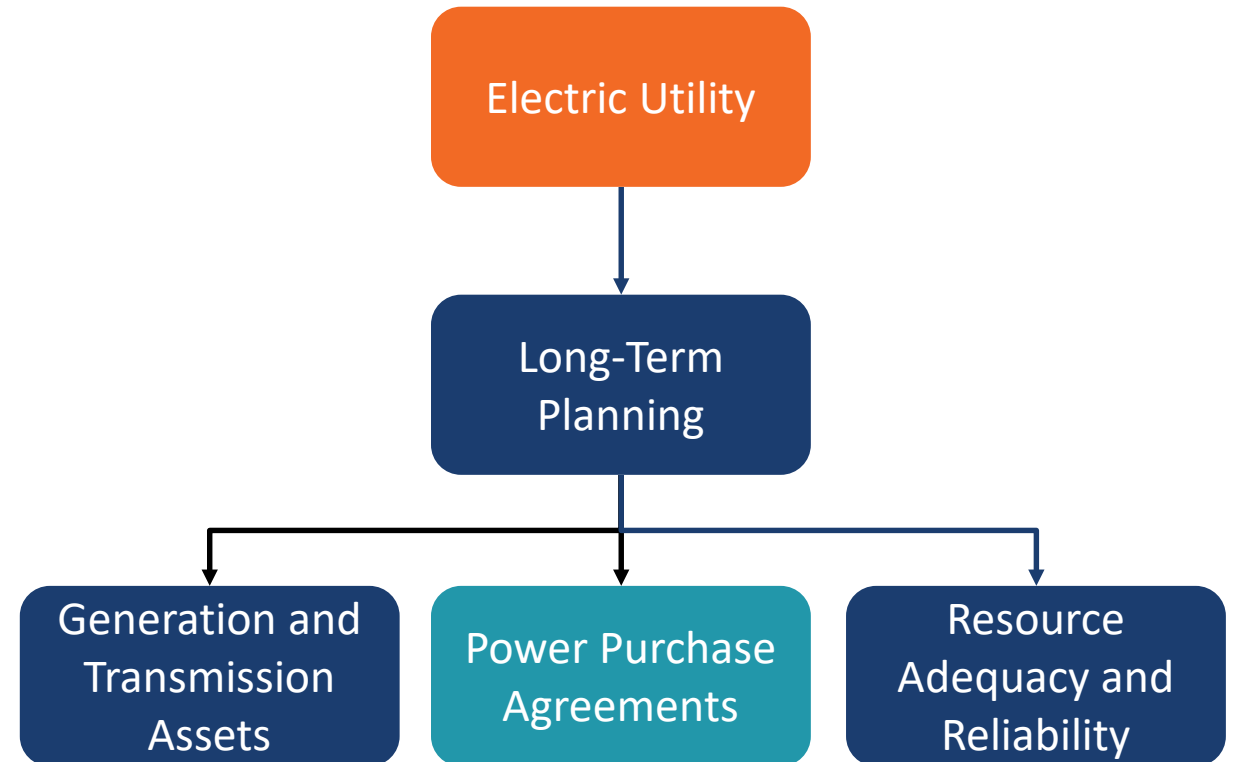
- Utilities' IRPs analyze future costs of building, owning, and operating different asset types and select the portfolio that best meet future needs; transmission is planned to make sure the system remains reliable
- IOUs (Duke, Dominion) tend to prefer to build and own assets because they earn returns on investments
- State and federal policies can drive investment decisions; some examples
 - Federal tax credits have lowered the cost of renewables
 - North Carolina clean energy policies drive Duke resource planning decisions
- Once approved, customers pay for the investments regardless of how costs change in the future



Wholesale Functions: Long-Term Planning (cont'd)

Power purchase agreements (PPA) with IPPs may be selected if they lower the cost of supplying customers relative to building new assets

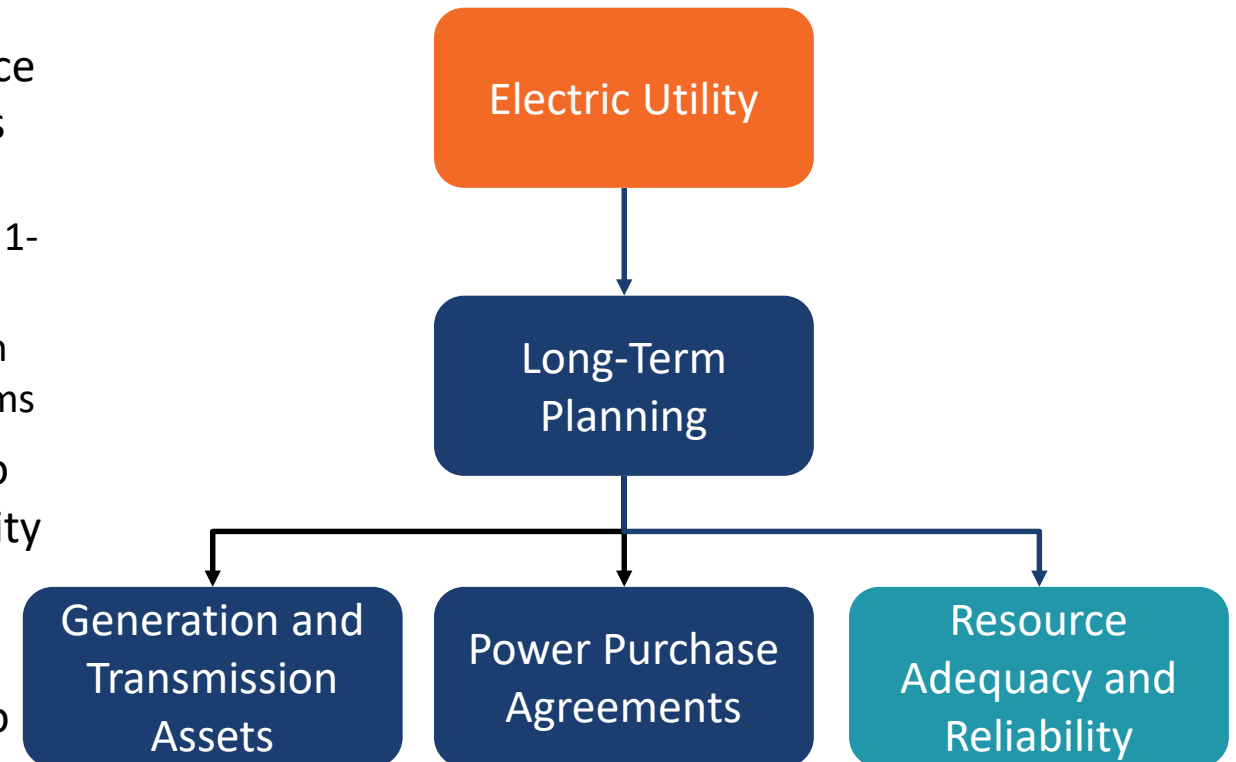
- The IRP processes will also consider signing long-term PPAs with IPPs if that is a lower-cost option than self-build and ownership
- In addition to PPAs, federal law (PURPA) requires utilities to integrate qualifying facilities (today these are usually small-scale solar facilities) as part of their plans and pay them state-regulated rate based on “avoided cost”
- FERC regulation requires that IPPs have open access to use the transmission system (at FERC-regulated rates), which also requires utilities to administer a generation interconnection process to allow IPP-owned resources to connect to the grid



Wholesale Functions: Long-Term Planning (cont'd)

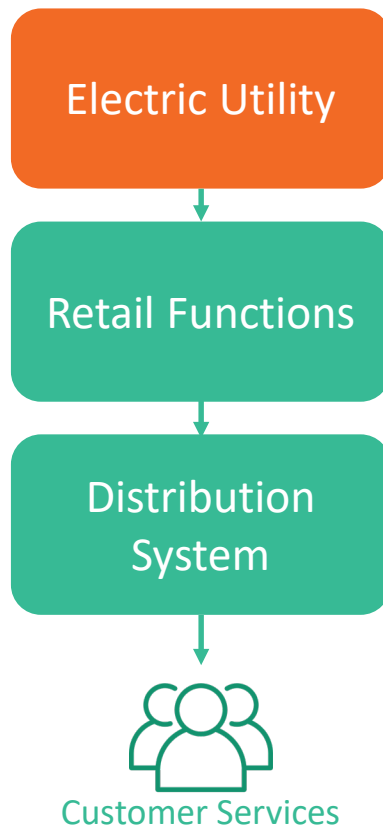
Utilities plan for extra generation capacity and build in system redundancies to ensure adequate supply and a reliable grid

- NERC criteria govern long-term planning to ensure adequate generation and reliable transmission is in place to accommodate future demand and system conditions
 - NERC criteria do not aim to eliminate all outages, which would be very costly, but limit frequency of outages (e.g., a 1-event-in-10-year standard for generation)
 - NERC criteria govern generation adequacy and transmission reliability (the “bulk power system”), not distribution systems
- Generation: NERC requires utilities to have resources to meet a **planning reserve margin** (e.g., additional capacity to serve unexpectedly high demand)
 - Reserve margins vary by utility, but typically are 15-20%
- Transmission: NERC requires utilities to build the grid to withstand outages under high-demand conditions



Retail Functions: Distribution System and Customer Services

In states without retail choice (such as South Carolina), customers are required to take service from the utility with the local franchise

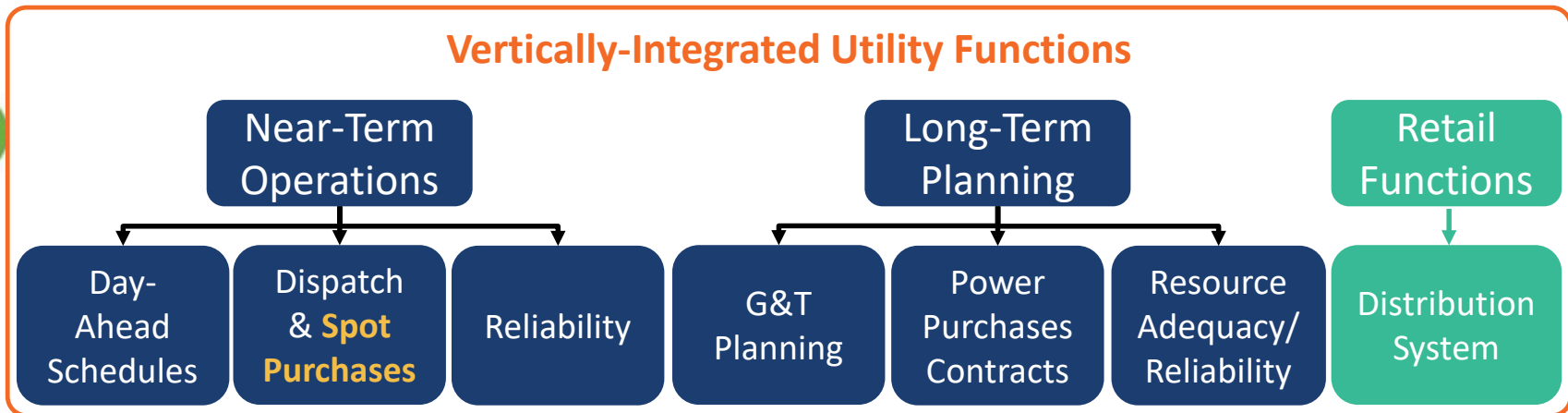
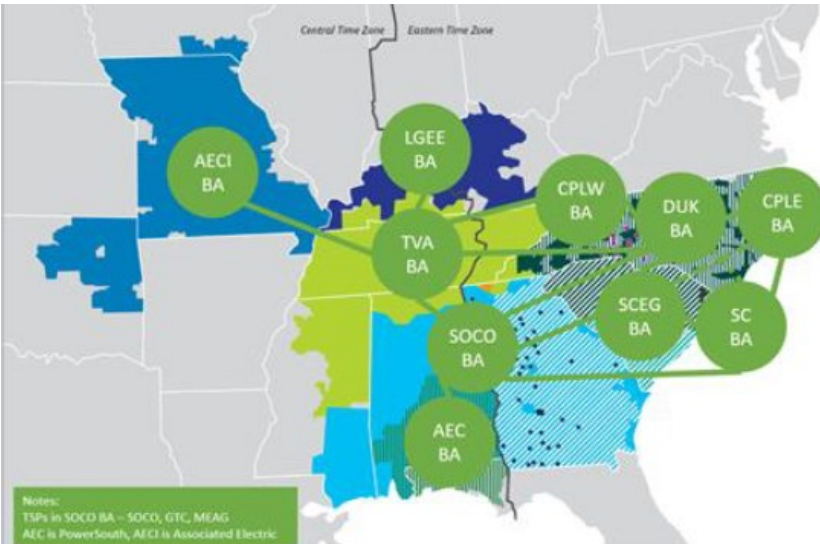


- Retail functions include owning, operating, and maintaining the distribution system; utilities plan for distribution system investments
- The IOUs in South Carolina (Duke and Dominion) directly serve customers in their territories (no retail choice)
- Santee Cooper serves some customers directly, but also supplies electric cooperatives and municipal utilities with wholesale services, who then serve retail customers
- Central Electric Cooperative is a customer of Santee Cooper, and supplies its member cooperatives with wholesale services; the member cooperatives directly serve customers
- The SC PSC approves distribution system capital investments and operation plans, and sets retail rates for IOUs to include distribution and retail service costs (bundled with generation and transmission costs)

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 trading platform that helps match buyers and sellers of power, and help 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” system optimization used in ISO/RTO or energy imbalance markets.



Source: SEEM Transmittal Letter to FERC, filed 2/12/21, Docket ER21-1111

Topics to be Covered in Next Workshop(s)



After understanding how the Status Quo works in South Carolina, we will

- Review each market reform option in Act 187 and understand how it would change the Status Quo
- Discuss the potential benefits and costs of each market reform options
- Determine which market reform options should be analyzed in this study, and which analytical tools are best suited to study those options in the time we have to complete the study

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 market reform options will not change:

- 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*)

