APPALACHIAN POWER℠

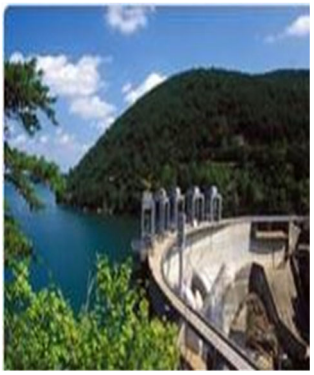
An AEP Company

BOUNDLESS ENERGY℠

2023 RENEWABLE PORTFOLIO STANDARD PLAN

CASE NO. PUR-2023-00001

March 15, 2023



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1. Executive Summary

Consistent with the requirements of Virginia Code Section 56.585.5.D.4, Appalachian Power Company (Appalachian, APCo, or the Company) submits this annual plan (the Plan) to meet the requirements of the Virginia Clean Economy Act (VCEA). This report will provide information on the assumptions and results of modeling prepared for the purpose of determining optimal sources of supply of the types of resources and the quantities of renewable energy renewable energy required by the law. VCEA compliant portfolios were prepared based on a variety of fundamental forecasts of power prices that reflect Virginia's participation in RGGI, Renewable Energy Certificate (REC) prices, and natural gas-fired resource availability The multiple scenarios are intended to inform the Company's decision making regarding its strategy for VCEA compliance. Each of the modeled portfolios resulted in the selection of a diverse collection of storage, solar, and wind resources, both Company and third party owned, as well as market REC purchases, which will be used for VCEA compliance. RFPs will continue to be issued in 2023 and beyond for the resources and/or RECs needed for compliance. A summary of the portfolios and the modeling results is presented in Section 6.

In the filing associated with this Plan, the Company is seeking a prudency determination of the agreements to purchase the output of several facilities that will produce VCEA-compliant RECs, as well as energy and capacity that were obtained through RFPs issued in 2022. These include five Virginia-domiciled solar facility power purchase agreements (PPAs); a 100 MW PPA with a solar facility located in Ohio; and a 142.6 MW owned wind resource located in Ohio. Additionally, the Company is seeking approval of a solar PPA for the 20 MW Horsepen solar facility, which the Commission deemed to be prudent in 2022 but then withdrawn by the developer and subsequently renegotiated. Finally, APCo is seeking cost recovery for market REC purchases necessary for annual compliance.

The Company developed these VCEA compliant portfolios in a way that is similar to how Integrated Resource Plans are developed, using the same general methods, commodity price forecasts, optimization software, load forecasts, and resource cost assumptions. The amount and timing of the resource additions were determined with Plexos® optimization software, adjusted as needed to include resource additions that were necessary to meet certain annual requirements associated Virginia-domiciled renewable and storage.

In addition to determining the type and timing of resource additions, this report provides an estimate for the rate impacts associated with compliance, consistent with the Commission's orders in previous RPS Plans.

2. VCEA Summary

In 2020, the General Assembly passed the VCEA and was signed into law. The VCEA is a transformative law that seeks to end carbon dioxide emissions from the electric utility industry in Virginia.[1]

[1] Appalachian is a "Phase I" utility as defined in Section 56.585.1. A.1. of the Code of Virginia. As such, this report will refer to the requirements in the VCEA that only apply to Appalachian.

2.1. VCEA Requirements

There are four primary requirements of the VCEA related to resource acquisition:

1. Annual RPS requirement. For APCo, this requirement is reproduced in Table 1 and begins at 6% in 2021 and escalates to 100% by 2050.

Table 1: APCo VCEA RPS Requirements By Year

Year	APCo RPS Requirement (%)	Year	APCo RPS Requirement (%)
2021	6	2036	53
2022	7	2037	53
2023	8	2038	57
2024	10	2039	61
2025	14	2040	65
2026	17	2041	68
2027	20	2042	71
2028	24	2043	74
2029	27	2044	77
2030	30	2045	80
2031	33	2046	84
2032	36	2047	88
2033	39	2048	92
2034	42	2049	96
2035	45	2050 and thereafter	100%

2. Development of Virginia domiciled solar and wind resources. APCo is required to petition the Commission for 600 MW solar or wind resources by December 31, 2030, with interim targets beginning December 31, 2023; and that 35% of those resources are owned by persons other than the Utility with the remainder in the aggregate being from the construction or acquisition by the Utility. The Company is using nameplate capacity to determine compliance with these requirements. The renewable additions identified in the Virginia Administrative Code [2] for the Company are shown in Table 2.

Table 2. 56-585.5.D Cumulative Renewable Additions Requirement

Date	PPA (MW)	Owned (MW)	Total (MW)
12-31-2023	70	130	200
12-31-2027	140	260	400
12-31-2030	210	390	600

3. Development of Energy Storage resources. By December 31, 2035, the VCEA requires APCo to have petitioned the Commission for necessary approvals to construct or acquire 400 MW of

[2] 20VAC5-335-30. Minimum interim targets for energy storage deployment by Phase I and Phase II Utilities #

energy storage capacity, or more with Commission approval. The Company must purchase at least 35% of the storage facilities placed into service from a party other than the utility, or owned by a third party with the capacity purchased by the utility. Further, 10% of the battery installations are required to be behind the meter (BTM) installations.

Required storage additions identified in the Virginia Administrative Code [3] for the Company are shown in Table 3. The Company issued an RFP in 2022 for storage resources[4] for its proposed Glade-White application in 2022.

Table 3: VCEA Required Storage Additions

Date	New Storage Additions (MW)	Cumulative Storage Additions (MW)
12-31-2025	25	25
12-31-2030	125	150
12-31-2035	250	400

4. Energy Efficiency requirement. APCo must implement energy efficiency measures that achieve energy savings equivalent to at least 2% of the Company's 2019 retail sales by 2025. The VCEA also specifies that the Commission shall establish new EE requirements for the period of 2026 to 2028, and for every three-year period thereafter.

2.2. Commission Filing Requirements

In the Attachment to its July 10, 2020 *Order Establishing 2020 RPS Proceedings*, the Commission set forth certain filing requirements. In addition, in the orders issued after the 2020 and 2021 RPS proceedings, the Commission imposed certain requirements for the Company's VCEA filings. The requirements of each of these orders, along with a description of where they are addressed in this report, are contained in Appendix C.

3. VCEA Proposed Resource Additions

APCo issued a series of RFPs for both owned and PPA wind and solar resources and RECs in 2021 and 2022 to seek to obtain resources which could be used to meet the VCEA requirements and is seeking approval in both Virginia and West Virginia for several projects that resulted from those RFPs. Of note, the Company issued an RFP for unbundled REC PPAs in 2022 but did not receive any responses. It is assumed for purposes of this plan that both Virginia and West Virginia commissions will approve those investments and that each retail jurisdiction will receive its allocated share of costs and attributes. All other identified renewable resource additions are assumed to accrue exclusively to Virginia retail customers.

[3] 20VAC5-335-30. Minimum interim targets for energy storage deployment by Phase I and Phase II Utilities

[4] https://www.appalachianpower.com/business/b2b/energy-rfps/2022Glade-WhitetopBESS

With this year's report, APCo is seeking approval of the renewable resources and 8MW of storage as shown in Table 4. With this year's report, APCo is seeking approval of the renewable resources and 8 MW of storage as shown in Table 4.

Table 4. 2023 VCEA Plan Resource Additions

Facility	Nameplate Capacity MW	Owned / PPA	State	Resource Type	Target In Service Date
Horsepen	20.0	PPA	VA	Solar	12/31/25
River Trail	20	PPA	VA	Solar	5/31/24
Shifting Sands	18.8	PPA	VA	Solar	5/31/24
Sunny Rock	20	PPA	VA	Solar	7/31/24
Mountain Brook	20	PPA	VA	Solar	8/31/24
Green Acres	5	PPA	VA	Solar	12/31/24
Glade-White Top*	7.5	Owned	VA	Storage	2025
Virginia Domiciled	**111.3**				
Grover Hill	142.6	Owned	OH	Wind	Jan 2026 – Dec 2055
Pleasant Prairie	100	PPA	OH	Solar	Jan 2026 – Dec 2045
TOTAL	**353.9**				
*Distribution Resource					

In addition to the facilities included in the table above that are the subject of this proceeding, the Company has three additional renewable resources that were approved by the Commission in 2022 that are or will be coming online to provide VCEA-compliant RECs. These include the 4.9 MW Amherst facility (June 2023 expected in service), 204 MW Top Hat wind facility (September 2025 expected in -service), and the 15 MW Depot solar facility (July 2022 in service).

The Company satisfied the 2023 interim wind and solar requirements with its petition to the Commission in 2021 for approval to acquire approximately 155 MW of owned Virginia-domiciled solar facilities (Firefly and Amherst), and approximately 75 MW of contracted, third-party owned, Virginia-domiciled solar facilities (Wytheville, Leatherwood, Depot, Horsepen). After the 2022 VCEA Proceeding concluded, the Firefly solar resource was withdrawn by the developer. An additional 105 MW towards the Virginia-domiciled resources will be used for compliance with the 2027 petition requirement as shown in Table 2. The VCEA section 56-585.5 E also contains interim storage resource requirements as reflected in Table 3. The 7.5 MW Glade-Whitetop storage facility is expected to be used towards the 2025 energy storage requirement. The Company expects to solicit bids for qualifying storage resources in future RFPs in 2023 and beyond to meet the remainder of the storage requirement.

3.1. VCEA Near-Term Renewable Energy Compliance

The Company met the RPS requirements of Section §56-585.5 C for 2022 with a combination of production from its current qualifying resources and spot market purchases of RECs. In Table 5, the Company has prepared a projection of its expected position in terms of VCEA qualifying REC production versus each year's renewable energy targets through 2027. During 2022 the Company purchased VCEA compliant RECs in excess of its 2022 compliance obligation to take advantage of favorable market

conditions. This resulted in an inventory (or bank) balance of RECs as of December 31, 2022, which will be carried forward for use in 2023 and beyond. This balance will replace a portion of the RECs that would have been produced in the coming years by the Bedington, Firefly, Dogwood, and Sun Ridge facilities, which were approved by this Commission in 2022 but then withdrawn due to issues associated with project development.

Modeled projections in Table 5 include assumptions known at the time the modeling was being prepared. Changes to the assumptions in the modeled projection of RECs since that time might result in some differences to the actual balances shown.

Table 5: APCo Near Term VCEA Energy Compliance

Modeled REC production and forecast requirments

Line #	Current Resources	2022	2023	2024	2025	2026	2027
1	Sub-total Current Resources	1,301,897	1,326,616	1,327,552	1,326,030	1,491,193	1,490,904
2	Subtotal - Projected Resources	0	5,242	5,230	15,078	789,103	787,767
	Total - Current and Projected	1,301,897	1,331,858	1,332,782	1,341,108	2,280,296	2,278,671
3 = 1+2	Production Available for Compliance	1,301,897	1,331,858	1,332,782	1,341,108	2,280,296	2,278,671
4	Beginning REC Inventory (MWh)	1,668,078	1,942,807	2,098,214	1,962,208	1,250,922	1,036,717
5=3-4	Total RECs Available	2,969,975	3,274,665	3,430,996	3,303,317	3,531,218	3,315,389
6	Virginia Retail Load (forecast)(MWh)	14,673,831	14,705,630	14,687,875	14,659,962	14,673,534	14,670,833
7	RPS % Requirement	7%	8%	10%	14%	17%	20%
8=6*7	RPS REC Requirement	1,027,168	1,176,450	1,468,788	2,052,395	2,494,501	2,934,167
9=5-8	Ending REC Inventory / (Deficit)	1,942,807	2,098,214	1,962,208	1,250,922	1,036,717	381,222
10=9-8	RECs to be acquired	0	0	0	0	0	0

The VCEA also sets out targets for energy savings to be generated from qualifying Company-sponsored EE programs. Savings from the programs included in the Company's approved 2022-2026 Demand-Side Management (DSM) plan are included in the Company's load forecast and meet the requirements of section §56-596.2 as shown in Table 6.

Table 6: VCEA Energy Efficiency Compliance

	Target %	Target EE (GWh)	Cum. Approved VA DSM Programs (GWh)	Surplus/ (Deficit) (GWh)
2022	0.5%	75	83	8
2023	1.0%	150	165	15
2024	1.5%	225	247	22
2025	2.0%	300	330	30
2026	*2.0%*	300	412	112

3.2. Environmental Justice

Appalachian is committed to AEP's Environmental & Social Justice Policy[5] and the tenets of the Commonwealth's Policy on Environmental Justice and considers it in all prospective transactions for

[5] https://aep.com/Assets/docs/AEP_Environmental_Social_Justice_Policy.pdf

renewable resources. Identification and remediation of potential concerns are made during the RFP process, as discussed in the petition. Because Environmental Justice is specific to the communities immediately surrounding resources, meaningful evaluation of impacts to environmental justice communities can only be accomplished once potential sites have been identified. The Plexos® selected resource additions identified in this Plan are generic in nature and are not site specific and thus cannot be evaluated for potential Environmental Justice issues.

3.3. Reliability Impacts

Through Plexos®, the Company models reliability at a system level by ensuring that sufficient resources are available to meet customer load based on the hourly profile of both load and resources. Because the Company is a member of PJM, Plexos® has the option to fill energy deficits in any specific hour with market purchases. The Company will continue to evaluate and identify potential reliability concerns and mitigation as renewable penetration increases in APCo's service territory, Virginia, and PJM.

4. APCo Company Summary and Assumptions Overview

4.1. Overview of APCo

APCo's customers are retail and sales-for-resale (wholesale) customers located in the states of Virginia, West Virginia and Tennessee (see Figure 1). Currently, APCo serves nearly 1 million customers, with nearly 542,000 of those customers being in Virginia. The peak load requirement of APCo's total retail and wholesale customers is seasonal in nature, with distinctive peaks occurring in the summer and winter seasons. APCo's all-time highest recorded peak demand was 8,708 MW, which occurred in February 2015, and the highest recorded summer peak was 6,755 MW, which occurred in August 2007. The most recent (summer 2022 and winter 2021) actual APCo summer and winter peak demands were 5,348 MW and 6,613 MW, occurring on June 15, 2022 and January 27, 2022, respectively.

Figure 1: APCo's service territory

4.2. APCo's existing resources

APCo serves its customers through owned generation resources and PPAs for renewable resources. See Table 7 and Table 8 for a summary of these owned and contracted resources, respectively.

Table 7: APCo Owned Generation Resources

Plant	Capacity [MW[1]]	No. of Units	Location	Fuel	First Unit Commissioned	Retirement Year
John E. Amos	2930.1	3	Winfield, WV	Coal	1971	2040*
Mountaineer	1305	1	New Haven, WV	Coal	1980	2040
Ceredo	452.9	6	Ceredo, WV	Natural Gas	2001	2041
Clinch River	456.5	2	Carbo, VA	Natural Gas	1958	2025
Dresden	570	3	Dresden, OH	Natural Gas	2012	2047
Buck	1.5	3	Ivanhoe, VA	Hydro	1912	2024
Byllesby	4	4	Byllesby, VA	Hydro	1912	2024
Claytor	75.2	4	Radford, VA	Hydro	1939	2041
Leesville	49	2	Leesville, VA	Hydro	1964	2040
London	6.5	3	Montgomery, WV	Hydro	1935	2044
Marmet	5.8	3	Marmet, WV	Hydro	1935	2044
Niagara	2.4	2	Roanoke, VA	Hydro	1906	2024
Smith Mountain	585	5	Penhook, VA	Hydro	1965	2040
Winfield	9.9	3	Winfield, WV	Hydro	1938	2044
TOTAL	**6454**	**44**				

[1] Nameplate rating. For capacity planning purposes, PJM UCAP ratings are used.
* Retirement date for resource planning purposes. May differ from retirement dates for depreciation purposes

Table 8: APCo Contracted Generation Resources

Facility	Capacity [MW[1]]	State	Fuel	Contract Expiration
Ohio Valley Electric Corporation	333	Ohio	Coal	2040
Summersville I and II	80	West Virginia	Hydro	2027
Bluff Point	120	Indiana	Wind	2037
Camp Grove	75	Illinois	Wind	2028
Beech Ridge	101	West Virginia	Wind	2030
Fowler Ridge III	99	Indiana	Wind	2029

Grand Ridge II and III	101	Illinois	Wind	2029
Depot Solar*	15	Virginia	Solar	2041
Wytheville*	20	Virginia	Solar	2036
Leatherwood*	20	Virginia	Solar	2036
TOTAL	**963**			
[1] Nameplate rating. For capacity planning purposes, PJM UCAP ratings are used.				

*Behind the Meter Resources

4.2.1. APCo's Coal Units

The Company is nearing the completion of environmental retrofit projects at its two coal plants (2,930 MW Amos, St. Albans, WV; 1,336 MW Mountaineer, New Haven, WV). These projects are required in order to allow continued operation in compliance with the federal Coal Combustion Residuals (CCR) rule and the Effluent Limitation Guidelines (ELG) rules. These investments have been approved by the Public Service Commission of West Virginia (WVPSC, Case No 20-1040-E-CN) and the Virginia SCC (Case PUR-2022-0001). These projects are expected to be completed during 2023. For the purposes of modeling, the Company assumes both plants will be operational through 2040., Additionally, in response to the Commission's Final Order to the Company's 2021 RPS Plan proceeding, the Company included a sensitivity to allow the model to select the retirement of the Amos and Mountaineer units earlier than 2040 on an economic basis. Those Portfolios are presented in Section 10.

4.3. Key Modeling Assumptions

Key modeling assumptions are as follows:

1. APCo operates in both Virginia and West Virginia and is subject to regulation in both states, with resource acquisition determinations made by regulators in both states and resource costs allocated between the jurisdictions. The Company assumes, for the purposes of this Plan, that all the specific resources in Table 4 will be approved by both Virginia and West Virginia. Subsequent renewable resources will accrue entirely to Virginia retail customers. There is not currently a renewable portfolio standard in place in West Virginia.
2. The Company's base case assumption is that Amos and Mountaineer coal-fired plants will run through 2040. After 2040, the Company has assumed in the VCEA Plan that capacity shortfalls will be met with a combination of renewable generators, energy storage and other advanced generation technologies. In other cases where the Company modeled fossil additions for informational purposes, it is understood that those resources would necessarily be located outside of Virginia. For this VCEA analysis, the Company's Clinch River units were not assumed to continue operation beyond their planned 2025 retirement date.
3. Market REC purchases were made available to the Plexos® model as a resource option that could be selected if they were a less costly VCEA compliance option than other renewable resources, based on an assumed REC price curve. In all portfolios, RECs from market purchases, existing and new owned and third-party sources were modeled to utilize REC banking. Specifically, the model was setup such that any excess RECs held by the Company

could be used in the subsequent five years to apply to its annual RPS requirement pursuant to §56-585.5.

4. Modeling also included the capacity value of resources at the Company's fundamental capacity price. It is assumed that the excess capacity would be sold to either the PJM capacity market or to a third party under a bilateral purchased power agreement beginning in 2023. An additional analysis was performed where the capacity monetization benefit from new resources was not included per the 2022 VCEA Order.
5. The Company's existing renewable resources are allocated based on the ratio of APCo Virginia retail load (including Public Authority and Commonwealth customers) to total company load, which is estimated to be 49.3%. Existing renewable resource contracts were modeled with the assumption that they would not be extended.
6. The Company assumed it would seek hydro relicensing for its owned hydro generation resources and a contract extension for Summersville.

4.4. APCo Load Forecast

The APCo load forecast was developed by the American Electric Power Service Corporation (AEPSC) Economic Forecasting organization and completed in June 2022.[6] The load forecast is the culmination of a series of underlying forecasts that build upon each other. The economic forecast provided by Moody's Analytics is used to develop the customer forecast, which is then used to develop the sales forecast, which is ultimately used to develop the peak load and internal energy requirements forecast.

Over the next 15-year period (2023-2037), APCo's service territory is expected to see population to decline at 0.3% per year and non-farm employment growth of -0.1% per year, and APCo is projected to see its customer count decline by 0.1% over this period. Over the same forecast period, APCo's retail sales are projected to decline at 0.1% per year, with growth expected from the industrial class (+0.1% per year) while the residential class is projected to decline at 0.4% per year. Finally, APCo's internal energy requirements and peak demand are expected to decline by 0.4% per year through 2037. For this forecast, it has been assumed that APCo's current wholesale customers will not renew their contracts beyond the current contract expiration dates, resulting in removal of their load from the forecast.

The load forecast utilizes the most current DSM programs that have been approved by the Commission at the time the load forecast is created to adjust for the impact of these programs. For the near-term horizon (through 2026), the load forecast includes approved programs through 2026 from the Company's approved 2022-2026 DSM plan. For the years beyond 2026, the IRP model included programs consistent with the Company's approved DSM Plan resources available for economic selection of optimal levels of economic EE measures.

[6] The load forecasts (as well as the historical loads) integral to this Plan reflect the traditional concept of internal load, i.e., the load that is directly connected to the utility's transmission and distribution system and that is provided with bundled generation and transmission service by the utility. Such load serves as the starting point for the load forecasts used for generation planning. Internal load is a subset of *connected load*, which also includes directly connected load for which the utility serves only as a transmission provider. Connected load serves as the starting point for the load forecasts used for transmission planning.

Additionally, distributed generation in the form of rooftop solar is driven by customer decisions and continues to grow. The Company has developed a forecast of the number of units and capacity shown in Figure 2. While the net impact to the load forecast is not explicitly quantified, to the extent that it affects consumption trends, it is implicitly captured in the load forecast.

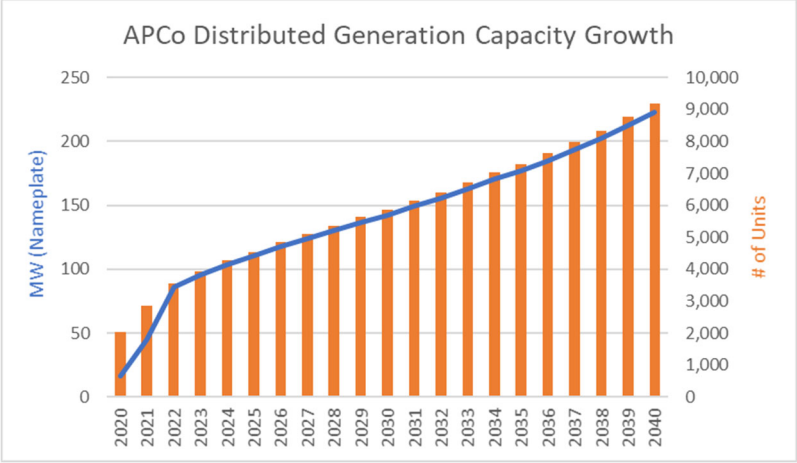


Figure 2. APCo Distributed Generation

Figure 3 shows both the total load forecast for APCo and the Virginia retail sales applicable to the VCEA. The Company understands "retail" as defined in the Code to include the Public Authority and Commonwealth customers in Virginia, for the purposes of determining VCEA RPS requirements. These forecasted retail sales along with the annual VCEA energy targets provided a key input into the development of the proposed VCEA Plan.

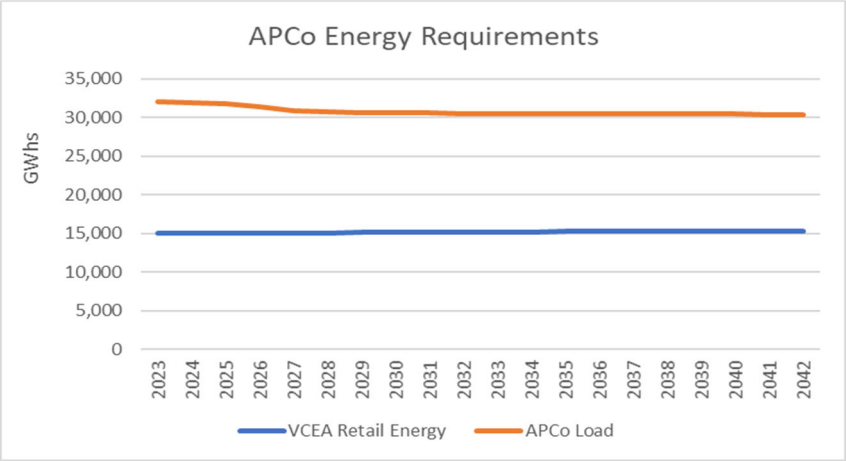


Figure 3: APCo Energy Requirements

4.5. The Fundamentals Forecast

The Fundamentals Forecast is a long-term, weather-normalized commodity market forecast principally based upon the assumptions contained in the Energy Information Administration's Annual Energy Outlook (AEO). It is provided to AEPSC and all AEP operating companies for purposes such as resource planning, capital improvement analyses, fixed asset impairment accounting, and others. These projections cover the electricity market within the Eastern Interconnect, the Electric Reliability Council of Texas, and the Western Electricity Coordinating Council. The Fundamentals Forecast includes, among

other factors: 1) hourly, monthly and annual regional power prices (in both nominal and real dollars); 2) prices for various qualities of coals; 3) monthly and annual locational natural gas prices, including the benchmark Henry Hub; 4) nuclear fuel prices; 5) SO_2, NO_x, and CO_2 burden values; 6) locational implied heat rates; 7) electric generation capacity values; 8) renewable energy subsidies; and 9) inflation factors; 10) VCEA compliance for Virginia utilities among others. Table 9 below describes the Fundamentals Forecast components, which are sourced directly from the EIA AEO, from third party energy consultancies, or were sourced internally. As the EIA AEO does not provide the granularity for most regulatory applications, the Aurora energy market simulation model was utilized to create a reasonable proxy for the EIA AEO while providing the level of detail necessary for downstream consumption.

Table 9: Fundamentals Forecast Components

Forecast Components	EIA	Other	Source
Economy; Inflation/GDP deflators	✓		EIA Reference case
Generating Reserve Margins		✓	RTO Requirements
Electric Load		✓	AEP Load Forecasting
Electric Load shapes		✓	AEP Fundamentals
Solar/Wind production shapes by area		✓	NREL
Coal; Delivered price to EIA regions	✓	✓	EIA Reference case FOB prices + AEP Fundamentals
Natural gas price; Henry Hub	✓		EIA Reference case
Natural gas price; Locational values	✓	✓	EIA Reference case - Henry Hub + AEP Fundamentals
Natural gas supply; Lower 48 production	✓		EIA Reference case
Natural gas demand (incl. losses)	✓		EIA Reference case
Natural gas; net pipeline/LNG exports	✓		EIA Reference case
Oil price, WTI	✓		EIA Reference case
Fuel Oil price; locational values	✓	✓	EIA Reference case - WTI + AEP Fundamentals
Uranium prices		✓	AEP Fundamentals
Other Fuel(Biofuel, etc...)	✓		EIA Reference case
New gen unit options and capital costs	✓		EIA Reference case
Existing gen units	✓		EIA Reference case
Announced new gen units	✓		EIA Reference case
Aged-out retirements of existing gen units	✓		EIA Reference case
Gen unit maintenance schedule		✓	AEP Fundamentals
Gen unit outages		✓	AEP Fundamentals
Unit-level emission rates; CO_2, SO_2, NO_x		✓	US EPA CEMS data
Application of a CO_2 burden		✓	AEP Environmental
REC		✓	AEP Regulatory Forecast
PTC	✓		EIA Reference case
ITC	✓		EIA Reference case
State-mandated Renewable Portfolio Standards		✓	AEP Environmental
Reporting parameters; Peak/Off-Peak/NERC Holidays		✓	PJM/SPP/other RTO and/or internal guidelines
Transmission/links between Zones		✓	AEP Fundamentals

The Fundamentals Forecasts incorporates requirements of the Virginia Clean Energy Act and the Regional Greenhouse Gas Initiative (RGGI) for both APCo and Dominion:

- Including Virginia in the RGGI, applying RGGI CO_2 prices through 2027 before switching to an assumption of a higher $15/metric ton national standard in 2028
- Applying the Virginia RPS program to Phase I and Phase II utilities within the state
- Retiring all fossil units named in the VCEA law by stated retirement dates
- Retiring all remaining Phase I fossil units by 2050 and Phase II fossil units by 2045

- Including the resource additions required for Dominion under the VCEA based upon the Company's understanding of those requirements

The Aurora model iteratively generates zonal, but not company-specific, long-term capacity expansion plans, annual energy dispatch, fuel burns and emission totals from inputs including fuel, load, emissions, and capital costs, among others. Ultimately, Aurora creates a weather-normalized, long-term forecast of the market in which a utility would be operating. The Aurora model is widely used by utilities for integrated resource and transmission planning, power cost analysis and detailed generator evaluation. The database includes approximately 25,000 electric generating facilities in the contiguous United States, Canada, and Baja Mexico. These generating facilities include wind, solar, biomass, nuclear, coal, natural gas, and oil. A licensed online data provider, ABB Velocity Suite, provides up-to-date information on markets, entities and transactions along with the operating characteristics of each generating facility, which are subsequently exported to the Aurora model.

For this analysis, the Company utilized both the base and high commodity versions of its 2021 Forecast to analyze fully the range of outcomes possible given recent market volatility. The annual results from each scenario developed are shown in Appendix A and include on-peak and off-peak energy prices, natural gas prices, coal prices, CO_2 prices and capacity prices.

4.6. Determining Compliant VCEA Plans

For the purposes of modeling compliance with the VCEA, APCo used a process nearly identical to its typical IRP process, which used the Plexos® model to address the gap between resource needs and current resources, while also including minimums related to the requirements established under the VCEA for energy from renewable resources, energy savings from energy efficiency resources and capacity from energy storage resources.

Given the cost and performance parameters around sets of potentially available proxy resources–both supply and demand side–and a scenario of economic conditions that include long-term fuel prices, capacity costs, energy costs, emission-based pricing proxies including CO_2, as well as projections of energy usage and peak demand, Plexos® will return the optimal suite of proxy resources (portfolio) that meet the resource need. Portfolios created under similar pricing scenarios may be ranked on the basis of cost, or the net present value of the resulting stream of revenue requirements. The least cost option is considered the optimum portfolio for that unique input parameter scenario.

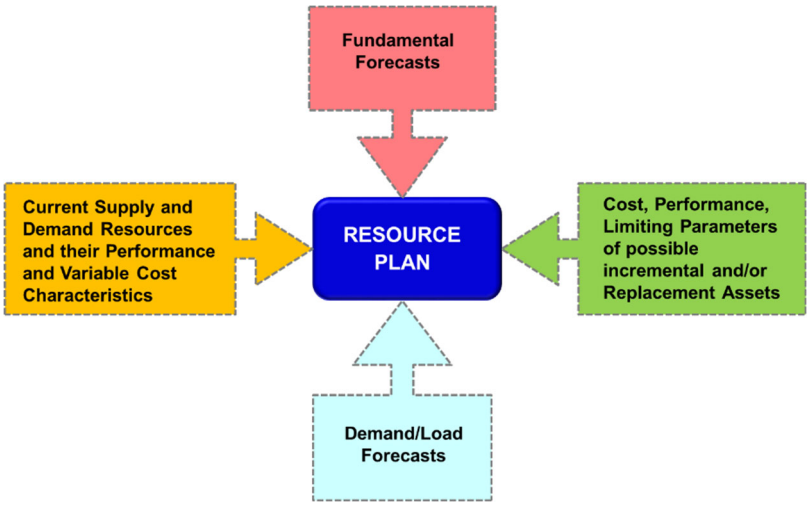


Figure 4: Resource Planning Diagram

5. Supply- and Demand-side Resource Options

Supply-side resource options including base/intermediate and peaking generating technologies of natural gas and small modular nuclear reactors and intermittent renewable resources including large-scale solar, wind and battery storage were made available to develop compliant plans.[7] It is important to note that alternative technologies with comparable cost and performance characteristics, subject to limitations included in Section §56-585.5 of the Code of Virginia, can ultimately be substituted, should technological or market-based profile changes warrant.

[7] The Company referred to the EIA ANNUAL ENERGY OUTLOOK 2022 report (https://www.eia.gov/outlooks/aeo/pdf/AEO2022_Narrative.pdf) and the associated EIA Cost and Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2022 (https://www.eia.gov/outlooks/aeo/assumptions/pdf/table_8.2.pdf) to inform the analysis process.

Table 10 includes a summary of the technologies and their associated cost and performance parameters made available to the model. These generation technologies are intended to represent reasonable proxies for each capacity type (baseload, intermediate, peaking). Subsequent substitution of specific technologies could occur in any later plan, based on emerging economic or non-economic factors not yet identified.

Table 10: Generation Technology Options (2022$)

AEP System
New Generation Technologies
Key Supply-Side Resource Option Assumptions (a)(b)(c)(d)

Type	Capability (MW) (e) Std. ISO	Summer	Winter	Installed Cost (c,d,f) ($/kW)	Capacity Factor (%)	Yr: 2022 LCOE (c,g) ($/MWh)
Base Load						
SMALL MODULAR REACTOR NUCLEAR POWER PLANT, 600 MW	600	600	600	7,600	85	112.2
COMBUSTION TURBINE H CLASS, COMBINED-CYCLE SINGLE SHAFT W/90% CO2 CAPTURE, 430 M	380	370	390	3,600	75	68.7
COMBUSTION TURBINE H CLASS, 1100-MW COMBINED CYCLE	1,030	1,010	1,070	1,400	75	57.1
COMBUSTION TURBINE H CLASS, COMBINED-CYCLE SINGLE SHAFT, 430 MW	420	410	440	1,600	75	61.8
Peaking						
COMBUSTION TURBINE F CLASS, 240-MW SIMPLE CYCLE	230	230	250	1,000	20	120.0
COMBUSTION TURBINES AERODERIVATIVE, 100-MW SIMPLE CYCLE	110	100	110	1,700	20	153.2
INTERNAL COMBUSTION ENGINES, 20 MW	20	20	20	2,700	20	251.5
Intermittent						
BATTERY ENERGY STORAGE SYSTEM, 50 MW / 200 MWH	50	50	50	1,800	14	244.2
SOLAR PHOTOVOLTAIC WITH BATTERY ENERGY STORAGE SYSTEM, 150 MWx200 MWh	150	150	150	3,900	21	169.7
ONSHORE WIND, LARGE PLANT FOOTPRINT, 200 MW	200	200	200	3,400	30	102.3
SOLAR PHOTOVOLTAIC, 150 MWAC	150	150	150	2,900	21	125.1

Notes:
(a) Costs and performance data informed by EIA report Capital Cost and Performance Characteristic Estimates for Utility Scale Electric Power Generating Technologies (Feb 2020)
(b) Capital & Installed cost, capability and heat rate numbers have been rounded
(c) The capital costs represent current costs for plants that would come online in First Year In Service modeled.
(d) $/kW costs are based on summer capability
(e) All Capabilities adjusted by the Performance Adjustment Factors defined in the reference report (a)
(f) Total Plant Investment Cost w/AFUDC (AEP rate of 4.67%,site rating $/kW) as applicable.
(g) Indicative levelized cost of energy (LCOE) based on capacity factors shown in table

For this analysis, the Company adopted a "learning curve" forecast based on the National Renewable Energy Laboratory (NREL) 2022 Annual Technology Baseline (ATB)[8] capital costs for all resource types. The learning curve cost reductions are illustrated in Figure 5 and applied to the technology cost forecasts used in the Plexos® modeling.

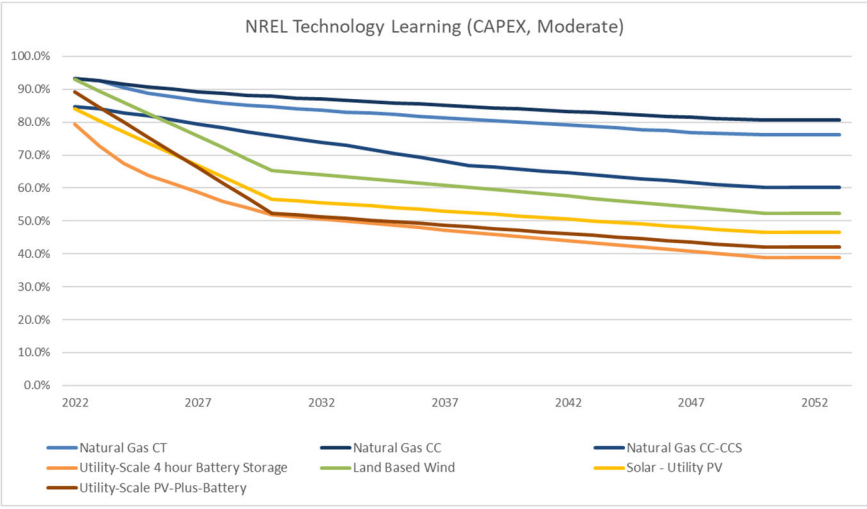


Figure 5: NREL Capital Cost Learning Curves (2020$)

[8] https://atb.nrel.gov/

5.1. Baseload & Peaking Resource Options

For Baseload resources, the Company modeled a 600 MW small modular nuclear reactor (SMR) and three natural gas combined cycle configurations shown in

Table 10 including the multi-shaft 1,100 MW resource and the single shaft, 430 MW resource and a single shaft 370MW combined cycle with carbon sequestration. For Peaking resource options, the Company modeled the three resources including a 240 MW combustion turbine (CT), a 105 MW aero-derivative engine (AD) and a 20 MW Reciprocating Internal Combustion Engine (RICE). Capital build costs were informed by the EIA Cost and Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2022 report.
(https://www.eia.gov/outlooks/aeo/assumptions/pdf/table_8.2.pdf)

5.2. Intermittent and Renewable Resource Options

Development of intermittent and renewable resources continues to grow, driven by renewable portfolio standards, supporting tax policies and interest by utilities and companies to include these clean energy generating resources as part of their diverse portfolios. Various intermittent and renewable generating technologies were available for selection by the model including Solar, Wind, Hybrid Solar and Battery Energy Storage.

Renewable energy resources, because of their intermittent nature, typically provide more energy value than capacity value, and PJM continues to refine its guidance on the Effective Load Carrying Capability (ELCC) for intermittent resources. In general, under the current PJM draft guidance, as intermittent resources continue to increase in relation to the total of all PJM resources, the planning capacity credit of new renewable resources added to the system will decline. The Company referred to PJM's latest available ELCC report at the time of the model development released in December 2021[9] to inform the plan for intermittent resource contributions to the Company's capacity obligations. A summary chart of the ELCC levels assumed in this plan is shown in Figure 6. PJM's December 2021 ELCC Report did not produce projections beyond 2032 and for this analysis, the 2032 ELCC values were held constant until the end of the planning horizon.

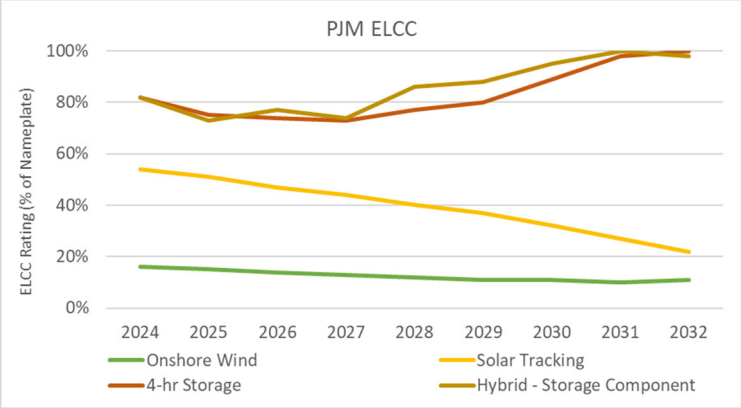


Figure 6. PJM Effective Load Carrying Capability (ELCC)

5.2.1. Solar

Large-scale solar resources were available starting in 2026. The Company relied on information from its 2022 Renewable RFP to model prospective owned solar costs for assets to be placed in service

[9] https://www.pjm.com/-/media/planning/res-adeq/elcc/elcc-report-december-2021.ashx

in early 2026. For new solar resources, a Virginia specific capacity factor was identified based on an analysis of the EIA 923 and 860 reports for utility sector solar resources. In this analysis, a capacity factor of 21.0% was modeled for all new solar resources although RFP responses used to inform the resource cost in this analysis included an estimated capacity factor of approximately 24%.

Capital build costs were informed from the Company's 2022 Renewable RFP[10] and are modeled as an average of the Company's responses. Annual resource limits were informed in part by the APCo 2022 RFP responses, a review of resources in the PJM queue and through Company opinion for potentially available solar resources that might be acquired in a year by either owned and/or PPA methods. The amount of PPA and owned resources was established for the model to manage the total amounts of either PPA or Owned resources it could select. The actual amounts of PPA and Owned resources that would be selected are subject to continued evaluation through annual RFP responses.

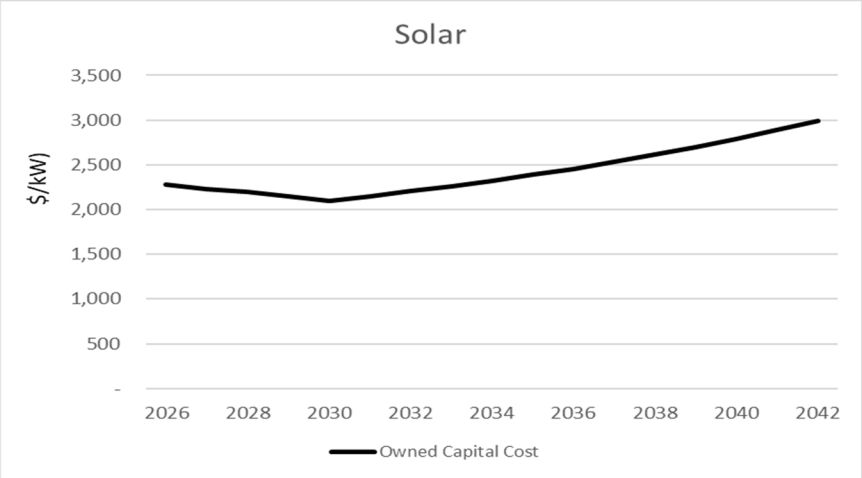


Figure 7. Solar Capital Costs

5.2.2. Large-Scale Wind

Large-scale wind resources were available starting in 2026. The Company relied on information from its 2022 Renewable RFP to model owned wind costs for assets to be placed in service in early 2026. For new wind resources, the Company modeled a capacity factor of 29.82% which represents a three-year MW weighted average of its current wind resources capacity factors although RFP responses used to inform the resource cost in this analysis included an estimated capacity factor of approximately 32%.

Capital build costs were informed from the Company's 2022 Renewable RFP and are modeled as an average of the Company's responses. Annual resource limits were informed in part by the APCo 2022 RFP responses and through Company opinion for potentially available wind resources that might be acquired in a year by either owned and/or PPA methods. The amount of PPA and owned resources was established for the model to manage the total amounts of either PPA or Owned resources it could select. The actual amounts of PPA and owned resources that would be selected are subject to continued evaluation through annual RFP responses.

[10] https://www.appalachianpower.com/business/b2b/energy-rfps/

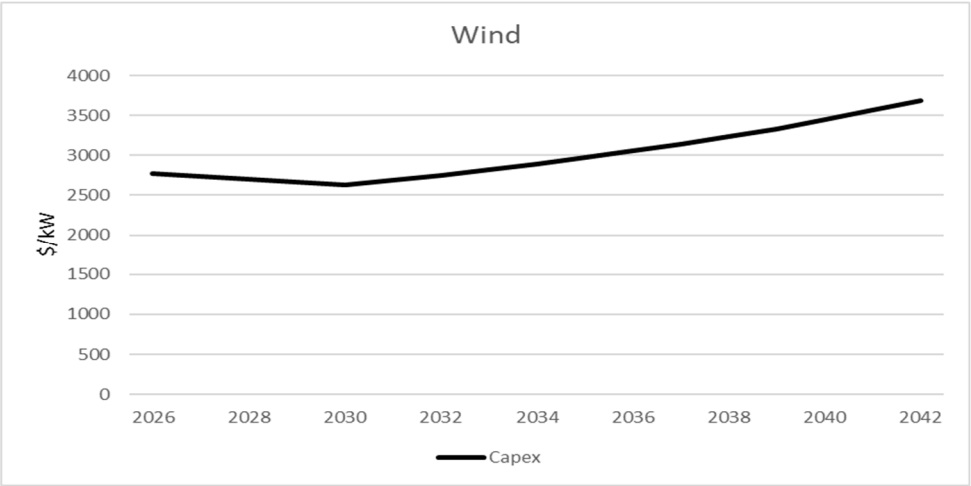


Figure 8. Wind Capital Costs

5.2.3. Power Purchase Agreement (PPA) Options

Consistent with the requirements in Section §56-585.5.D.4, the VCEA compliant portfolios reflect, in the aggregate and over its duration, modeled renewable resources meeting the obligation for 35% of these to be procure or purchased from persons other than the utility. In practice, however, the amount of PPA versus owned wind and solar added in any one year will be the result of competitive solicitations subject to regulatory approval.

PPA resource costs were informed from the results of the RFP that APCo issued in 2022. The PPA bids in response to the 2022 Renewable RFPs on an equivalent LCOE basis were on average, 10% less than owned asset bids. This difference was used in this analysis to establish modeled build costs for PPA resources. This does not necessarily reflect the results of future RFPs and does not include other factors both explicit and implicit regarding ownership benefits. Actual owned and PPA resource costs will be identified in future solicitations for specific resources and may depend on multiple factors including federal tax policy.

5.2.4. Hybrid Solar / Storage

Hybrid Solar systems include a Solar PV plant with a 4-hour closed loop battery storage system associated with it. For this analysis, a 150 MW_{ac} solar plant was modeled, coupled with a 50 MW (200 MWh) Li-Ion Battery Energy Storage system.

5.2.5. Renewable Energy Certificates (RECs)

The Company included RECs as an RPS energy compliance option in the Plexos® modeling, allowing the model to choose whether to build physical resources or purchase RECs based on economics. In this analysis a 50 MW block of new utility solar with an assumed ~92 GWh set the size for a single REC (block) addition in the model. The first year when RECs could be added was assumed to be 2023. A third-party forecast provided by S&P Global[11], as shown in Figure 9, was used for the base REC

[11] S&P Global, SPGlobalMI_RECForecast_2022Q3, available by subscription.

price forecast in all portfolios. The number of RECs selected by the model in each portfolio is presented in Appendix B. Higher and lower priced REC sensitivity forecasts were also prepared based on an assumption that RECs would be available at 50% above and below the cost of the base REC forecast curve. These price forecasts are also shown in Figure 9.

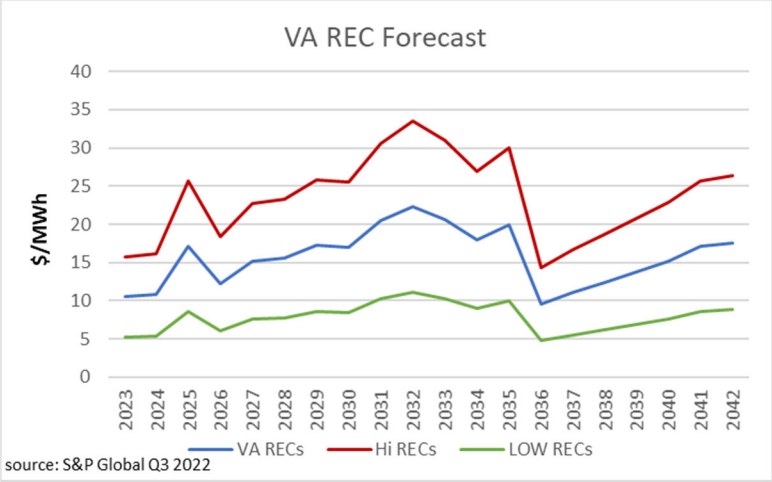


Figure 9. REC Price Forecast

5.3. Inflation Reduction Act (IRA)

In August 2022, Congress passed the Inflation Reduction Act which, among many things, introduced additional benefits for clean energy resources. Specifically, the IRA allows for the inclusion of Production Tax Credits (PTCs) or Investment Tax Credits (ITCs) for solar and wind resources as well as for new nuclear facilities, such as SMRs. Additionally, the IRA introduced incentives for storage resources in the form of ITCs and expanded benefits for carbon sequestration solutions.

A summary of IRA benefit assumptions to specific resources included in this plan is:

- 10 years of 100% PTCs or ITCs for "Technology Neutral" Clean Electricity resources including solar, wind and advanced nuclear resources through 2032 with an additional 4-year safe harbor assumption.
- 10 years of ITC benefits for storage resources with an additional 4-year safe harbor assumption
- Carbon Sequestration benefits are applied at $85/ton for 12 years for a 1x1 Combined Cycle Unit.

5.4. Annual and Cumulative Resource Limits

Annual and cumulative intermittent and renewable resource limits were determined based on simultaneous consideration of multiple regulatory requirements. All portfolios were modeled to be VCEA-compliant. Table 11 contains a summary of the resource parameters included in the modeling. These parameters are consistent with assumptions and inputs for the Company's 2022 IRP with some adjustments made to renewable and REC block sizes based on feedback received in that proceeding. The Company modified the annual amount of wind resources available based on market insights from recent RFPs and included annual storage resources available beginning in 2037 for up to 1,000MW per year.

Table 11: New Resource Limitations

New Resource Assumptions						
Resource Type	**First Year Available**	**Life [yr]**	**Block Size [MW]**	**Annual Limits [MW/yr]**	**Individual Technology Total [MW]**	**Cumulative Technology Total [MW]**
Solar PPA	1/1/2026	35	50	200	2000	6,000
Solar Utility T1		35	50	400	4,000	
Solar Hybrid (4hr storage closed loop)	1/1/2026	35	150 MW/ 200 MWh	450 MW/ 600 MWh	1050 MW/ 1,400 MWh	1,050 MW/ 1,400 MWh
Wind PPA Limits	1/1/2026	30	75	75	750	2,250
Wind Owned Limits	1/2/2026	30	75	150	1,500	
Renewable Energy Certificates	1/1/2023	1	50 MW/ 92 GWh	3000 MW/ 7,000 GWh	450 GW/ 7,000 GWh	450 GW/ 7,000 GWh
Stand Alone Storage	1/1/2026	10	25	through 2036: 300 2037 on: 1,000	12,500	12,500
Combustion Turbine F Class Simple Cycle	1/1/2029	30	240	960	Unconstrained	Unconstrained
Combined Cycle H Class	1/1/2029	30	1,100	1,100	Unconstrained	
Combined Cycle H Class Single Shaft	1/1/2029	30	418	418	Unconstrained	
Combined Cycle H Class Single Shaft w/ 90% CO2 Capture	1/1/2029	40	390	390	Unconstrained	
RICE	1/1/2029	20	20	100	Unconstrained	
Aero Derivative	1/1/2029	30	105	105	Unconstrained	
Small Modular Nuclear Reactor	1/1/2033	40	600	600	Unconstrained	Unconstrained

The primary regulatory constraints considered in setting the annual and cumulative resource limits were 1) PJM minimum capacity requirements; 2) VCEA annual Virginia-jurisdictional renewable energy targets; 3) management of a wind and solar PPA/Owned division of resources; and 4) near term (prior to 2030) VCEA wind, solar, and storage new resource requirements.

Additionally, the Company considered practical limits regarding the absolute levels of cost-effective renewable capacity that are available in Virginia and more broadly across PJM as well as mitigating potentially excessive customer rate impacts that can result from adding required resources. The near-term availability of Virginia domiciled wind and solar resources was also considered. Based on the numbers of bids received of each resource type in recent Renewable RFPs issued in 2021 and 2022, solar resources are expected to be more widely available than wind, and the quantity of wind MW available in Virginia could be limited. As a result, higher cumulative limits were allowed for solar than wind.

It should be noted that for the purposes of modeling zero emissions resources to fill the capacity need after the assumed retirement of the Amos and Mountaineer units in 2040, a high cumulative lifetime storage limit was included as a proxy resource at that time. The assumption that 1,000 MW of storage could be added to a Company the size of APCo in any one year, or even cumulatively beginning in 2037 is particularly optimistic.

All of these constraints are applied simultaneously. Compliance with the minimum obligations under any one of these requirements, such as the VCEA annual energy targets, could and did lead to substantial over-compliance with other requirements, such as PJM's minimum capacity requirement.

By choosing these limits, the Company is not expressing an opinion regarding whether these levels of resources are in fact available, or whether adding that level of a given resource is desired. These limits are simply an attempt to give the model enough available capacity and energy options to meet the necessary PJM and VCEA requirements in all years of the analysis from a portfolio of all the available resource types under each portfolio.

5.5. Energy Storage

The stand-alone Energy Storage resource modeled in this plan is a Lithium-ion storage technology and has a nameplate rating of 50 MW/200 MWh, with a round trip efficiency of 82.7%. The modeling of Energy Storage utilized the values shown in Table 12, with the nameplate rating adjusted from 50 MW to 25 MW to align with the storage levels in the Commission's order regarding the interim requirements. A Storage PPA option was not modeled as separate resource from an owned storage resource, under the assumption that the cost of the solar resource included in the model represents a blend of owned and PPA. Both PPA and owned storage resources will be considered in future RFPs.

5.6. Demand-Side Resource Options

5.6.1. Energy Efficiency

As discussed in section 4.4, approved programs through 2026 from the Company's approved 2022-2026 DSM plan are included in the Company's load forecast. After 2026, the Company included both Residential and Commercial/Industrial energy efficiency bundles as demand-side resource options for the model to consider.

Table 12 shows the Residential Bundles cost and potential by year, and Table 13 shows the Commercial/Industrial Bundles included in the model.

Table 12: Residential EE Bundles

Bundle	Installed Cost ($/kWh)	Yearly Potential Savings (MWh) 2027-2031	Yearly Potential Savings (MWh) 2032-2036	Yearly Potential Savings (MWh) 2037-2041	Yearly Potential Savings (MWh) 2042-2046	Bundle Life
Thermal Shell - AP	$0.23	6,799	3,219	3,783	3,671	10
Thermal Shell - HAP	$0.34	21,066	822	0	0	10
Heating/Cooling - AP	$0.75	50,626	9,653	0	0	18
Heating/Cooling - HAP	$1.04	7,659	0	0	0	18
Water Heating - AP	$0.26	36,439	12,884	14,381	6,905	14
Water Heating - HAP	$0.37	86,536	10,863	12,155	0	14
Appliances - AP	$0.22	37,676	4,125	3,864	2,728	13
Appliances - HAP	$0.31	8,719	0	0	0	13
Lighting - AP	$0.08	2,475	0	0	557	31
Lighting - HAP	$0.12	1,636	0	0	0	30
Behavioral Programs	$0.05	22,692	0	0	0	2

Table 13: Commercial EE Bundles

Bundle	Installed Cost ($/kWh)	Yearly Potential Savings (MWh) 2027-2031	Yearly Potential Savings (MWh) 2032-2036	Yearly Potential Savings (MWh) 2037-2041	Yearly Potential Savings (MWh) 2042-2046	Bundle Life
Heat Pump - AP	$8.26	3,308	0	0	0	15
Heat Pump - HAP	$12.40	221	0	0	0	15
HVAC Equipment - AP	$0.17	2,760	0	0	0	15
HVAC Equipment - HAP	$0.26	1,649	0	0	0	15
Indoor Screw-In Lighting - AP	$0.01	2,957	0	0	0	6
Indoor Screw-In Lighting - HAP	$0.02	1,255	0	0	0	6
Indoor HID/Fluor. Lighting - AP	$0.11	18,475	1,484	0	0	14
Indoor HID/Fluor. Lighting - HAP	$0.17	2,053	0	0	0	14
Outdoor Lighting - AP	$0.22	6,835	1,068	0	0	15
Outdoor Lighting - HAP	$0.34	7,595	0	0	0	15

5.6.2. Demand Response

Incremental levels of Demand Response (DR) was included in the model for the entire operating company. The DR resource is modeled based on the Residential Bring Your Own Thermostat (BYOT) program where customers would own and self-install Wi-Fi enabled thermostats, which will communicate with APCo. Table 14 shows the DR resource offered into the model. A single block of DR resources were available beginning in 2027 with a service life of seven years.

Table 14: APCo Demand Response Resource

Sector	Participants	Demand Savings (kW)	Energy Savings (kWh)	Installation Cost	Annual Cost	Total First Year Cost	Service Life (Years)
Residential / Commercial	1,000	2,000	13,000	$ 55,000	$ 478,000	$ 533,000	7

5.6.3. Volt VAR Optimization

The Company included Volt VAR Optimization (VVO), which represents a form of voltage control that allows the grid to operate more efficiently as a resource option. VVO enables Conservation Voltage Reduction (CVR) on a utility's system. CVR is a process by which the utility systematically reduces voltages in its distribution network, resulting in a proportional reduction of load on the network. Voltage optimization can allow a reduction of system voltage that still maintains minimum levels needed

by customers, thereby allowing customers to use less energy without any changes in behavior or appliance efficiencies.

VVO has been modeled as a unique DSM resource. Table 15 below shows the resource characteristics of the VVO resources made available to the model in all portfolios.

Table 15: VVO Resources

Tranche	No. of Circuits	Capital Investment	Annual O&M	Demand Reduction (kW)	Energy Reduction (MWh)
1	36	$12,600,000	$378,000	11,172	45,996
2	36	$12,600,000	$378,000	9,639	39,684
3	36	$12,600,000	$378,000	8,799	36,227
4	36	$12,600,000	$378,000	8,298	34,163
5	36	$12,600,000	$378,000	7,826	32,222
6	36	$12,600,000	$378,000	7,458	30,705
7	36	$12,600,000	$378,000	7,126	29,340
8	36	$12,600,000	$378,000	6,884	28,343
9	36	$12,600,000	$378,000	6,629	27,292
10	36	$12,600,000	$378,000	6,435	26,493
11	36	$12,600,000	$378,000	6,186	25,470
12	36	$12,600,000	$378,000	5,909	24,329
13	36	$12,600,000	$378,000	5,849	24,081
14	36	$12,600,000	$378,000	5,473	22,532

6. VCEA Compliant Portfolios and Results

6.1. Modeled Portfolios

The Company modeled eight VCEA compliant portfolios to evaluate compliance strategies under a wide range of assumptions. Modeling was performed under fundamental forecasts based on two different CO_2 emissions burden assumptions, as described in Section 4.5. For this report, the Company also modeled the capacity expansion plan to a reserve margin 3% higher than the minimum PJM Installed Reserve Margin (IRM) requirement of 14.7%. The Company included this assumption to identify an optimal selection of resources that provides some mitigation to risks related to uncertainty in renewable resource accredited capacity and planning to only the minimum PJM capacity obligation. Additional portfolios were also modeled to evaluate how resources needed for VCEA compliance would be impacted by the availability of natural gas resources. Portfolios were also modeled per the Commission's directive, including retirement sensitivities of the Amos and Mountaineer facilities on an economic basis (Portfolios G-J) and a sensitivity where capacity revenue benefits for new resources was excluded (Portfolio K).

Table 16 summarizes the portfolio variations for each scenario other than the Amos/Mountaineer retirement Portfolios G-J, which are presented in Section 11.

Table 16: Portfolio Assumptions Matrix

Case	Portfolio Description - Fundamental Case	Natural Gas Resource Options
A	Base Fundamentals	No
B	Base Fundamentals	Yes
C	Base No Carbon Fundamentals	No
D	Base No Carbon Fundamentals	Yes
E	High Fundamentals	No
F1	Base - Low REC Price (-50%)	No
F2	Base - High REC Price (50%)	No
K	Base, Exclude New Resource Capacity Benefit	No

6.2. Portfolio Analysis and Economic Analysis Summary

6.2.1. Portfolio Analysis:

All portfolios were modeled where RGGI standards are in place with several portfolios transitioning to an assumption where a national carbon burden was introduced beginning in 2028.

Portfolios A&B are modeled under a scenario the national carbon burden is introduced. Portfolio A included an assumption where natural gas resources were not available to the model for selection where Portfolio B, natural gas resources were available for selection. The natural gas assumption in these two portfolios was influential to the optimal selection of resources.

In Portfolio A, without natural gas resources available for selection, the model selected only solar resources through 2040, with the additional storage resources added to meet the Company's requirements for storage additions. Without natural gas resources, the solar resources provide more capacity value than wind such that the model chose these leading up to the loss of capacity from the Amos and Mountaineer facilities. Through 2040, the model selected consistent amounts of owned and PPA solar.

In Portfolio B, when natural gas resources are available for selection, both wind and solar resources were selected as part of the optimal set of resources through 2040 with the natural gas resources providing an important capacity benefit to the portfolio.

New resource selections through 2042 in Portfolios A and B are shown in Figure 10 and Figure 11.

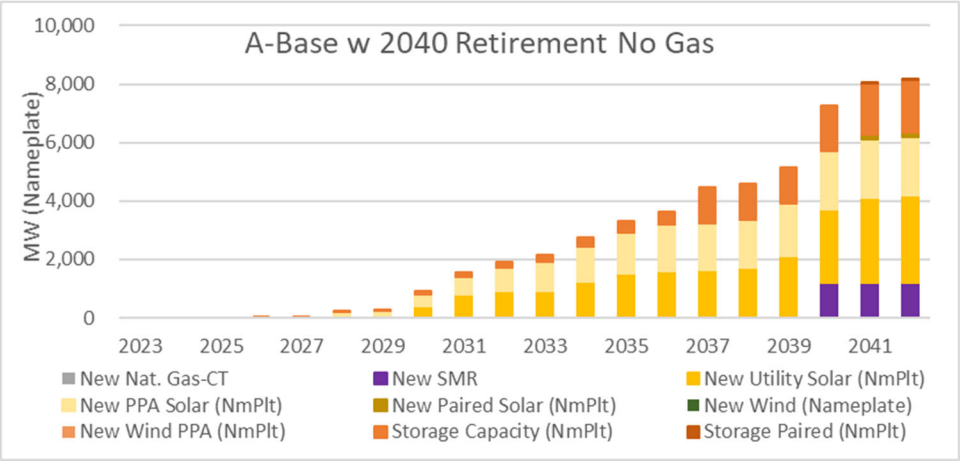


Figure 10. Portfolio A New Resources

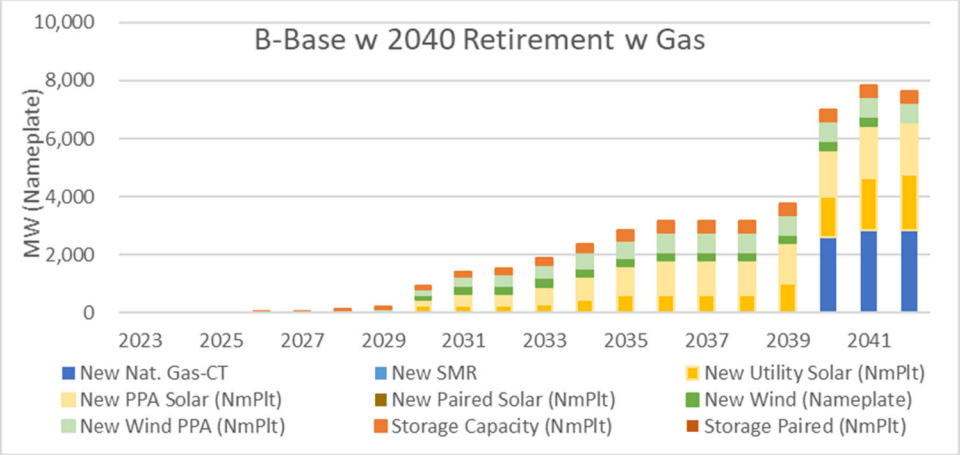


Figure 11. Portfolio B New Resources

Portfolios C and D were modeled under a scenario where only RGGI standards are in place and no national carbon burden was not assumed. In these portfolios, a similar dynamics of resource selections were seen as discussed for Portfolios A and B. Without natural gas resources available, only solar resources were selected while wind and solar resources were selected when natural gas resources were made available. New resource selections through 2042 in Portfolios C and D are shown in Figure 12 and Figure 13.

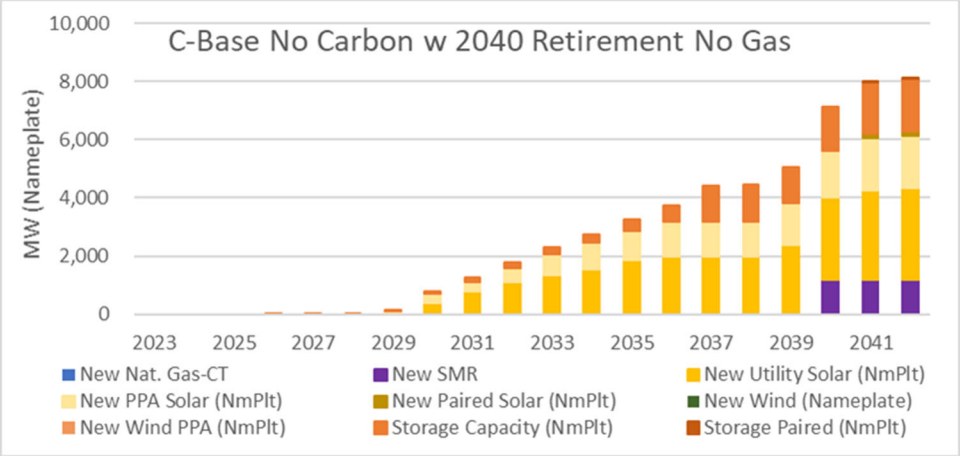


Figure 12. Portfolio C New Resources

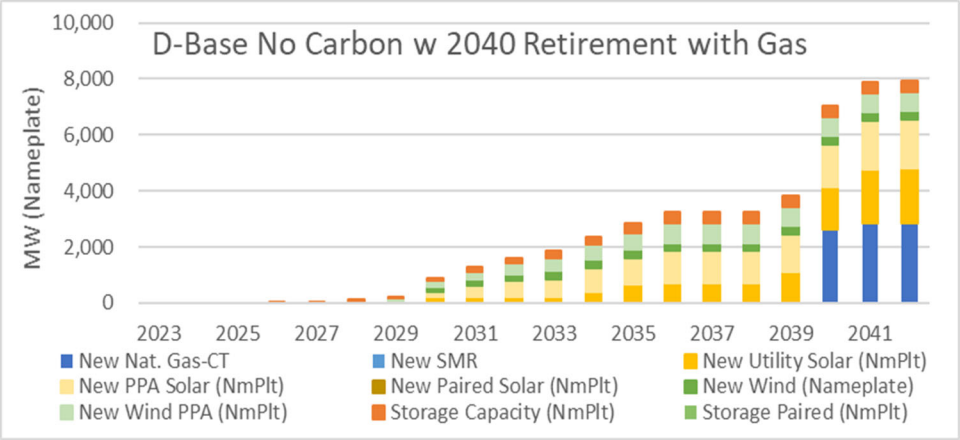


Figure 13. Portfolio D New Resources

As directed by the Commission, the Company also modeled Portfolio K, where the capacity revenue benefit was excluded for new resources. Portfolio K is the same as Portfolio A with respect to all other inputs and assumptions. Unlike Portfolio A, in this portfolio without the capacity revenue benefit, the model selected wind resources and selected less solar resources. New resource selections through 2042 in Portfolio K are shown in Figure 14.

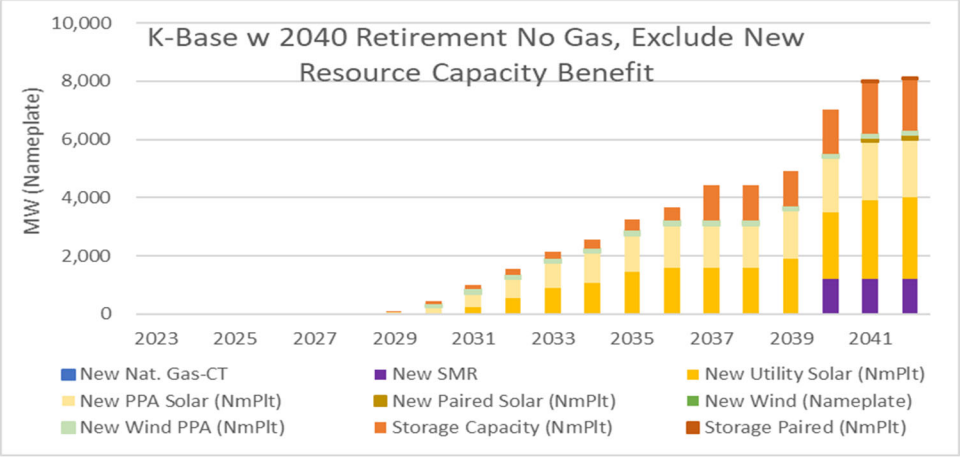


Figure 14. Portfolio K New Resources

Portfolio E was modeled under the same assumptions as Portfolio A except that it included the Company's high fundamentals dataset as a proxy for a scenario condition where higher energy prices might be realized. The high fundamentals data set also assumed RGGI standards are in place until a national carbon burden is introduced in 2028. The optimized resource selections resulted similarly to Portfolio A in that no wind resources were selected although fewer solar resources were selected. New resource selections through 2042 in Portfolio K are shown in Figure 15.

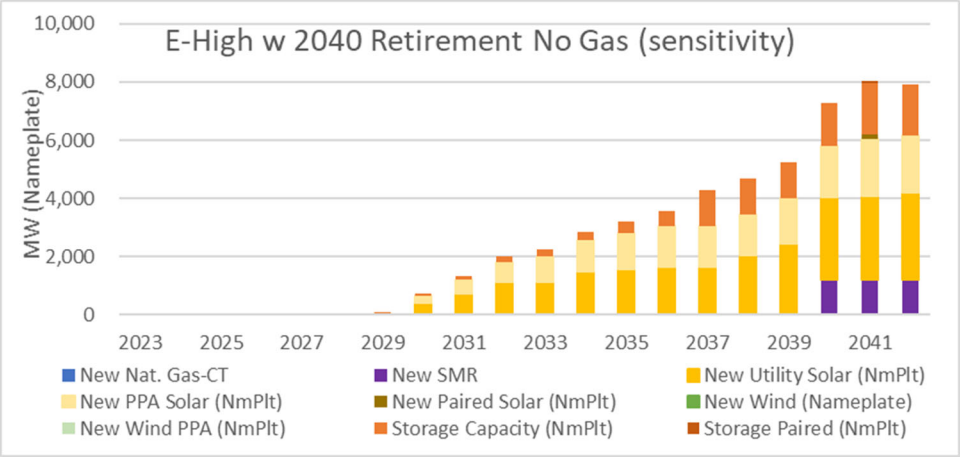


Figure 15. Portfolio E New Resources

Table 17 summarizes the net present value of the expected revenue requirement (NPVRR) for each compliant portfolios A-D and K computed for the incremental 10-year periods and over 30 years. Total costs of each portfolio reflect a combination of fixed and variable costs and associated capacity and energy revenues from the Plexos® model. In summary, the No Gas Portfolios have higher costs. When the excess capacity value of new resources is ignored as in Portfolio K, the portfolio cost increases by approximately 10%.

Table 17: NPV Of Portfolios A-E & K Lifetime Revenue Requirements ($M)

	Port A	Port B	Port C	Port D	Port E	Port K
	Portfolio A - Base, No Gas	Portfolio B - Base w/Gas	Portfolio C - Base No CO2, No Gas	Portfolio D - Base No CO2, w/ Gas	Portfolio E - High Fundamentals	Portfolio K - Base, No Gas, Excl Cap Ben
Utility NPV 2023-2032 ($M)	9,287	9,262	8,620	8,614	9,627	9,061
Utility NPV 2033-2042 ($M)	8,190	7,729	7,660	7,144	8,592	8,029
Utility NPV 2043-2052 ($M)	7,095	6,245	7,016	5,937	7,124	6,983
NPV of End Effects beyond 2052 ($M)	9,997	7,351	9,982	7,081	9,898	9,923
TOTAL Utility Cost, Net Present Value ($M)	34,569	30,586	33,279	28,777	35,241	33,996

6.2.2. REC Price Sensitivities

The Company performed both high and low REC sensitivities as required by the Commission in its final order in PUR-2020-00135. The sensitivities analysis reflected a 50% price variation above and below the base REC forecast. The sensitivity price curves were presented in Figure 9. Portfolio A assumptions were used with the exception of different REC price forecasts.

The REC price sensitivities showed minimal variances to Portfolio A. Specifically, the 30-year Net Present Value of Revenue Requirements for the lower REC sensitivity build plan was projected to be lower by 0.24% than Portfolio A while the High REC price sensitivity resulted in a 30-year Net Present Value of Revenue Requirements higher by only 0.04% than Portfolio A. Table 18 presents the NPV of Revenue Requirements for these portfolios.

The effects of the changing in REC prices on the capacity expansion resource selections was also minimal in the Portfolios compared to Portfolio A. Some near-term variations were recognized including fewer solar resources selected by 2031 in the Low Rec sensitivity and more solar resources selected by 2031 in the High REC sensitivity. However, by 2042, both Portfolios F1 and F2 included nearly the same

type and amount of new resources. New resource selections in Portfolios F1 and F2 through 2042 are shown in Figure 16 and Figure 17.

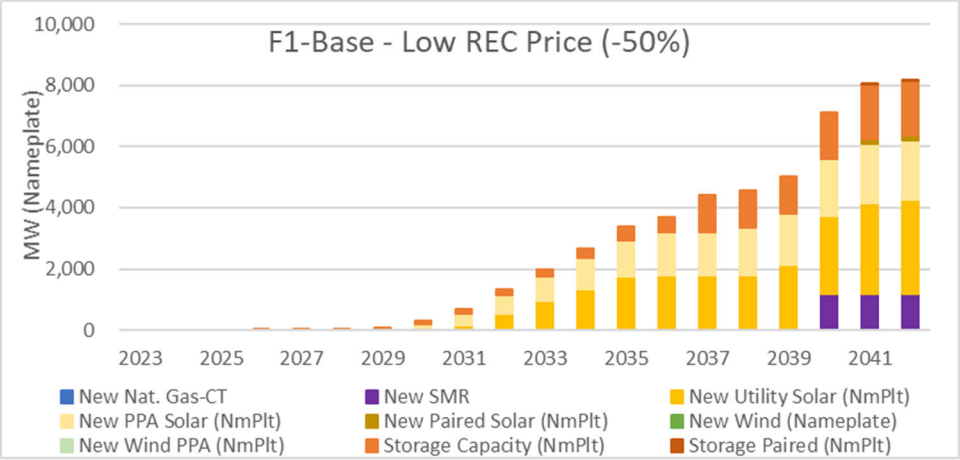


Figure 16. REC Sensitivity Portfolio F1 New Resources

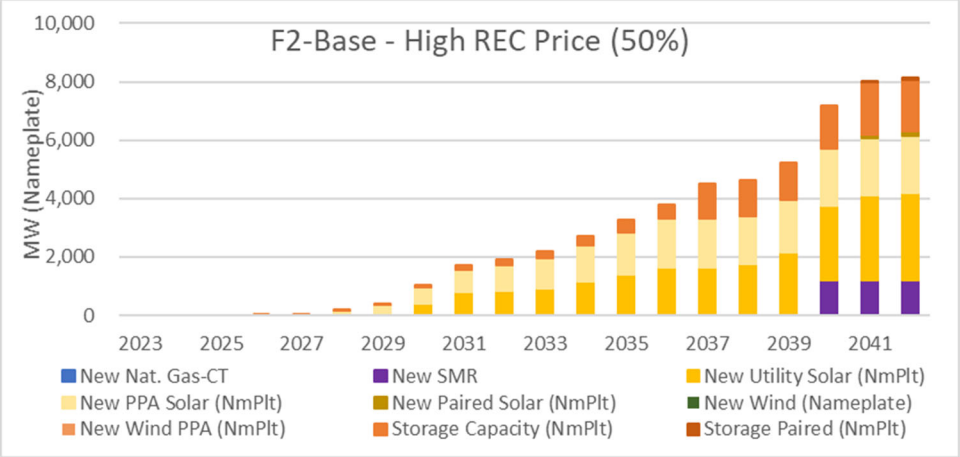


Figure 17. REC Sensitivity Portfolio F2 New Resources

Table 18. NPV Of Portfolios F1 and F2 Revenue Requirements ($M)

	Port A	Port F1	Port F2
	Portfolio A - Base, No Gas	Portfolio F1 - Low REC $	Portfolio F2 - High REC $
Utility NPV 2023-2032 ($M)	9,287	9,194	9,307
Utility NPV 2033-2042 ($M)	8,190	8,204	8,194
Utility NPV 2043-2052 ($M)	7,095	7,072	7,094
NPV of End Effects beyond 2052 ($M)	9,997	10,017	9,984
TOTAL Utility Cost, Net Present Value ($M)	34,569	34,487	34,579

When compared to the results for Portfolio A, these NPV results indicate that the price of REC's has a very limited impact on the cost of service. This is because very few RECs are optimally selected over the forecast period over physical resource options.

6.2.3. REC Banking Analysis

All portfolios were modeled such that any remaining REC balances held by the Company were available for use in future years up to the five-year limit that RECs could be held. In all portfolios, the Company began 2023 with a surplus amount of RECs relative to the minimum RPS requirement. The modeling applied these surplus RECs through 2028 and first purchased RECS in 2028-2031. The model optimally selected new renewable additions in 2031 and future years such that generally, the need for further REC purchases was minimal. The actual future mix of RECs and physical resources will be dependent on the results of future RFPs for both RECs and physical resources, and market prices and available for RECs. An illustration of the REC banking dynamics for Portfolio A, which is similar for all portfolios, is shown in Figure 18. A schedule of REC purchases in each portfolio is included in Appendix B.

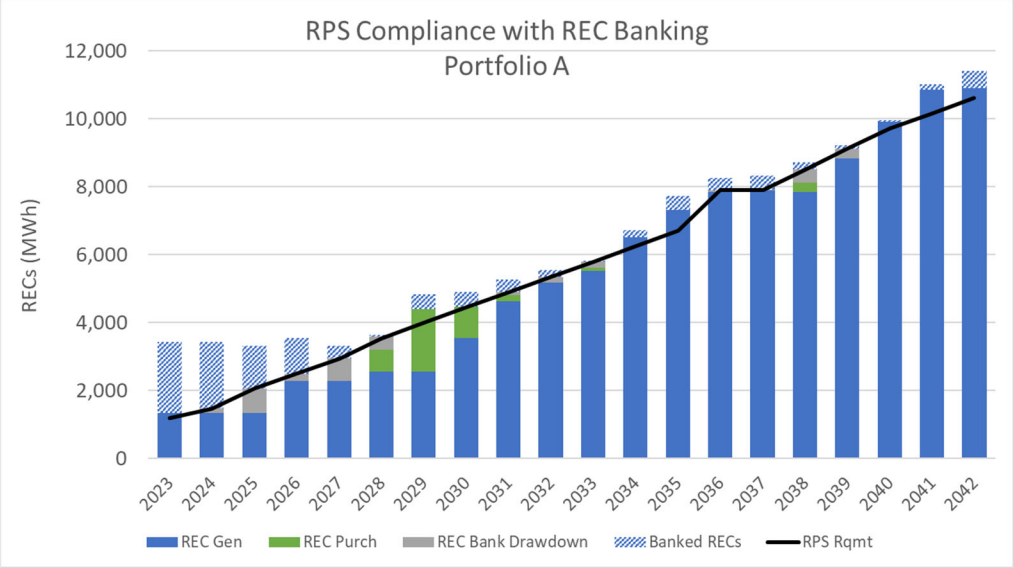


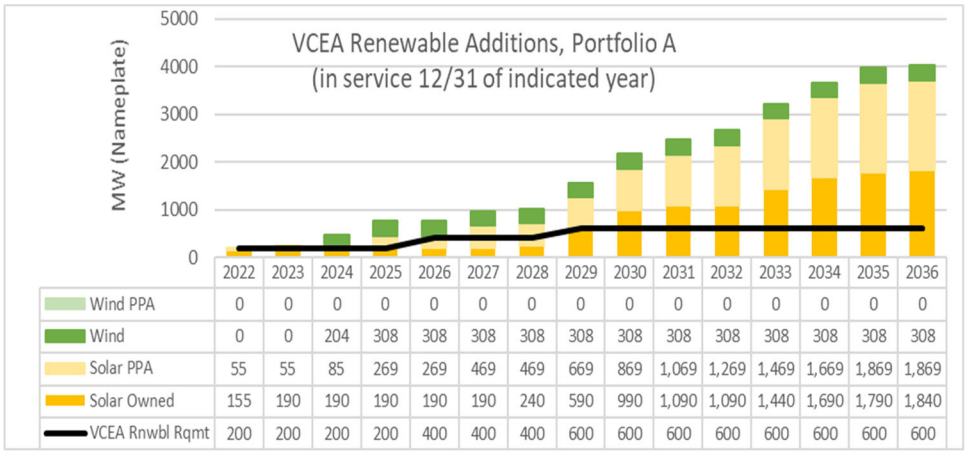
Figure 18. RPS Compliance with REC Banking

6.3. VCEA Compliance Resource Additions

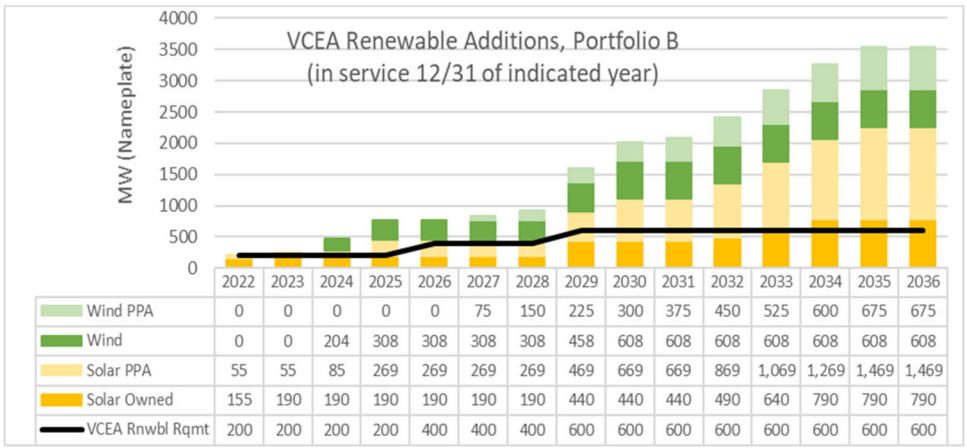
For this report, the Company modeled all portfolios to meet VCEA compliance. The timing and quantity of diverse resources was found to be primarily dependent on the availability of natural gas resources in the model. In portfolios where natural gas resources are an option, wind resources were found to be optimal. Without the reliance on natural gas resources, solar resources were selected over wind. For this report, the Company modeled all portfolios such that they would all be VCEA compliant. The timing and quantity of diverse resources was found to be dependent on the primarily dependent on the inclusion of natural gas resources in the model, where wind resources were found to be optimal. Without the reliance on natural gas resources, solar resources were selected. Figure **19** and

Figure 20 illustrate the timing of new renewable and storage resources included in the VCEA Compliant Plans A, B and E with additions of new renewable and intermittent resources continuing periodically through the planning period. Storage resources are added beginning in 2025 and include gradual increases until meeting the 400 MW VCEA minimum. For this analysis, solar resources are assumed to be located within Virginia while wind resources are assumed to be in the PJM region but likely outside of Virginia. Further details of the resource additions by resource type for all portfolios are presented in Appendix B.

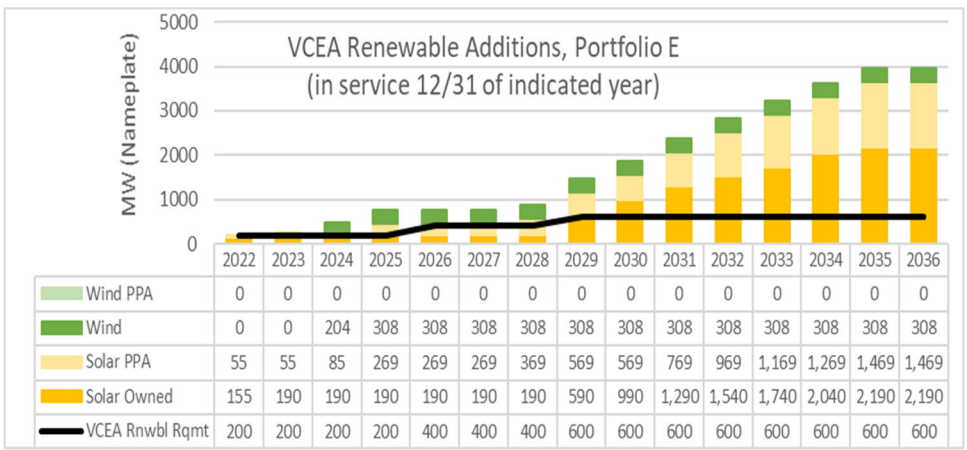
Figure 19**: VCEA Compliant Portfolios A, B, E Wind and Solar Additions**



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Wind PPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	204	308	308	308	308	308	308	308	308	308	308	308	308
Solar PPA	55	55	85	269	269	469	469	669	869	1,069	1,269	1,469	1,669	1,869	1,869
Solar Owned	155	190	190	190	190	190	240	590	990	1,090	1,090	1,440	1,690	1,790	1,840
VCEA Rnwbl Rqmt	200	200	200	200	400	400	400	600	600	600	600	600	600	600	600



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Wind PPA	0	0	0	0	0	75	150	225	300	375	450	525	600	675	675
Wind	0	0	204	308	308	308	308	458	608	608	608	608	608	608	608
Solar PPA	55	55	85	269	269	269	269	469	669	669	869	1,069	1,269	1,469	1,469
Solar Owned	155	190	190	190	190	190	190	440	440	440	490	640	790	790	790
VCEA Rnwbl Rqmt	200	200	200	200	400	400	400	600	600	600	600	600	600	600	600



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
Wind PPA	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind	0	0	204	308	308	308	308	308	308	308	308	308	308	308	308
Solar PPA	55	55	85	269	269	269	369	569	569	769	969	1,169	1,269	1,469	1,469
Solar Owned	155	190	190	190	190	190	190	590	990	1,290	1,540	1,740	2,040	2,190	2,190
VCEA Rnwbl Rqmt	200	200	200	200	400	400	400	600	600	600	600	600	600	600	600

Figure 20 VCEA Compliant Portfolios A, B, E Storage Additions

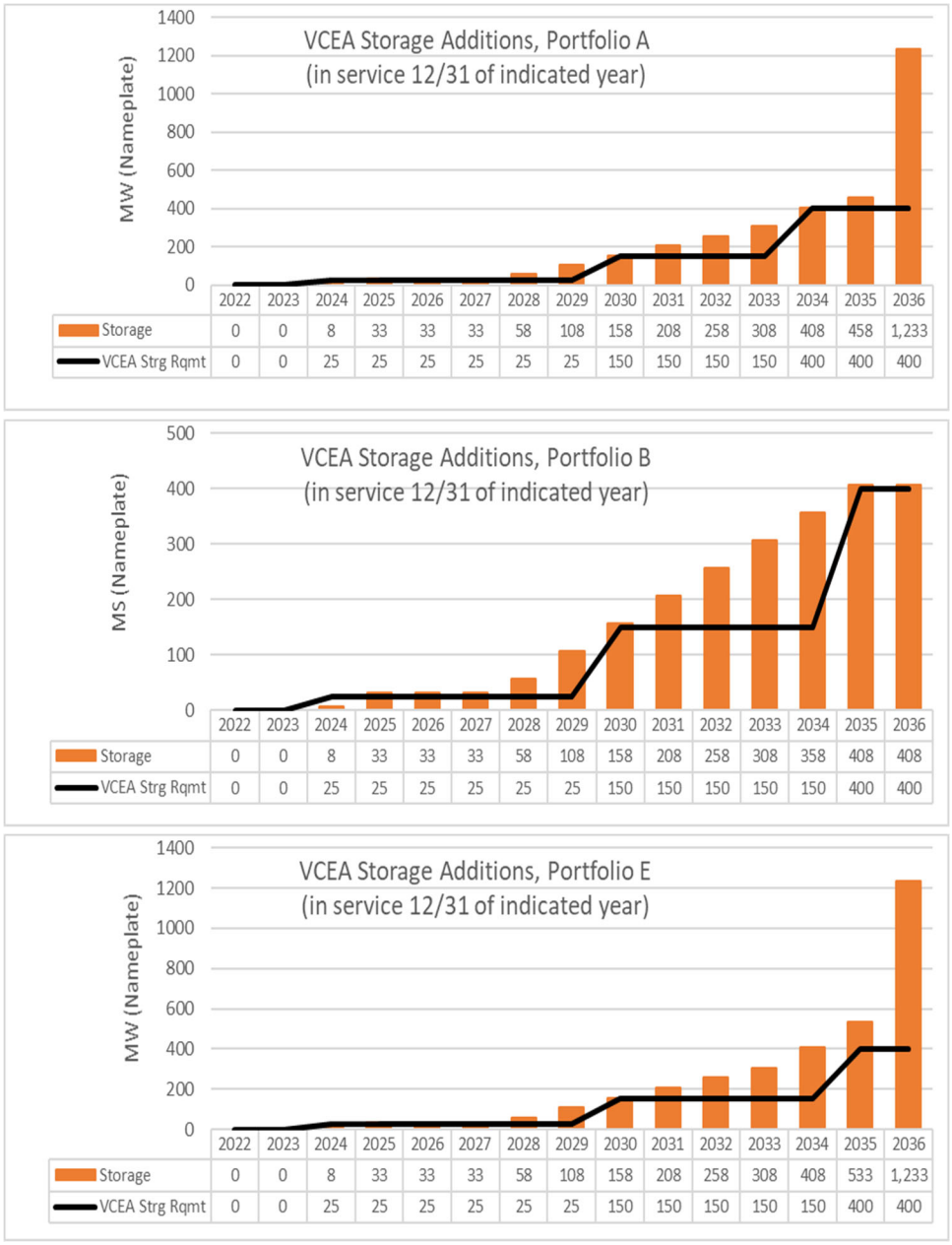


Table 19 lists the cumulative Energy Efficiency additions in the VCEA plan through 2026 to meet the VCEA requirements. These resources were included within the development of the Company's load forecast as discussed in Section 4.4 and therefore, are included in all Portfolios.

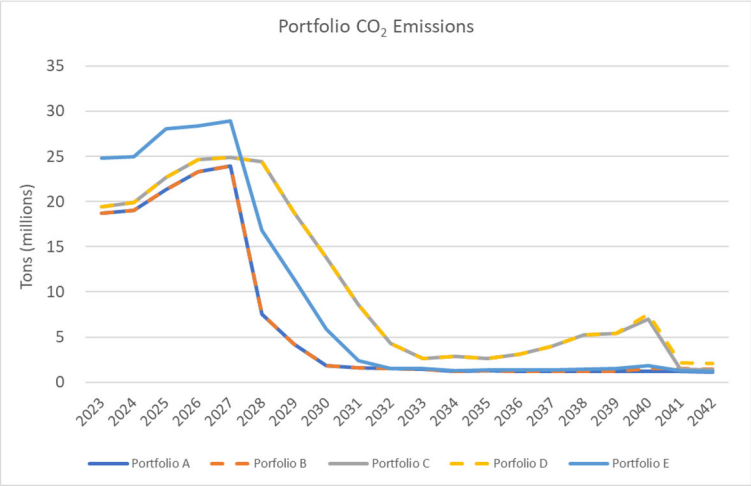
Table 19. VCEA Plan Energy Efficiency Additions

	Target %	Target EE (GWh)	Cum. Approved VA DSM Programs (GWh)	Surplus/ (Deficit) (GWh)
2022	0.5%	75	83	8
2023	1.0%	150	165	15

2024	1.5%	225	247	22
2025	2.0%	300	330	30
2026	*2.0%*	300	412	112

6.4. Carbon Dioxide Reduction Projection

The Company's modeled portfolios A-E reflect a forecasted reduction of CO_2 emissions. Figure 21 illustrates the 2023-2037 reduction of CO_2 associated with the modeled portfolios. All portfolios show a significant reduction in carbon emissions while also providing a diverse mix of resources to meet the Company's obligations. Portfolios C and D reflect a RGGI-only carbon view, and Portfolios A, B and E reflect a RGGI plus $15/ton national carbon burden and show a quicker reduction of CO_2.

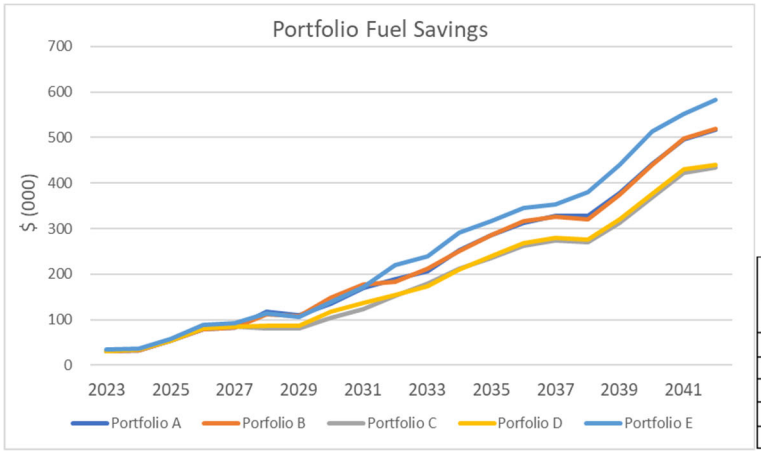


Case	Portfolio Description - Fundamental Case	Natural Gas Resource Options
A	Base Fundamentals	No
B	Base Fundamentals	Yes
C	Base No Carbon Fundamentals	No
D	Base No Carbon Fundamentals	Yes
E	High Fundamentals	No

Figure 21. Carbon Dioxide Emissions – Total Company

6.5. Portfolio Fuel Savings

Each portfolio includes a mix of renewable resources along with dispatchable resources. With the diverse set of resources, the portfolios afford customers savings in future anticipated fuel costs. As shown in Figure 22, each portfolio recognizes continued fuel savings as a result of energy being supplied from renewable resources.



Case	Portfolio Description - Fundamental Case	Natural Gas Resource Options
A	Base Fundamentals	No
B	Base Fundamentals	Yes
C	Base No Carbon Fundamentals	No
D	Base No Carbon Fundamentals	Yes
E	High Fundamentals	No

Figure 22. Estimated Portfolio Fuel Savings

7. Rate Impacts

The Company prepared estimated rate impacts associated with the implementation of the VCEA under Portfolio B. In order to estimate rate impacts, the Company assumed a consistent class allocation for the period 2023-2037, based on a 2022 test year. The class allocation methodology splits costs 85-15% between a 6-cp and an energy allocation methodology. The actual cost allocation methodology could vary from the Company's assumption in this proceeding.

7.1. VCEA Lifetime Revenue Requirement - Gross

The lifetime gross revenue requirement includes the costs of the renewables and storage, including financing costs. Table 20 shows the gross revenue requirement by year and by component for new resources in Portfolio B. The table also displays the associated energy offset value to these gross costs to identify an estimated net annual revenue requirement for the new resources.

Table **20** Jurisdictional Gross Revenue Requirement

Long-Term Revenue Requirement VA Retail Basis - With Energy Offsets (in 000s)												
	Specific Resources Under Development			Generic Resources								
	Wind	Solar	Outside the Model Additions	Wind	Solar	Storage	EE / DR/ VVO	REC Purchases	Gross Costs	Energy Offset	REC Bank Drawdown	Total Net RR $000
2023	22,260	-	2,134	-	-	-	-	-	24,394	(9,116)	-	15,278
2024	22,784	-	2,062	-	-	-	-	-	24,845	(9,464)	(1,292)	14,089
2025	23,285	-	2,052	-	-	-	-	-	25,337	(10,008)	(6,757)	8,572
2026	57,610	13,181	2,020	-	-	4,816	-	-	77,628	(31,368)	(2,035)	44,225
2027	53,686	13,345	1,990	-	-	4,803	5,079	-	78,904	(32,796)	(6,227)	39,881
2028	47,140	13,543	1,980	13,756	-	5,002	5,107	15,719	102,246	(47,744)	(3,622)	50,880
2029	37,416	13,681	1,974	27,248	-	9,610	5,577	30,106	125,612	(51,388)	-	74,224
2030	33,302	13,853	1,956	69,779	72,351	18,685	3,119	9,372	222,417	(103,217)	(239)	118,960
2031	31,783	14,028	1,923	113,354	103,155	27,408	2,491	1,879	296,021	(138,583)	-	157,438
2032	31,810	14,237	1,907	127,199	103,155	35,823	135	-	314,267	(145,930)	(5,331)	163,006
2033	30,569	14,386	2,095	141,384	144,568	44,568	128	-	377,699	(173,605)	(2,205)	201,889
2034	29,779	14,569	2,078	155,968	205,828	53,404	-	-	461,625	(211,694)	-	249,931
2035	28,677	14,755	2,060	172,169	272,765	61,056	-	-	551,482	(246,002)	-	305,479
2036	43,540	14,977	2,043	190,056	312,276	70,778	-	-	633,671	(275,216)	(424)	358,031
2037	43,122	15,136	953	190,056	312,276	70,893	-	-	632,435	(284,216)	-	348,219
2038	32,813	15,330	939	190,056	312,276	71,205	-	7,991	630,610	(285,200)	-	345,409
2039	32,257	15,528	928	190,056	467,777	73,026	1,347	-	780,919	(338,827)	(4,857)	437,235
2040	31,821	15,765	916	190,056	628,063	76,906	2,745	-	946,271	(402,547)	-	543,724
2041	31,197	15,934	827	190,056	793,615	80,802	4,171	-	1,116,602	(460,391)	-	656,211
2042	30,727	16,141	410	190,056	823,251	84,942	4,941	-	1,150,467	(480,895)	-	669,572
2043	30,197	16,352	400	190,056	823,251	89,846	6,450	-	1,156,550	(491,674)	-	664,876
2044	29,730	16,603	391	190,056	901,633	94,977	8,023	-	1,241,413	(525,681)	-	715,732
2045	29,382	16,783	382	190,056	1,030,528	99,899	9,597	-	1,376,627	(585,577)	-	791,050
2046	32,098	1,472	373	190,056	1,163,040	106,860	9,740	-	1,503,638	(637,837)	-	865,801
2047	31,392	1,464	365	279,861	1,359,941	106,898	9,883	-	1,789,804	(757,525)	-	1,032,279
2048	30,838	1,461	355	279,861	1,395,017	107,132	8,504	-	1,823,168	(802,269)	-	1,020,898
2049	30,167	1,450	346	312,611	1,395,017	109,102	9,384	-	1,858,077	(841,881)	-	1,016,196
2050	29,594	1,442	337	346,313	1,432,226	112,885	7,928	-	1,930,726	(879,608)	-	1,051,118
2051	28,844	1,435	329	380,970	1,432,226	116,039	6,428	-	1,966,271	(911,625)	-	1,054,646
2052	28,230	1,432	321	416,617	1,451,946	119,838	5,718	-	2,024,101	(967,207)	-	1,056,894
Long-Term Revenue Requirement	$ 996,051	$ 308,282	$ 36,846	$4,927,702	$ 16,936,180	$1,857,204	$ 116,495	$ 65,066	$ 25,243,827	$ (11,139,091)		**$ 14,071,746**

7.2. Rate Impacts

The Company prepared the rate impacts of the VCEA relative to current rates. For illustrative purposes, the Company used the total net annual revenue requirement for the new resources shown in Table 20 to calculate an estimated impact on a residential customer using 1,000 kWh, and SGS customer using 5,000 kWh, and a 1 MW customer with an 80% load factor as shown in Table 21.

Table 21 Monthly Rate Impacts

Estimated Monthly Bill Impacts - Selected Rate Schedules																
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Residential Net Bill Impact	$ 158.61	$ 160.34	$ 160.21	$ 159.58	$ 163.63	$ 163.14	$ 164.39	$ 167.04	$ 172.12	$ 176.48	$ 177.12	$ 181.53	$ 186.99	$ 193.29	$ 199.26	$ 198.14
% increase (cumulative)		1.1%	1.0%	0.6%	3.2%	2.9%	3.6%	5.3%	8.5%	11.3%	11.7%	14.5%	17.9%	21.9%	25.6%	24.9%
SGS Net Bill Impact	$ 691.04	$ 698.34	$ 697.77	$ 695.14	$ 712.17	$ 710.10	$ 715.35	$ 726.51	$ 747.89	$ 766.28	$ 768.94	$ 787.52	$ 810.48	$ 837.02	$ 862.13	$ 857.44
% increase (cumulative)		1.1%	1.0%	0.6%	3.1%	2.8%	3.5%	5.1%	8.2%	10.9%	11.3%	14.0%	17.3%	21.1%	24.8%	24.1%
LPS Net Bill Impact	$ 31,671	$ 32,378	$ 32,323	$ 32,068	$ 33,715	$ 33,514	$ 34,023	$ 35,102	$ 37,169	$ 38,947	$ 39,204	$ 41,001	$ 43,221	$ 45,789	$ 48,217	$ 47,764
% increase (cumulative)		2.2%	2.1%	1.3%	6.5%	5.8%	7.4%	10.8%	17.4%	23.0%	23.8%	29.5%	36.5%	44.6%	52.2%	50.8%
Total Net Annual Increases		1.4%	-0.1%	-0.5%	3.2%	-0.4%	1.0%	2.1%	4.0%	3.5%	0.5%	3.5%	4.3%	5.0%	4.7%	-0.9%

8. RFP Process

The Company, by itself and through its support from AEPSC, has extensive RFP experience for the procurement of the resources required under the VCEA. AEPSC has previously performed RFPs on behalf of APCo and has also performed RFPs for AEP's other vertically-integrated utilities including KPCo, I&M, SWEPCO, and PSO that have resulted in the procurement, or currently planned procurement, of thousands of megawatts of renewable resources. The Company has extensive experience analyzing renewable resource opportunities for both utility-owned and contracted renewables.

As reflected in Section §56.585.5, the Company is required to issue annual RFPs in order to meet the resource acquisition and RPS standards. The Company expects to procure materially all resources through this process, whether through acquisition or contracts for energy, capacity, and environmental attributes (including RECs). The RFP process will be open to interested and qualified parties including, potentially, its own affiliates. Depending on the RFP requirements, the Company may also submit a "self-build" proposal.

Annual RFPs will allow for the procurement of both utility and non-utility owned resources. The Company shall continue to monitor its renewable resource procurements to meet the 35% PPA – 65% ownership requirement included in Sub-sections §56.585.5. D and §56.585.5. E although meeting this with precision each year might not be attainable, as the most economic project sizes may not fit this metric in any given year. Nevertheless, it is the Company's intention to continue to adjust the RFP to target resources that will meet this requirement in aggregate and over the duration of the planning period.

If the Company's competitive affiliates have the opportunity to participate in the RFP process, the Company will ensure that proper controls are in place to guarantee all bids are considered on an even basis. The Company and AEPSC have experience with evaluating bids from affiliates, and can ensure that all necessary protections to maintain an equitable and reasonable review process occur considering all bids on an equal basis.

Finally, the Company expects to issue its annual RFPs in the first or second quarter of each year.

9. VCEA Plan

To develop and inform the Company's short-term plan, the Company ran multiple resource optimizations under different pricing scenarios and with different resource options available. All portfolios modeled for this RPS analysis were least cost and, VCEA compliant, and demonstrated an optimal selection of diverse resources over the planning horizon. As illustrated in Figure 21 and Figure 22, the Company's reserve margin continues to grow consistent with the growth in the required RPS energy requirements through 2040. The new renewable resources, however, serve to mitigate some of the expected capacity needs in 2040 with the modeled retirement of the Amos and Mountaineer units. Market REC purchases constitute a significant share of compliance strategy for the years prior to 2025. The use of Virginia compliant RECs in those years enables the Company to bank RECs generated from its own resources for use in 2025 and 2026 as its first wave of acquired and contracted resources begin to go into service.

In all portfolios, solar resources are selected consistently. Wind resources tend to be added in greater amounts if natural gas resources are included as options. The Company's decisions on the mix of wind and solar resources in the near term will depend on several factors including in part, responses to competitive RFPs, the need for capacity and/or the ability to monetize excess capacity, and the evolution of PJM resource adequacy requirements.

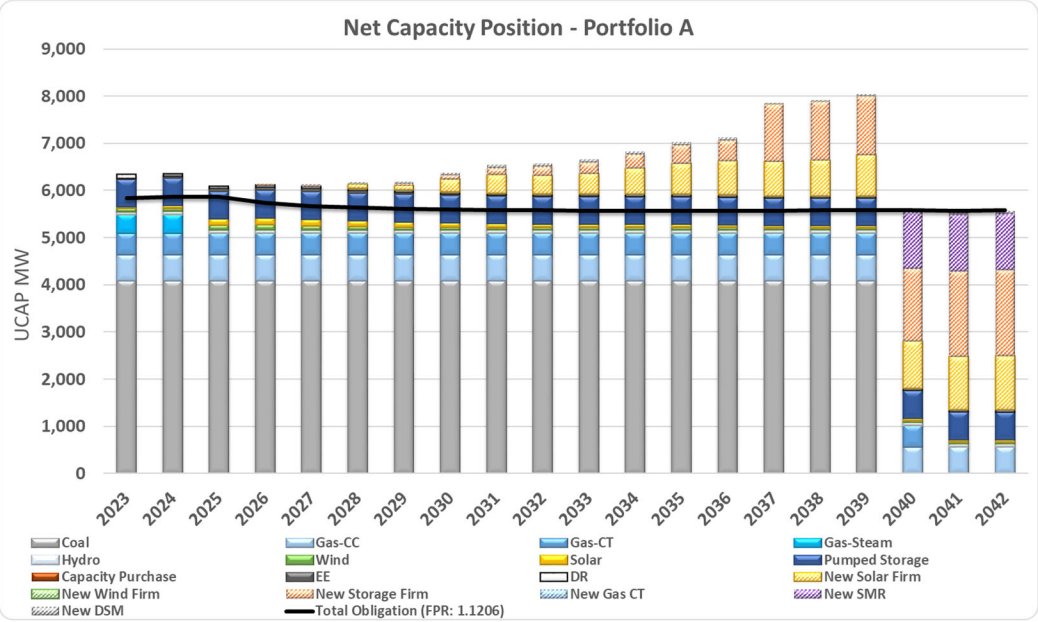


Figure 23. APCo Capacity Position, Portfolio A

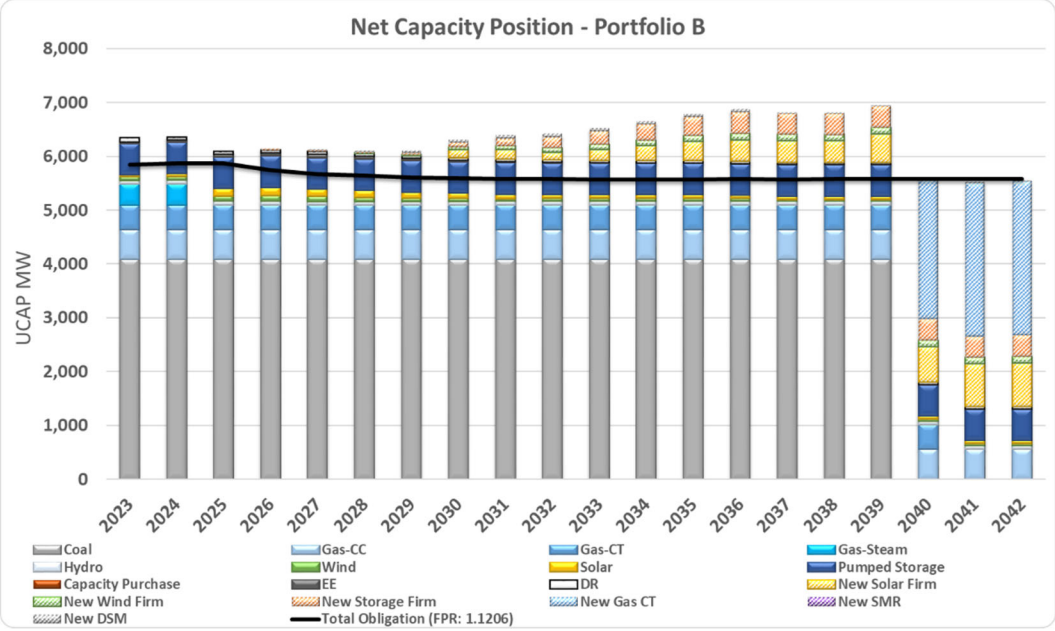


Figure 24. APCo Capacity Position, Portfolio B

Action Plan:

1. Seek approval of current portfolio of onshore wind and solar and energy storage resources.
2. Issue RFPs in early 2023 for onshore wind, solar, and energy storage resources.
3. Pursue lowest cost compliance options consistent with the allocation percentages for construction or purchase described in Subsection D of §56.585.5.
4. Make market REC purchases when advantageous.

10.Amos and Mountaineer Retirement Sensitivities

Pursuant to the Commission's order from the previous VCEA docket, the Company modeled portfolio sensitivities G, H, I and J to evaluate the customer impacts of potential retirement of the Amos and Mountaineer units on an economic basis. See Table 22 for a description of these Portfolios. The Fundamental forecasts and gas availability options in Portfolios G-J correspond to Portfolios A-D (G aligns with A, H aligns with B, etc.), with the only change being the treatment of four Amos and Mountaineer units.

Table 22: Retirement Portfolios

Case	Amos / Mountaineer Retirement Portfolio Description - Fundamental Case	Natural Gas Resource Options
G	Base Fundamentals	No
H	Base Fundamentals	Yes
I	Base No Carbon Fundamentals	No
J	Base No Carbon Fundamentals	Yes

In this analysis, all four units at these plants were removed from the APCo portfolio beginning in 2028. The PLEXOS model was then given the option to either select each unit every year from 2029 through 2040 as a part of a least-cost long-term resource plan or retire the unit if a less expensive replacement plan could be identified within the model. As with the base portfolios described earlier in this report, the model was required to comply with the Company's two primary RTO/regulatory requirements. The first constraint was to maintain the targeted PJM capacity reserve margin every year, and the second was to comply with the VCEA's renewable energy requirements every year.

In order to simulate customer cost of service from each year through 2040, all fuel cost, variable O&M, fixed O&M and future capital expense was considered to be a cost of selecting these units as a resource. The model also considered the remaining unrecovered net book value of each unit to be a cost of retirement in each year.

The result of the analysis was that the model did not economically select any of the units to retire earlier than 2040. This indicates that operating them through 2040 is the most economic option for customers. Resource selections were very similar to those selected in Portfolios A-D with minor variances in specific amounts and timing. New resource selections in Portfolios G-J through 2037 are shown in Figure 25 through Figure 28.

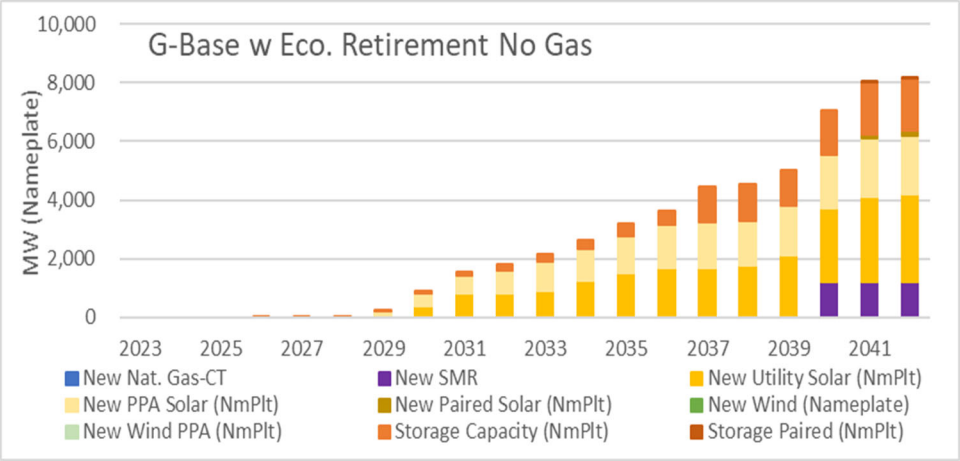


Figure 25. Portfolio G New Resources

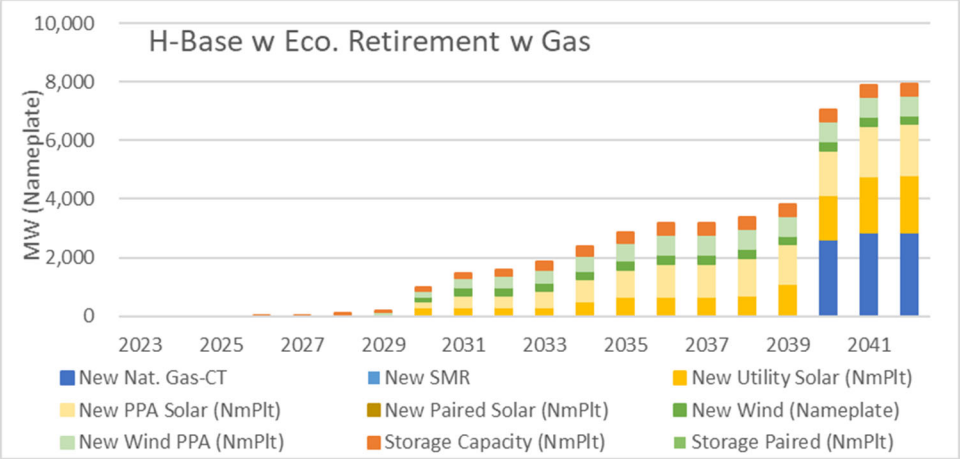


Figure 26. Portfolio H New Resources

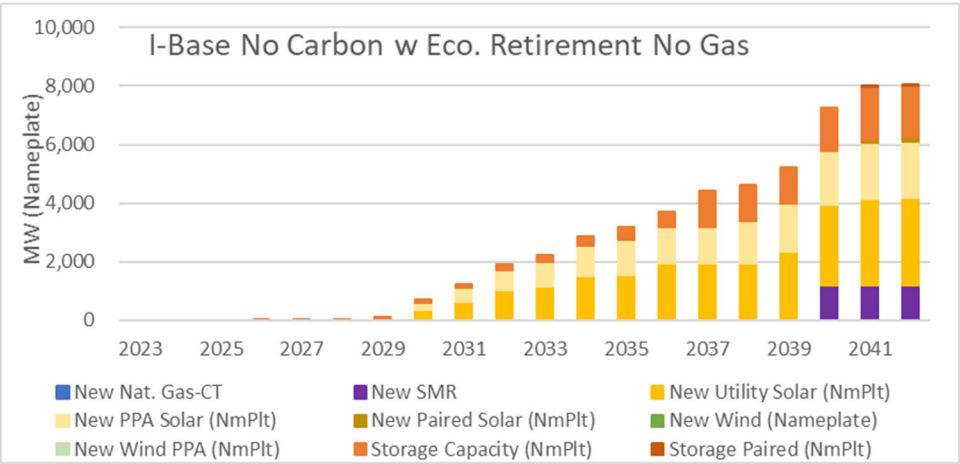


Figure 27. Portfolio I New Resources

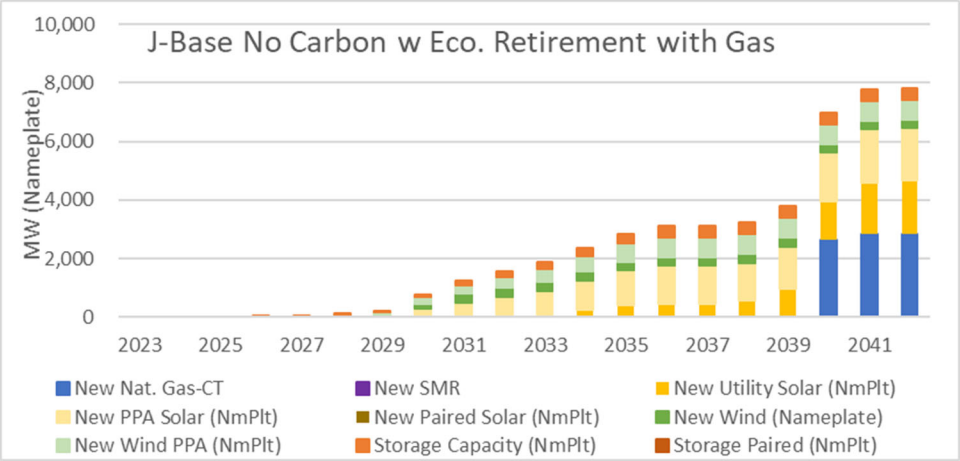


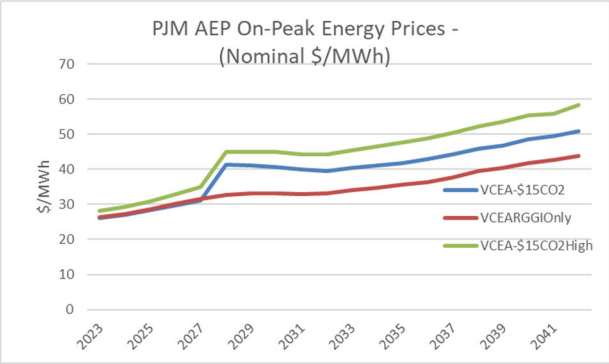
Figure 28. Portfolio J New Resources

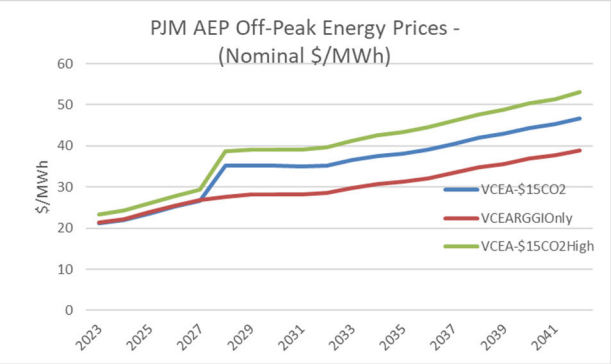
Table 23. NPV Of Portfolios G-J Revenue Requirements ($M)

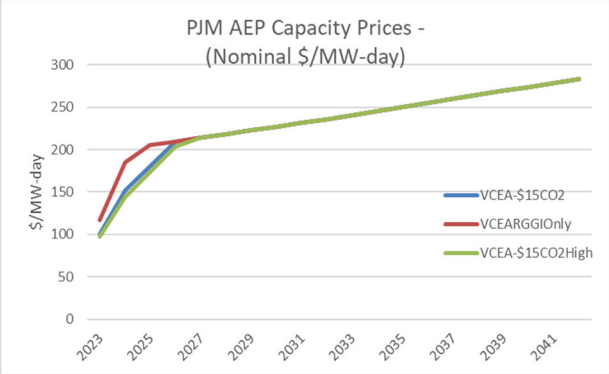
	Port G	Port H	Port I	Port J
	Portfolio G - Base No Gas, Eco Retire	Portfolio H - Base w/Gas, Eco Retire	Portfolio I - Base No CO2, No Gas, Eco Retire	Portfolio J - Base No CO2, w/ Gas, Eco Retire
Utility NPV 2023-2032 ($M)	9,041	9,032	8,294	8,283
Utility NPV 2033-2042 ($M)	8,037	7,595	7,509	6,967
Utility NPV 2043-2052 ($M)	7,065	6,188	6,970	5,913
NPV of End Effects beyond 2052 ($M)	9,987	7,303	9,948	7,049
TOTAL Utility Cost, Net Present Value ($M)	34,130	30,118	32,721	28,212

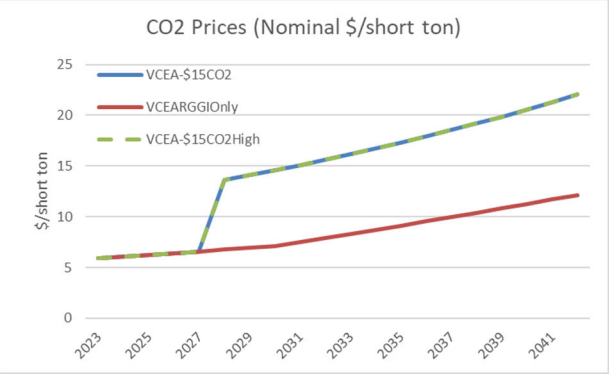
APPENDIX

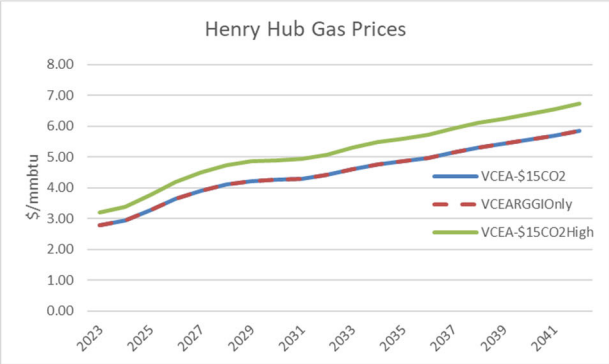
Appendix A: Fundamentals

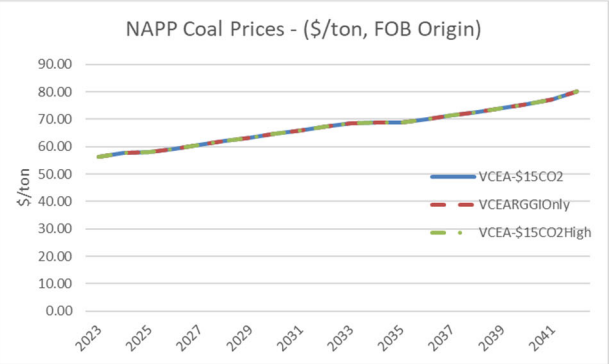












Appendix B: Scenario Resource Plan Details

Table 24 Portfolio A Nameplate and Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
A-Base w 2040 Retirement No Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	50	400	800	900	900	1,250	1,500	1,600	1,650	1,700	2,100	2,500	2,900	3,000
	New Utility Solar (Firm)	0	0	0	0	0	0	19	128	216	198	198	275	330	352	363	374	462	550	638	660
	New PPA Solar (NmPlt)	0	0	0	0	0	200	200	400	600	800	1,000	1,200	1,400	1,600	1,600	1,650	1,800	2,000	2,000	2,000
	New PPA Solar (Firm)	0	0	0	0	0	80	74	128	162	176	220	264	308	352	352	363	396	440	440	440
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	400	450	1,225	1,250	1,250	1,550	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	400	450	1,225	1,250	1,250	1,550	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	22	34	46	60	58	55	52	51	49	8	7	10	13	17	14
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	19	24	29	34	34
	Total Additions (Firm & Degraded)	0	0	0	19	29	121	167	391	585	632	723	891	1,094	1,213	1,963	2,014	2,142	3,782	4,185	4,205
	Capacity Reserves (MW) without new additions	240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	240	218	5	298	336	410	453	660	838	874	966	1,133	1,335	1,439	2,179	2,227	2,354	83	36	43

Table 25 Portfolio B Nameplate and Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
B-Base w 2040 Retirement w Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,618	2,856	2,856
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	250	250	250	300	450	600	600	600	600	1,000	1,400	1,800	1,900
	New Utility Solar (Firm)	0	0	0	0	0	0	0	80	68	55	66	99	132	132	132	132	220	308	396	418
	New PPA Solar (NmPlt)	0	0	0	0	0	0	0	200	400	400	600	800	1,000	1,200	1,200	1,200	1,400	1,600	1,800	1,800
	New PPA Solar (Firm)	0	0	0	0	0	0	0	64	108	88	132	176	220	264	264	264	308	352	396	396
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Nameplate)	0	0	0	0	0	0	0	150	300	300	300	300	300	300	300	300	300	300	300	300
	New Wind (Firm)	0	0	0	0	0	0	0	17	30	33	33	33	33	33	33	33	33	33	33	33
	New Wind PPA (NmPlt)	0	0	0	0	0	75	150	225	300	375	450	525	600	675	675	675	675	675	675	675
	New Wind PPA (Firm)	0	0	0	0	0	9	17	25	30	41	50	58	66	74	74	74	74	74	74	74
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	350	400	400	400	400	400	400	400
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	350	400	400	400	400	400	400	400
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New EE	0	0	0	0	11	22	34	46	60	58	55	51	50	48	4	2	1	1	0	0
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	17
	Total Additions (Firm & Degraded)	0	0	0	19	29	50	91	320	443	475	585	717	851	951	907	906	1,041	3,795	4,170	4,194
	Capacity Reserves (MW) without new additions	240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	240	218	5	298	336	339	377	589	696	717	828	959	1,092	1,178	1,123	1,119	1,253	96	20	32

Table 26 Portfolio C Nameplate and Firm (UCAP) Resource Additions And Capacity Position

Resource		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
C-Base No Carbon w 2040 Retirement No Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	400	800	1,100	1,350	1,550	1,850	2,000	2,000	2,000	2,400	2,800	3,050	3,150
	New Utility Solar (Firm)	0	0	0	0	0	0	0	128	216	242	297	341	407	440	440	440	528	616	671	693
	New PPA Solar (NmPlt)	0	0	0	0	0	0	100	300	300	500	700	900	1,000	1,200	1,200	1,200	1,400	1,600	1,800	1,800
	New PPA Solar (Firm)	0	0	0	0	0	0	37	96	81	110	154	198	220	264	264	264	308	352	396	396
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	400	525	1,225	1,250	1,250	1,525	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	400	525	1,225	1,250	1,250	1,525	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	22	31	41	55	53	52	49	49	47	7	10	13	20	27	25
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	19	24	29	34	34
Total Additions (Firm & Degraded)		0	0	0	19	29	41	108	354	499	605	753	888	1,080	1,286	1,950	1,983	2,123	3,742	4,184	4,205
Capacity Reserves (MW) without new additions		240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
Capacity Reserves (MW) with new additions		240	218	5	298	336	330	394	622	752	847	995	1,130	1,321	1,513	2,167	2,197	2,335	42	34	43

Table 27 Portfolio D Nameplate and Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
D-Base No Carbon w 2040 Retirement with Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,618	2,856	2,856
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	200	200	200	200	400	650	700	700	700	1,100	1,500	1,900	1,950
	New Utility Solar (Firm)	0	0	0	0	0	0	0	64	54	44	44	88	143	154	154	154	242	330	418	429
	New PPA Solar (NmPlt)	0	0	0	0	0	0	0	200	400	600	650	850	950	1,150	1,150	1,150	1,350	1,550	1,750	1,750
	New PPA Solar (Firm)	0	0	0	0	0	0	0	64	108	132	143	187	209	253	253	253	297	341	385	385
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Nameplate)	0	0	0	0	0	0	0	150	225	225	300	300	300	300	300	300	300	300	300	300
	New Wind (Firm)	0	0	0	0	0	0	0	17	23	25	33	33	33	33	33	33	33	33	33	33
	New Wind PPA (NmPlt)	0	0	0	0	0	75	150	225	300	375	450	525	600	675	675	675	675	675	675	675
	New Wind PPA (Firm)	0	0	0	0	0	9	17	25	30	41	50	58	66	74	74	74	74	74	74	74
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	350	400	400	400	400	400	400	400
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	350	400	400	400	400	400	400	400
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New EE	0	0	0	0	11	22	31	41	55	53	51	48	48	46	2	1	1	0	0	0
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	12
Total Additions (Firm & Degraded)		0	0	0	19	29	50	87	299	417	495	571	714	849	960	916	916	1,047	3,799	4,174	4,189
Capacity Reserves (MW) without new additions		240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
Capacity Reserves (MW) with new additions		240	218	5	298	336	339	373	568	670	737	813	956	1,090	1,187	1,133	1,129	1,259	99	24	27

Table 28 Portfolio E Nameplate and Firm (UCAP) Resource Additions And Capacity Position

Resource		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
E-High w 2040 Retirement No Gas (sensitivity)	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	400	750	1,150	1,150	1,500	1,550	1,650	1,650	2,050	2,450	2,850	2,900	3,000
	New Utility Solar (Firm)	0	0	0	0	0	0	0	128	203	253	253	330	341	363	363	451	539	627	638	660
	New PPA Solar (NmPlt)	0	0	0	0	0	0	50	250	450	650	850	1,050	1,250	1,400	1,400	1,400	1,550	1,750	1,950	1,950
	New PPA Solar (Firm)	0	0	0	0	0	0	19	80	122	143	187	231	275	308	308	308	341	385	429	429
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	425	525	1,225	1,250	1,250	1,475	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	425	525	1,225	1,250	1,250	1,475	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	23	35	51	65	61	58	54	53	51	9	11	14	20	27	24
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	19	24	29	34	34
Total Additions (Firm & Degraded)		0	0	0	19	29	42	94	348	536	657	748	915	1,099	1,256	1,920	2,040	2,168	3,736	4,185	4,203
Capacity Reserves (MW) without new additions		240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
Capacity Reserves (MW) with new additions		240	218	5	298	336	331	380	617	789	899	991	1,158	1,340	1,483	2,136	2,253	2,380	36	35	41

Table 29 Portfolio F1 Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	0	150	550	950	1,350	1,750	1,800	1,800	1,800	2,150	2,550	2,950	3,050
	New Utility Solar (Firm)	0	0	0	0	0	0	0	0	41	121	209	297	385	396	396	396	473	561	649	671
	New PPA Solar (NmPlt)	0	0	0	0	0	0	50	200	400	600	800	1,000	1,200	1,400	1,400	1,550	1,650	1,850	1,950	1,950
	New PPA Solar (Firm)	0	0	0	0	0	0	19	64	108	132	176	220	264	308	308	341	363	407	429	429
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
F1-Base - Low REC Price	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(-50%)	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	425.0	475	1,225	1,225	1,225	1,525	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	425.0	475	1,225	1,225	1,225	1,525	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	22	34	46	61	58	55	52	51	49	7	7	6	10	14	12
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	19	24	29	34	34
	Total Additions (Firm & Degraded)	0	0	0	19	29	41	93	199	356	511	690	869	1,130	1,238	1,951	1,988	2,091	3,732	4,182	4,203
	Capacity Reserves (MW) without new additions	240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	240	218	5	298	336	330	379	468	609	753	933	1,111	1,371	1,464	2,167	2,202	2,303	32	32	41

Table 30. Portfolio F2 Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
F2-Base - High REC Price (50%)	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	400	800	850	900	1,150	1,400	1,650	1,650	1,750	2,150	2,550	2,900	3,000
	New Utility Solar (Firm)	0	0	0	0	0	0	0	128	216	187	198	253	308	363	363	385	473	561	638	660
	New PPA Solar (NmPlt)	0	0	0	0	0	150	350	550	750	850	1,050	1,250	1,450	1,650	1,650	1,650	1,800	1,950	1,950	1,950
	New PPA Solar (Firm)	0	0	0	0	0	60	130	176	203	187	231	275	319	363	363	363	396	429	429	429
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	425	500	1,225	1,225	1,275	1,500	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	425	500	1,225	1,225	1,275	1,500	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	22	34	46	60	58	55	52	51	49	8	11	15	21	28	26
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	5	10	14	19	24	29	34	34
	Total Additions (Firm & Degraded)	0	0	0	19	29	101	204	439	626	632	734	880	1,108	1,285	1,974	2,003	2,183	3,740	4,186	4,206
	Capacity Reserves (MW) without new additions	240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	240	218	5	298	336	390	490	708	879	874	977	1,122	1,349	1,511	2,190	2,217	2,395	41	36	44

Table 31. Portfolio G Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
G-Base w Eco. Retirement No Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	400	800	800	900	1,250	1,500	1,700	1,700	1,750	2,100	2,500	2,900	3,000
	New Utility Solar (Firm)	0	0	0	0	0	0	0	128	216	176	198	275	330	374	374	385	462	550	638	660
	New PPA Solar (NmPlt)	0	0	0	0	0	0	200	400	600	800	1,000	1,100	1,250	1,450	1,550	1,550	1,700	1,850	2,000	2,000
	New PPA Solar (Firm)	0	0	0	0	0	0	74	128	162	176	220	242	275	319	341	341	374	407	440	440
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	450	500	1,225	1,225	1,225	1,525	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	450	500	1,225	1,225	1,225	1,525	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	22	35	47	61	58	56	52	51	49	8	10	12	16	16	14
	New DR	0	0	0	0	0	0	0	0	0	0	0	2	7	12	17	22	26	31	34	34
	Total Additions (Firm & Degraded)	0	0	0	19	29	41	149	392	586	610	724	872	1,113	1,254	1,965	1,982	2,100	3,729	4,184	4,204
	Capacity Reserves (MW) without new additions	483	450	91	449	495	468	464	438	413	397	399	397	396	378	361	357	354	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	483	450	91	467	524	510	613	830	999	1,008	1,122	1,269	1,509	1,632	2,326	2,339	2,454	29	35	42

Table 32. Portfolio H Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
H-Base w Eco. Retirement w Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,618	2,856	2,856
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	300	300	300	300	500	650	650	650	700	1,100	1,500	1,900	1,950
	New Utility Solar (Firm)	0	0	0	0	0	0	0	96	81	66	66	110	143	143	143	154	242	330	418	429
	New PPA Solar (NmPlt)	0	0	0	0	0	0	0	200	400	400	550	750	950	1,150	1,150	1,300	1,350	1,550	1,750	1,750
	New PPA Solar (Firm)	0	0	0	0	0	0	0	64	108	88	121	165	209	253	253	286	297	341	385	385
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Nameplate)	0	0	0	0	0	0	0	150	300	300	300	300	300	300	300	300	300	300	300	300
	New Wind (Firm)	0	0	0	0	0	0	0	17	30	33	33	33	33	33	33	33	33	33	33	33
	New Wind PPA (NmPlt)	0	0	0	0	0	75	150	225	300	375	450	525	600	675	675	675	675	675	675	675
	New Wind PPA (Firm)	0	0	0	0	0	9	17	25	30	41	50	58	66	74	74	74	74	74	74	74
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	350	400	400	400	400	400	400	400
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	350	400	400	400	400	400	400	400
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New EE	0	0	0	0	11	22	34	46	60	58	55	51	50	48	3	2	1	1	0	0
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	12
	Total Additions (Firm & Degraded)	0	0	0	19	29	50	91	336	456	486	574	717	851	951	907	949	1,047	3,799	4,174	4,189
	Capacity Reserves (MW) without new additions	483	450	91	449	495	468	464	438	413	397	399	397	396	378	361	357	354	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	483	450	91	467	524	518	555	774	870	883	973	1,114	1,247	1,330	1,268	1,307	1,402	100	24	27

Table 33. Portfolio I Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
I-Base No Carbon w Eco. Retirement No Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	350	650	1,050	1,150	1,500	1,550	1,950	1,950	1,950	2,350	2,750	2,950	3,000
	New Utility Solar (Firm)	0	0	0	0	0	0	0	112	176	231	253	330	341	429	429	429	517	605	649	660
	New PPA Solar (NmPlt)	0	0	0	0	0	0	50	250	450	650	850	1,050	1,200	1,250	1,250	1,450	1,650	1,850	1,900	1,900
	New PPA Solar (Firm)	0	0	0	0	0	0	19	80	122	143	187	231	264	275	275	319	363	407	418	418
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	325	450	525	1,225	1,225	1,225	1,450	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	325	450	525	1,225	1,225	1,225	1,450	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	11	23	35	47	63	64	63	60	63	65	24	28	32	36	39	35
	New DR	0	0	0	0	0	0	0	0	0	0	0	2	7	12	17	22	26	31	34	34
	Total Additions (Firm & Degraded)	0	0	0	19	29	42	94	328	507	638	753	948	1,125	1,306	1,970	2,023	2,163	3,729	4,197	4,204
	Capacity Reserves (MW) without new additions	483	450	91	449	495	468	464	438	413	397	399	397	396	378	361	357	354	(3,700)	(4,150)	(4,162)
	Capacity Reserves (MW) with new additions	483	450	91	467	524	510	558	766	921	1,035	1,152	1,346	1,520	1,684	2,331	2,380	2,517	30	47	42

Table 34. Portfolio J Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
J-Base No Carbon w Eco. Retirement with Gas	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,618	2,856	2,856
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	100	100	100	100	250	400	450	450	550	950	1,350	1,750	1,800
	New Utility Solar (Firm)	0	0	0	0	0	0	0	32	27	22	22	55	88	99	99	121	209	297	385	396
	New PPA Solar (NmPlt)	0	0	0	0	0	0	0	200	400	600	800	1,000	1,200	1,300	1,300	1,300	1,450	1,650	1,800	1,800
	New PPA Solar (Firm)	0	0	0	0	0	0	0	64	108	132	176	220	264	286	286	286	319	363	396	396
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Nameplate)	0	0	0	0	0	0	0	150	300	300	300	300	300	300	300	300	300	300	300	300
	New Wind (Firm)	0	0	0	0	0	0	0	17	30	33	33	33	33	33	33	33	33	33	33	33
	New Wind PPA (NmPlt)	0	0	0	0	0	75	150	225	300	375	450	525	600	675	675	675	675	675	675	675
	New Wind PPA (Firm)	0	0	0	0	0	9	17	25	30	41	50	58	66	74	74	74	74	74	74	74
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	350	400	400	400	400	400	400	400
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	350	400	400	400	400	400	400	400
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New EE	0	0	0	0	11	22	31	41	55	53	51	48	48	46	2	1	1	0	0	0
	New DR	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	12	17	22	26	31
Total Additions (Firm & Degraded)		0	0	0	19	29	50	87	267	397	481	582	714	849	941	902	928	1,053	3,807	4,171	4,186
Capacity Reserves (MW) without new additions		483	450	91	449	495	468	464	438	413	397	399	397	396	378	361	357	354	(3,700)	(4,150)	(4,162)
Capacity Reserves (MW) with new additions		483	450	91	467	524	518	551	705	811	879	980	1,111	1,244	1,319	1,263	1,285	1,407	108	21	25

Table 35. Portfolio K Nameplate And Firm (UCAP) Resource Additions And Capacity Position

	Resource	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
K-Base w 2040 Retirement No Gas, Exclude New Resource Capacity Benefit	New Nat. Gas-CT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New SMR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,200	1,200	1,200
	New Utility Solar (NmPlt)	0	0	0	0	0	0	0	0	250	550	900	1,050	1,450	1,600	1,600	1,600	1,900	2,300	2,700	2,800
	New Utility Solar (Firm)	0	0	0	0	0	0	0	0	68	121	198	231	319	352	352	352	418	506	594	616
	New PPA Solar (NmPlt)	0	0	0	0	0	0	50	250	450	650	850	1,050	1,250	1,450	1,450	1,450	1,650	1,850	2,000	2,000
	New PPA Solar (Firm)	0	0	0	0	0	0	19	80	122	143	187	231	275	319	319	319	363	407	440	440
	New Paired Solar (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	150
	New Paired Solar (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33
	New Wind (Nameplate)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	New Wind PPA (NmPlt)	0	0	0	0	0	0	0	75	150	150	150	150	150	150	150	150	150	150	150	150
	New Wind PPA (Firm)	0	0	0	0	0	0	0	8	15	17	17	17	17	17	17	17	17	17	17	17
	Storage Capacity (NmPlt)	0	0	0	25	25	25	50	100	150	200	250	300	400	475	1,225	1,225	1,225	1,525	1,775	1,775
	Storage Capacity (Firm)	0	0	0	19	18	19	40	89	147	200	250	300	400	475	1,225	1,225	1,225	1,525	1,775	1,775
	Storage Paired (NmPlt)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	50
	Storage Paired (Firm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	49	49
	New EE	0	0	0	0	8	14	22	33	49	51	54	56	60	65	25	29	33	38	42	37
	New DR	0	0	0	0	0	0	0	0	0	0	0	5	10	14	19	24	29	34	34	34
Total Additions (Firm & Degraded)		0	0	0	19	26	34	81	210	400	532	706	839	1,081	1,242	1,957	1,966	2,085	3,726	4,183	4,200
Capacity Reserves (MW) without new additions		240	218	5	280	306	289	286	269	253	242	243	242	241	226	216	214	212	(3,700)	(4,150)	(4,162)
Capacity Reserves (MW) with new additions		240	218	5	298	333	323	367	479	653	774	948	1,081	1,322	1,468	2,173	2,180	2,297	26	33	38

Table 36 VCEA Energy Target Position

VCEA Annual Energy Target Position - (GWh)													
	Virginia Clean Energy Act Renewable Energy Requirement (GWh)	Portfolio A - Base, No Gas	Portfolio B - Base w/Gas	Portfolio C - Base No CO_2, No Gas	Portfolio D - Base No CO_2, w/ Gas	Portfolio E - High Fundamentals	Portfolio F1 - Low REC $	Portfolio F2 - High REC $	Portfolio G - Base No Gas, Eco Retire	Portfolio H - Base w/Gas, Eco Retire	Portfolio I - Base No CO_2, No Gas, Eco Retire	Portfolio J - Base No CO_2, w/ Gas, Eco Retire	Portfolio K - Base, No Gas, Excl Cap Ben
2023	1,176	2,098	2,098	2,098	2,098	2,098	2,098	2,098	2,098	2,098	2,098	2,098	2,098
2024	1,469	1,962	1,962	1,962	1,962	1,962	1,962	1,962	1,962	1,962	1,962	1,962	1,962
2025	2,052	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251
2026	2,495	1,037	1,037	1,037	1,037	1,037	1,037	1,037	1,037	1,037	1,037	1,037	1,037
2027	2,934	381	381	381	381	381	381	381	381	381	381	381	381
2028	3,535	49	247	327	247	420	51	234	51	247	420	247	51
2029	3,991	443	484	448	392	448	447	352	79	484	448	484	263
2030	4,441	455	470	371	470	465	466	455	461	470	465	471	477
2031	4,894	370	491	384	480	18	486	459	470	490	295	402	428
2032	5,342	197	173	34	242	35	149	282	115	263	130	179	22
2033	5,791	9	42	37	19	37	76	91	23	39	42	50	62
2034	6,245	216	37	64	14	62	122	18	48	33	69	48	39
2035	6,699	426	414	462	483	458	445	409	353	409	375	427	479
2036	7,898	352	408	484	476	385	481	425	376	402	305	422	347
2037	7,904	419	324	460	494	454	374	491	354	318	373	339	430
2038	8,508	212	415	70	137	156	263	191	151	132	74	338	420
2039	9,111	117	155	345	59	63	79	187	152	54	70	171	62
2040	9,712	54	18	10	12	2	18	214	1	7	8	34	15
2041	10,161	150	103	116	187	190	23	308	377	181	292	304	125
2042	10,616	500	425	384	415	448	283	380	268	500	463	443	395

Table 37 Annual REC Purchases

	Virginia Clean Energy Act Renewable Energy Requirement (GWh)	Portfolio A - Base, No Gas	Portfolio B - Base w/Gas	Portfolio C - Base No CO_2, No Gas	Portfolio D - Base No CO_2, w/ Gas	Portfolio E - High Fundamentals	Portfolio F1 - Low REC $	Portfolio F2 - High REC $	Portfolio G - Base No Gas, Eco Retire	Portfolio H - Base w/Gas, Eco Retire	Portfolio I - Base No CO_2, No Gas, Eco Retire	Portfolio J - Base No CO_2, w/ Gas, Eco Retire	Portfolio K - Base, No Gas, Excl Cap Ben
2023	1,176	0	0	0	0	0	0	0	0	0	0	0	0
2024	1,469	0	0	0	0	0	0	0	0	0	0	0	0
2025	2,052	0	0	0	0	0	0	0	0	0	0	0	0
2026	2,495	0	0	0	0	0	0	0	0	0	0	0	0
2027	2,934	0	0	0	0	0	0	0	0	0	0	0	0
2028	3,535	646	1,015	1,291	1,015	1,383	1,015	922	1,015	1,015	1,383	1,015	1,015
2029	3,991	1,840	1,748	1,840	1,656	1,840	2,208	1,380	1,564	1,748	1,840	1,748	2,024
2030	4,441	920	552	1,012	736	1,196	2,024	736	1,288	460	1,288	828	1,932
2031	4,894	184	92	828	368	184	1,840	0	276	0	644	276	1,104
2032	5,342	0	0	0	0	0	830	0	0	0	0	0	277
2033	5,791	92	0	0	0	92	460	0	184	0	0	0	184
2034	6,245	0	0	92	0	0	0	0	0	0	0	0	0
2035	6,699	0	0	0	0	0	0	0	0	0	0	0	0
2036	7,898	0	0	0	0	277	92	0	553	0	0	92	0
2037	7,904	0	0	92	0	0	0	0	0	0	0	0	0
2038	8,508	276	644	184	184	184	184	92	184	92	92	552	368
2039	9,111	0	0	736	0	0	184	0	368	0	0	92	184
2040	9,712	0	0	0	0	0	0	0	0	0	0	0	0
2041	10,161	0	0	0	0	0	0	0	0	0	0	276	0
2042	10,616	0	0	0	0	0	0	0	0	0	0	0	0

Table 38. Renewable Portfolio 2021 VCEA Order Compliance

Virginia Clean Economy Act Analysis

Renewable Portfolio Compliance

All Values in MWhs

	Order Rqmt 1	Order Rqmt 1.a.i	Order Rqmt 1.a.ii	Order Rqmt 1.a.iii	Order Rqmt 1.a.iii	Order Rqmt 1.b.i	Order Rqmt 1.b.ii	Order Rqmt 1.b.iii	Order Rqmt 1.b.iv	Order Rqmt 1.b.v	Order Rqmt 1.b.vi	Order Rqmt 1.b.vii	Order Rqmt 1.c		
Year	Virginia Clean Energy Act Renewable Energy Requirement	Virginia Energy	Coast	PJM Energy (A)(B)(C)	Compliance RECs	Solar	On-shore Wind	Off-Shore Wind	falling water	waste to energy	biomass	Compliance RECs	Non-utility Sources Incl. REC's	Utility Sources	RPS Nonutility Sources percent
2023	1,176,450	625,367	0	706,490	0	63,948	390,329	0	877,581	0	0	0	653,350	678,507	49%
2024	1,468,788	625,222	0	707,560	136,006	63,803	391,398	0	877,581	0	0	136,006	790,292	678,496	54%
2025	2,052,395	634,618	0	706,490	711,286	73,199	390,329	0	877,581	0	0	711,286	1,373,939	678,455	67%
2026	2,494,501	793,687	0	1,486,609	214,204	325,056	912,206	0	1,043,034	0	0	214,204	1,092,469	1,402,032	44%
2027	2,934,167	792,778	0	1,485,893	655,496	323,431	912,206	0	1,043,034	0	0	655,496	1,532,342	1,401,825	52%
2028	3,534,668	989,086	0	1,397,259	1,395,772	322,695	1,020,617	0	1,043,034	0	0	1,395,772	2,378,957	1,403,161	63%
2029	3,990,705	1,182,823	0	1,297,032	1,747,620	320,204	1,116,616	0	1,043,034	0	0	1,747,620	2,826,061	1,401,414	67%
2030	4,441,265	2,595,357	0	1,279,607	566,301	1,144,263	1,687,666	0	1,043,034	0	0	566,301	2,189,505	2,251,760	49%
2031	4,894,395	3,545,076	0	1,278,905	91,980	1,505,500	2,275,446	0	1,043,034	0	0	91,980	2,274,854	2,641,107	46%
2032	5,341,859	3,743,432	0	1,280,527	317,900	1,500,480	2,480,446	0	1,043,034	0	0	317,900	2,697,895	2,643,965	51%
2033	5,790,886	4,381,906	0	1,277,512	131,468	1,949,088	2,667,296	0	1,043,034	0	0	131,468	3,063,033	2,727,854	53%
2034	6,244,738	5,210,859	0	1,276,821	0	2,581,429	2,863,216	0	1,043,034	0	0	0	3,487,566	3,000,114	54%
2035	6,699,087	6,036,585	0	1,276,133	0	3,210,548	3,059,136	0	1,043,034	0	0	0	4,041,723	3,270,995	55%
2036	7,897,822	6,599,290	0	1,277,762	20,770	3,566,701	3,267,316	0	1,043,034	0	0	20,770	4,626,297	3,271,524	59%
2037	7,904,116	6,566,481	0	1,274,768	62,868	3,543,148	3,255,066	0	1,043,034	0	0	62,868	4,644,547	3,259,569	59%
2038	8,507,595	6,549,060	0	1,087,921	870,613	3,525,050	3,068,897	0	1,043,034	0	0	870,613	5,253,741	3,253,853	62%
2039	9,111,104	7,632,534	0	1,087,247	391,322	4,607,850	3,068,897	0	1,043,034	0	0	391,322	5,129,045	3,982,058	56%
2040	9,711,670	8,728,907	0	1,088,372	0	5,693,607	3,080,637	0	1,043,034	0	0	0	5,102,399	4,714,880	52%
2041	10,161,175	9,774,589	0	1,085,909	0	6,748,567	3,068,897	0	1,043,034	0	0	0	5,433,047	5,427,451	50%
2042	10,616,040	9,918,301	0	999,041	0	6,891,615	3,068,897	0	956,830	0	0	0	5,323,153	5,594,189	49%

Appendix C: Filing Requirements

Requirement	Citation	Development Plan/Testimony Location	Company Witness Sponsor
Submit an annual plan that (i) reflects, in the aggregate and over the duration, the Subsection D requirements for allocation between utility-owned facilities and PPAs, and (ii) includes a plan to meet energy storage development targets under Subsection E, including the goal of installing at least 10% behind the meter.	Va. Code§ 56-585.5 D 4	2022 RPS Development Plan	Witness Martinez
Consider the promotion of new renewable generation and energy storage resources within the Commonwealth, and associated economic development.	Va. Code§ 56-585.5 D 4	2022 RPS Development Plan	Witness Martinez
Consider the fuel savings projects to be achieved by the plan.	Va. Code§ 56-585.5 D 4	2022 RPS Development Plan – Section 6.5	Witness Martinez
Report on the plan to meet and progress toward the interim targets set forth in the storage regulations.	20 VAC 5-335-30	2022 RPS Development Plan – Section 3	Witness Martinez
Report annually on any competitive solicitations for energy storage.	20 VAC 5-335-40	Testimony	Witness Casablanca
Address behind-the meter incentives related to energy storage projects.	20 VAC 5-335-50	Testimony	Witness Casablanca
Address non-wires alternatives programs related to energy storage.	20 VAC 5-335-60	Testimony	Witness Casablanca
Address peak demand reduction programs related to energy storage.	20 VAC 5-335-70	Testimony	Witness Casablanca
Analyze how the Company's plan and petition requests address and implement the RPS and carbon dioxide reduction requirements in Code§ 56-585.5, including but not necessarily limited to Code 56-585.5c.	PUR-2020-00135 Final Order at 4	Section 6.4	Witness Martinez
Include a least cost plan consistent with the requirements of the 2020 IRP Final Order that meets (i) applicable carbon regulations and (ii) the mandatory RPS Program.	PUR-2020-00135 Final Order at 5	2022 RPS Development Plan - Section 6.2.1	Witness Martinez
Include an evaluation of RECs from all sources (with both high and low-price sensitivities), including utility-owned, third-party PPAs and unbundled REC purchases.	PUR-2020-00135 Final Order at 5	2022 RPS Development Plan - Section 6.2.2	Witness Martinez
Provide modeling of the Company's actual wind capacity factor and Virginia-specific or PJM-specific solar capacity factor.	PUR-2020-00135 Final Order at 5	2022 RPS Development Plan Sections 5.2.1 & 5.2.2	Witness Martinez
Provide distributed generation sensitivities for unbundled REC purchases through Requests for Proposals ("RFPs"), fixed price offers and over the-counter purchases.	PUR-2020-00135 Final Order at 5	2022 RPS Development Plan – Section 6.2.2	Witness Martinez

Modeling of reliability impacts.	PUR-2020-00135 Final Order at 5	Section 3.3	Witness Martinez
Provide updated fundamentals forecasts and commodity pricing that reflects the VCEA requirements.	PUR-2020-00135 Final Order at 5	Section 4.5	Witness Martinez
Provide a detailed chart showing how APCo has complied to date with the VCEA's RPS requirements.	PUR-2020-00135 Final Order at 5	Testimony	Witness Stevens
The Company's bill analysis should include the effects of retirements, the effects of tax credits, offsets related to outside model additions, and any changes to customer class allocation factors.	PUR-2020-00135 Final Order at 6	2022 RPS Development Plan - Table 21	Witness Spaeth
Ensure modeling inputs and assumptions are consistent between IRP and RPS Development Plan proceedings and explain the reason behind any deviation in the assumptions and modeling used.	PUR-2020-00135 Final Order at 9	2022 RPS Development Plan - Section 4.3	Witness Martinez
Provide the complete results of RPS-related RFPs must be included in each of the Company's RPS filings. In addition to the specific requirements set forth in Code§ 56-585.5 D 3, the Company's RFPs shall address environmental justice considerations by assessing the impacts of proposed projects on underserved communities. The Company's RPS filing should identify how the RFP assessed environmental justice considerations, including any non-price considerations that were included in the Company's RFP analysis.	PUR-2020-00135 Final Order at 8	Testimony	Witness Karrasch Witness Long
The Company will propose reporting metrics, and any needed protocols, associated with RPS Program certification in its 2022 RPS filing.	PUR-2020-00135 Final Order at 6	Testimony	Witness Stevens
Provide information related to accelerated renewable energy buyers ("ARBs").	PUR-2020-00135 Final Order at 7	Testimony Exhibit	Witness Stevens
Present the Company proposed cost allocation methodology, along with the results of alternative cost allocation methodologies.	PUR-2020-00135 Final Order at 9	Petition	Witness Spaeth
Report each RPS-associated cost of benefit by type, month, general ledger account, rate mechanism and whether such cost or revenue is bypassable or non-bypassable.	PUR-2020-00135 Final Order at 10	Testimony	Witness Thomas Witness Spaeth
(1) For each year, 2022 through 2035, provide an estimate of the yearly RPS Program requirement expressed in MWh in accordance with the schedule provided in § 56-585.5 C.	PUR-2020-00135 Order Establishing Proceeding Attachment	2022 RPS Development Plan Appendix B Table 38	Witness Martinez
(1)(a) For each year, 2022 through 2035, provide an estimate (MWhs or RECs) of the RPS Program requirement that is expected to be met from	PUR-2020-00135 Order Establishing	2022 RPS Development Plan Appendix B Table 38	Witness Martinez

generation located: (i) in Virginia; (ii) off the coast of the Commonwealth; or (iii) otherwise located in PJM.	Proceeding Attachment		
(1)(b) For each year, 2022 through 2035, provide an estimate (MWhs or RECs) of the RPS Program requirement that is expected to be met from the following sources: (i) solar; (ii) on-shore wind; (iii) off-shore wind; (iv) falling water; (v) waste-to-energy or landfill gas; (vi) biomass; or (vii) any other qualifying resource.	PUR-2020-00135 Order Establishing Proceeding Attachment	2022 RPS Development Plan Appendix B Table 38	Witness Martinez
(1)(c) For each year, 2022 through 2035, provide an estimate, expressed in MWhs, of the RPS Program requirement that must be provided by non-utility sources.	PUR-2020-00135 Order Establishing Proceeding Attachment	2022 RPS Development Plan Appendix B Table 38	Witness Martinez
(2) Provide the lifetime revenue requirement for the proposed RPS Program by component, including supporting calculations on an annual basis.	PUR-2020-00135 Order Establishing Proceeding Attachment	2022 RPS Development Plan Table 20	Witness Spaeth Witness Martinez
(3) State whether the utility in its RPS Filing will treat the term "capacity" referenced in § 56-585.5 as nameplate capacity, or in some other way to be identified and described by the utility.	PUR-2020-00135 Order Establishing Proceeding Attachment	2022 RPS Development Plan Section 3	Witness Martinez
(4) Estimate the nameplate capacity of all renewable resources the utility will be required to procure to meet its capacity obligations in PJM, following the utility's full transition to renewable resources by 2045 (Phase II Utility), and 2050 (Phase I Utility), as required by § 56-585.5.	PUR-2020-00135 Order Establishing Proceeding Attachment	2022 RPS Development Plan Appendix B	Witness Martinez
(5) Regarding the tranches described in § 56-585.5 D 1 a, b, and c for a Phase I utility, (i) describe how the utility will obtain the requisite 35% of energy, capacity and environmental attributes from non-utility sources as required by the statute, and (ii) state, in detail, whether affiliates of the utility may potentially provide any of that energy, capacity or environmental attributes.	PUR-2020-00135 Order Establishing Proceeding Attachment	Testimony	Witness Stevens
Modeling assumptions and inputs for the Amos and Mountaineer retirements included in the Company's IRP filing should also be included in the Company's next RPS Filing.	PUR-2021-00206 Final Order at 6	2022 RPS Development Plan Section 4.3	Witness Martinez
A sensitivity to select retirement of these facilities on an economic basis should be included in the Company's next RPS Filing.	PUR-2021-00206 Final Order at 6	2022 RPS Development Plan Section 10	Witness Martinez

Modeling based on the historical average annual capacity factors for wind and Virginia-specific or PJM-specific solar generation resources, based on a three-year rolling average.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Sections 5.2.1 & 5.2.2	Witness Martinez
A modeling sensitivity that removes the capacity benefit from new resources through 2040.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Section 6.2.1	Witness Martinez
Modeling regarding capacity monetization that reflects, to the extent possible, the Company's actual or expected conduct. To the extent there is a deviation between APCo's actual conduct and its modeling inputs, the Company should explain the reason for such deviation.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Section 4.3	Witness Martinez
Modeling the most recently available Effective Load Carrying Capability guidance from PJM.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Section 5.2	Witness Martinez
REC modeling that includes accurate data so that the results reflect the Company's actual REC need.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Section 5.2.5 & 6.2.3	Witness Martinez
Modeling that utilizes REC banking and balancing. If the Company is unable to run this sensitivity through PLEXOS, the Company shall estimate the impact of the banking outside of PLEXOS to the best of its ability.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Section 6.2.3	Witness Martinez
Modeling that accurately reflects the Company's use of spot market RECs.	PUR-2021-00206 Final Order at 7	2022 RPS Development Plan Section 5.2.5	Witness Martinez
A status update on its short-term action plan from VCEA compliance in its next RPS Filing.	PUR-2021-00206 Final Order at 7	Testimony	All Witnesses
Prospective bill analyses should clearly distinguish between (i) resources that are, or will be, allocated to both Virginia and West Virginia customers; and (ii) resources whose costs and benefits are forecast to accrue entirely to Virginia retail customers.	PUR-2021-00206 Final Order at 8	Testimony	Witness Spaeth
APCo should provide information supporting its actual decisions to purchase, use, bank and/or optimize RECs in its next RPS Filing	PUR-2021-00206 Final Order at 12	2022 RPS Development Plan Testimony	Witness Stevens Witness Spaeth
APCo to file its Compliance Report with its 2022 RPS Development Plan.	PUR-2021-00206 Final Order at 8	Testimony	Witness Stevens