VIRGINIA STATEWIDE LONG-TERM ENERGY MODELING FRAMEWORK

FORECASTING, MODELING AND POLICY SIMULATION

PRESENTED BY:

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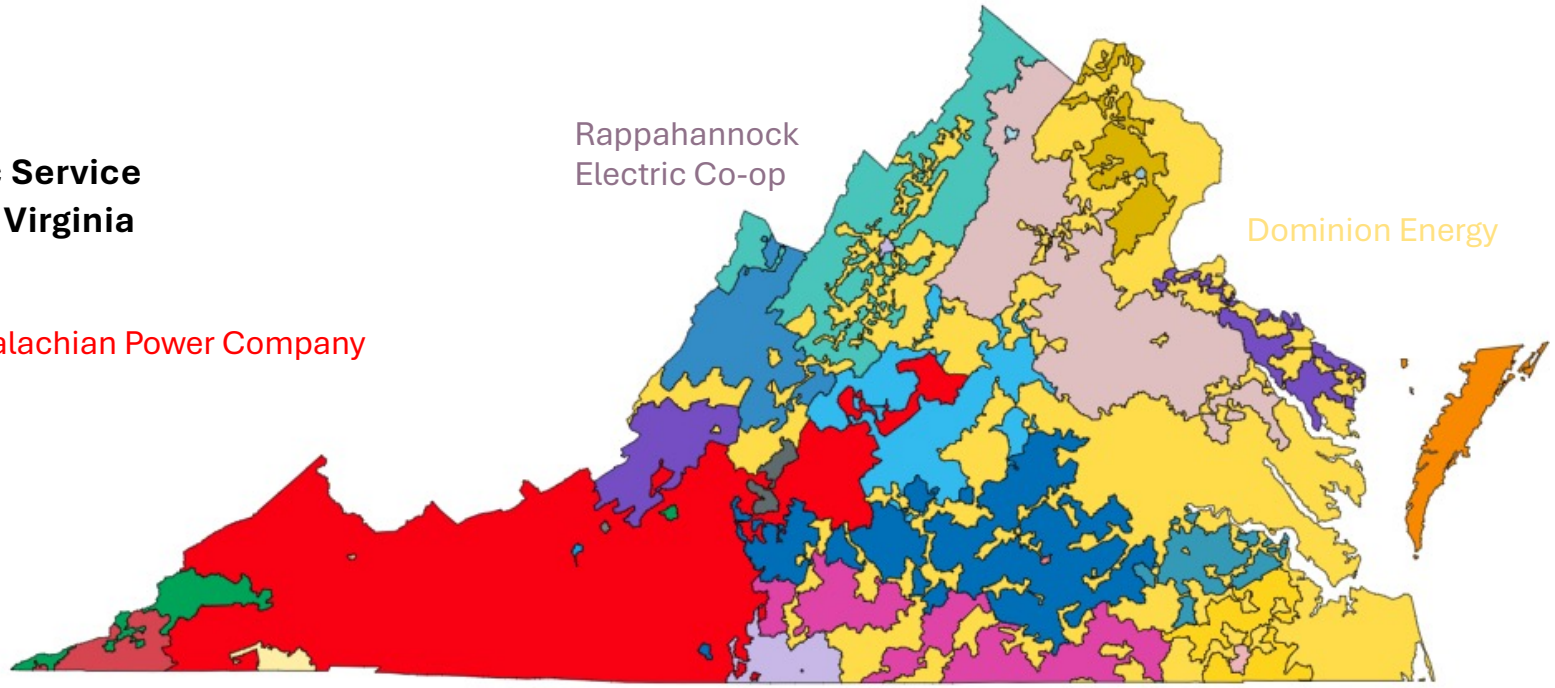
VIRGINIA Energy

Electric Service Territory: Virginia

In Virginia, Dominion Energy serves approximately 2.6 million customers, about 66% of the state's electric customers. The remaining customers are served by Appalachian Power, electric cooperatives, municipal utilities, and other providers.

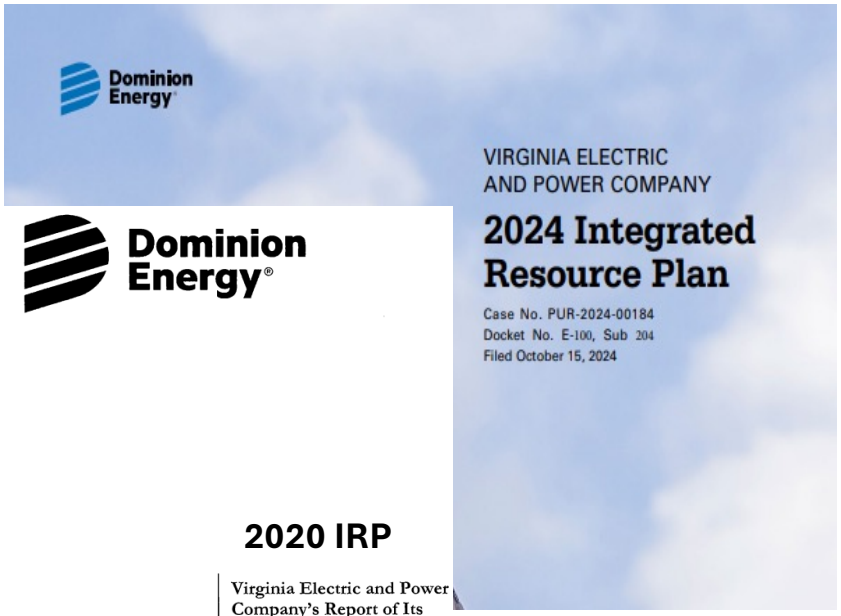
~ 33 Electric Service Providers in Virginia



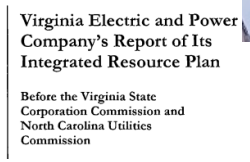
VA Long-Term Energy Planning: References

At Present, State long-term energy planning and policy primarily depend on:

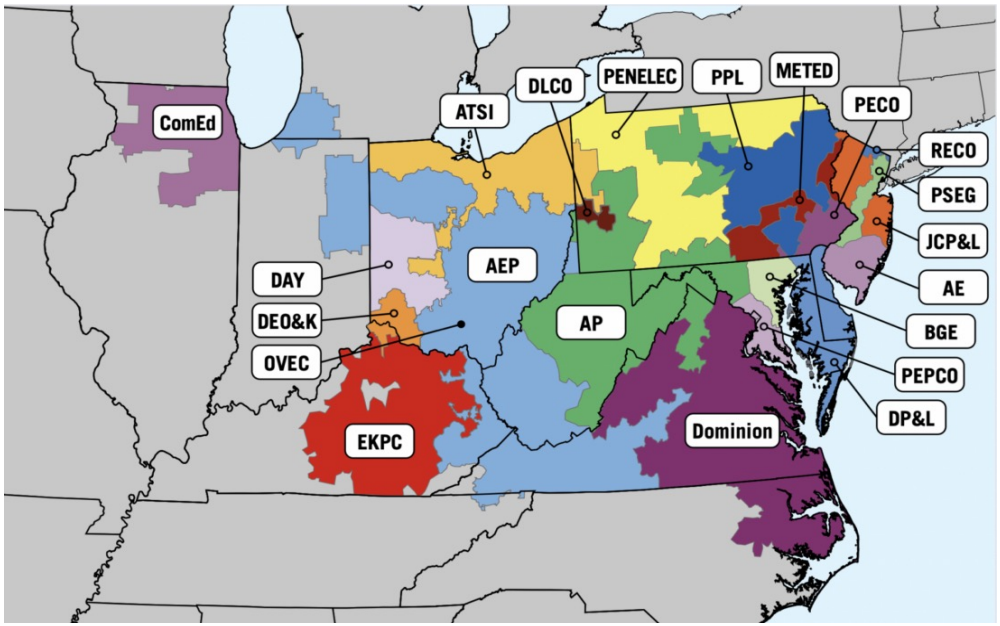
DOM IRPs



2020 IRP



PJM Regional Forecast



While these resources are valuable for energy planning, they do not provide a holistic, statewide view of the Commonwealth's energy system

Long-Term Energy Modeling Capabilities : Why Modeling Team at Virginia State Energy Office

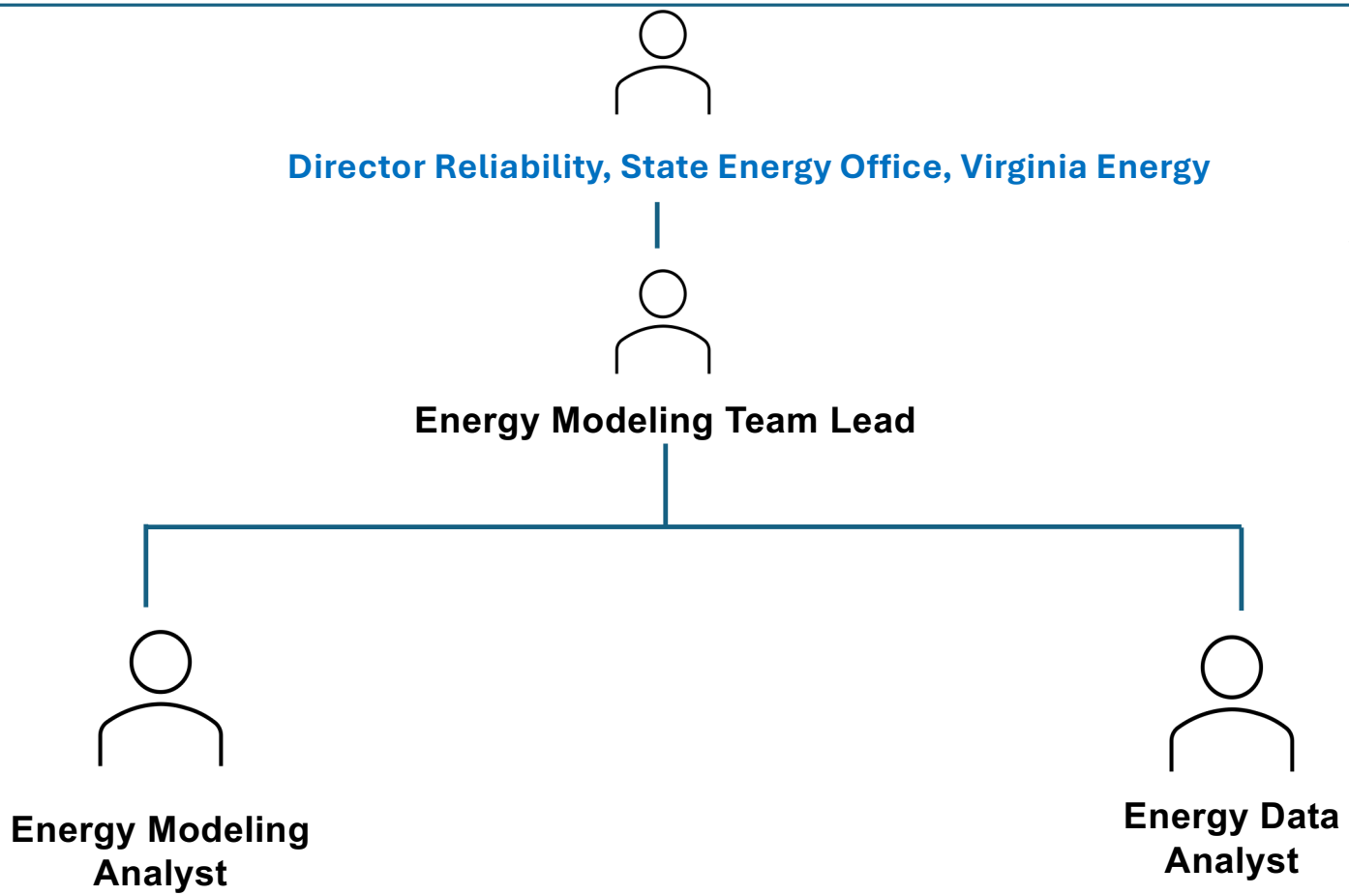
- Virginia's long-term energy planning relies heavily on IOUs IRP and RPS filing, which do not provide a full statewide view. Virginia has ~30 electric service providers other than IOUs. Virginia State Energy Office modeling effort can fill this gap with statewide modeling.

- The SCC does not independently model or rigorously evaluate IRPs, creating a gap in oversight and technical review, Virginia Energy can provide support to SCC on this.

- Virginia Energy needs independent modeling capabilities to develop a comprehensive and data-driven Virginia Energy Plan.

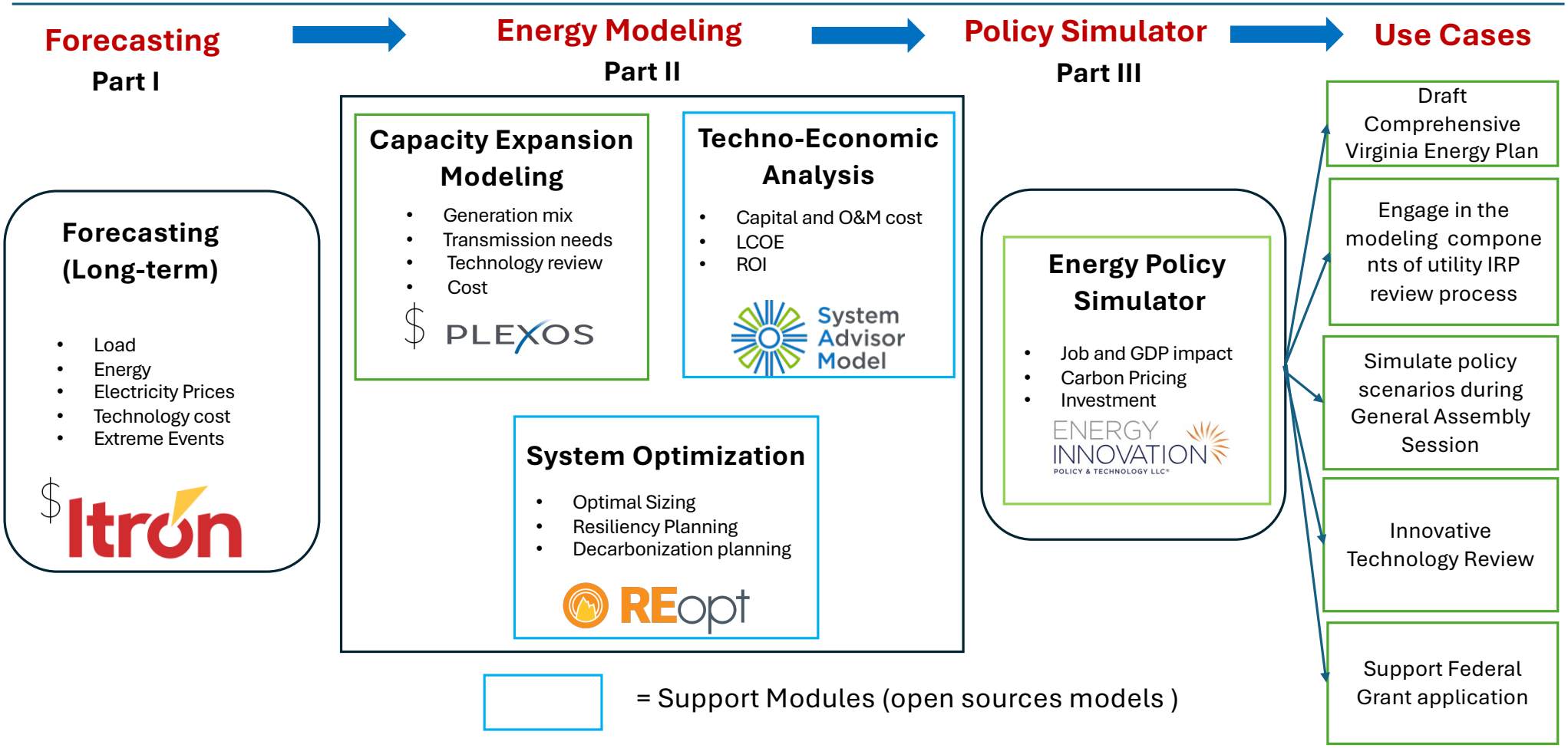
- Virginia Energy could leverage advanced modeling and policy simulation tools to evaluate energy-related bills and proposals during the General Assembly session.

Team Members



Virginia's State Energy Office is among the few states with a dedicated energy modeling team, envisioned to provide unbiased, high-quality analysis while reducing reliance on external consultants.

Virginia statewide long-term Energy Planning Framework



Virginia statewide long-term Energy Planning Framework: Part I

Forecasting

Virginia Energy Procured Itron's MetrixND and MetrixLT for statewide long-term forecasting

Itron

Modeling Team is working on Statewide forecast (2026-2050) for the following:

a) Sector wise Energy Consumption Forecast

Residential

Commercial

Industrial

Transportation

b) Electric Vehicle Growth Forecast

EV Growth

Energy Consumption (GWh)

Peak Load (kW)

c) Data Center Growth Forecast

Data Center Capacity (MW)

Energy Consumption (GWh)

d) DERs growth Forecast

e) Virginia Statewide forecast

MW

GWh

System-Wide Forecast

Virginia statewide long-term Energy Planning Framework: Part II

Energy Modeling

Capacity Expansion Modeling

We primarily rely on the PLEXOS model to evaluate long-term capacity expansion.

PLEXOS

The modeling team also uses NLR open-source tools (REopt and SAM) for techno-economic analysis.

Modeling Team is performing statewide modeling (2026–2050) under different policy scenarios. Modeling examples include evaluating:

- Generation mix
- System cost
- Emissions
- Fuel consumption
- Capacity additions
- Unit retirements
- Load growth sensitivities
- Policy compliance
- Reliability impacts
- Scenario analysis

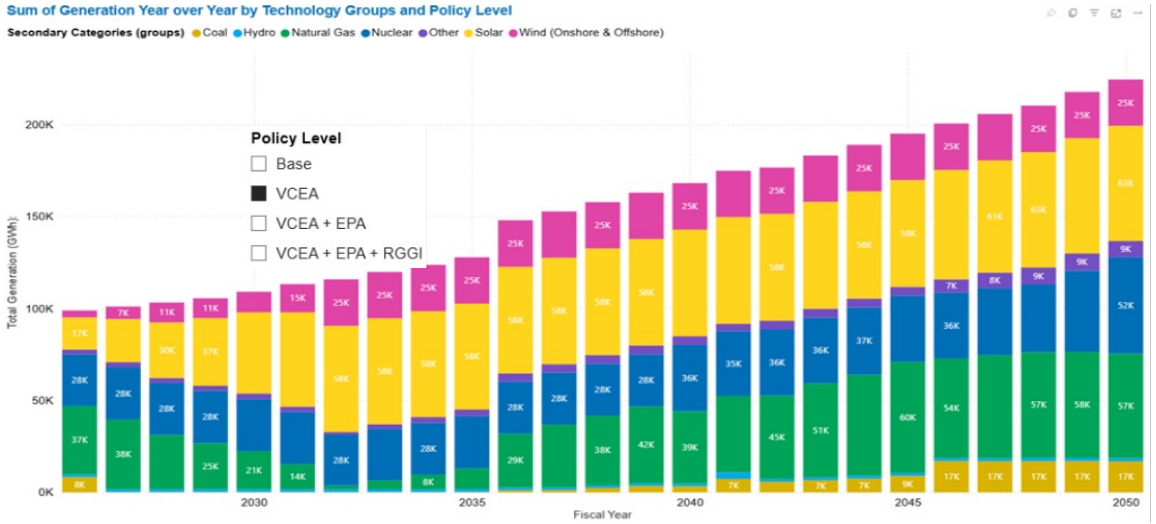


Figure: Forecasted Energy Mix under different policy scenarios.

(Results shown are illustrative and based on initial modeling assumptions)

Virginia statewide long-term Energy Planning Framework: Part III

Forecasting → **Energy Modeling** → **Policy Simulator** → **Use Cases**

Part I | **Part II** | **Part III**

Building on results from forecasting and capacity expansion modeling, the energy modeling team plan to use the Energy Policy Simulator (EPS) tool to assess broader economy-wide impacts of energy policies, including but not limited to:

Job Impact

Economic Impact

Cross-sector Interaction

Emissions

Workforce

Energy Policy Simulator

- Job and GDP impact
- Carbon Pricing
- Policy Impact

ENERGY INNOVATION POLICY & TECHNOLOGY LLC

- Draft Comprehensive Virginia Energy Plan
- Support SCC and legislative bodies in IRP Review
- Simulate policy scenarios during General Assembly Session
- Innovative Technology Review

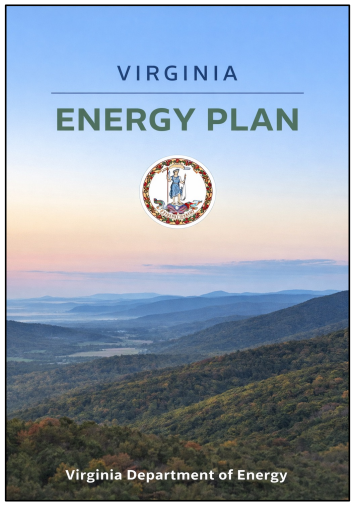
Virginia statewide long-term Energy Planning Framework

Forecasting
Part I

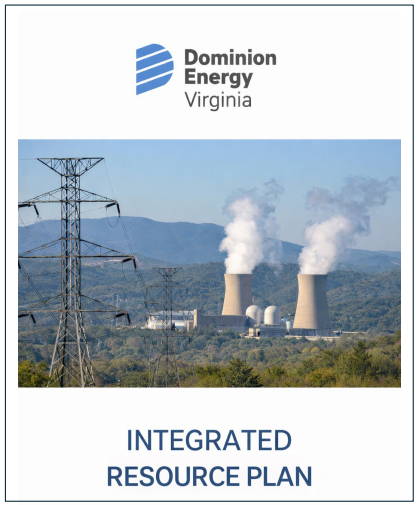
Energy Modeling
Part II

Policy Simulator
Part III

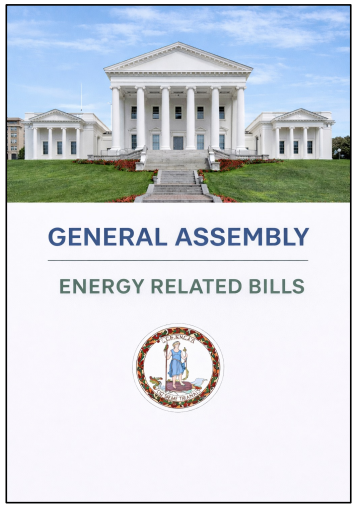
With the developed framework, State Energy Office plans to support:



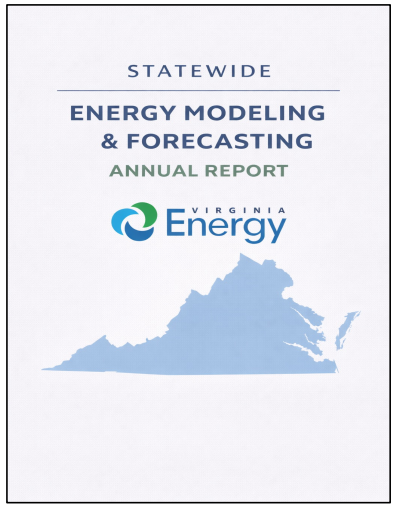
Drafting Comprehensive Virginia Energy Plan



Support SCC in review of IOUs IRP and RPS filing



Evaluate energy-related bills during the GA session



Develop an annual statewide energy modeling and forecasting report

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