



# 2022 VA IRP DISCUSSION

January 26, 2023



**Working Toward a Sustainable Future**

# Agenda

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- Significant Updates
- Load Forecast
- Alternative Plans for 2022
- Capacity, Energy and REC Charts
- Change in Generation Energy Mix (2005 - 2036)
- System CO2 Emissions

# 2022 IRP - Significant Updates from 2021

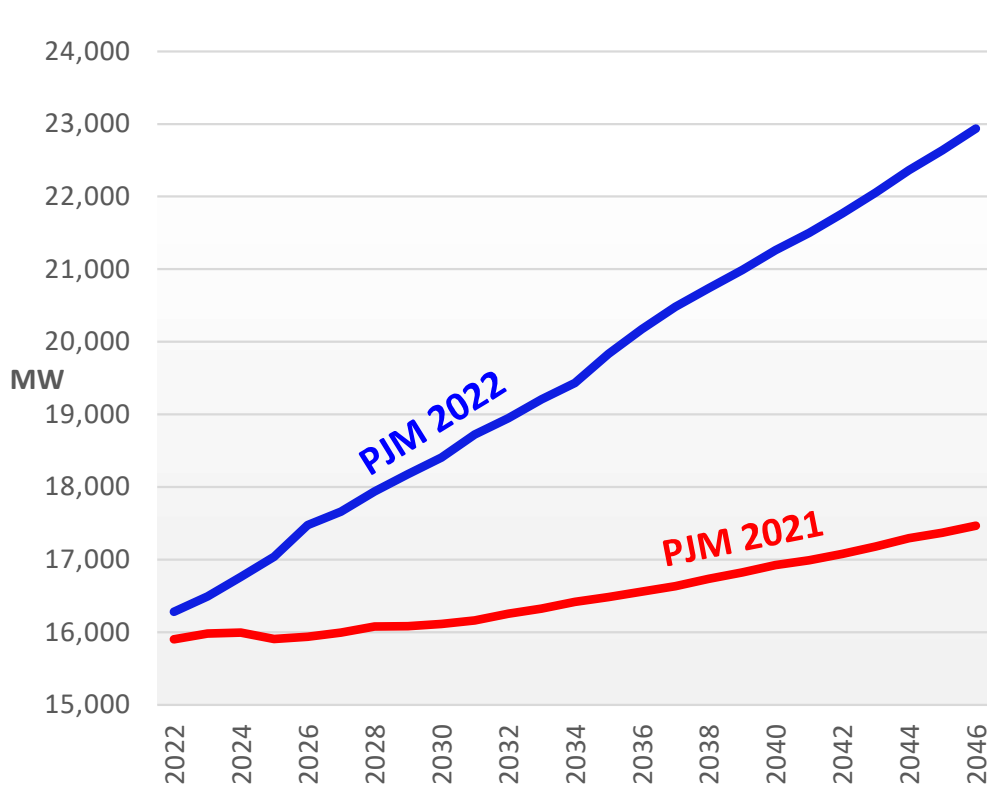
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- PJM Load Forecast Increase
  - Larger Build Plans
  - Higher generation and CO2
- Two additional Plans – economically selected
- Nuclear extensions and CVOW in all plans
- Commodity and construction costs have increased
- RGGI removed from modeling
- SMRs available for resource selection

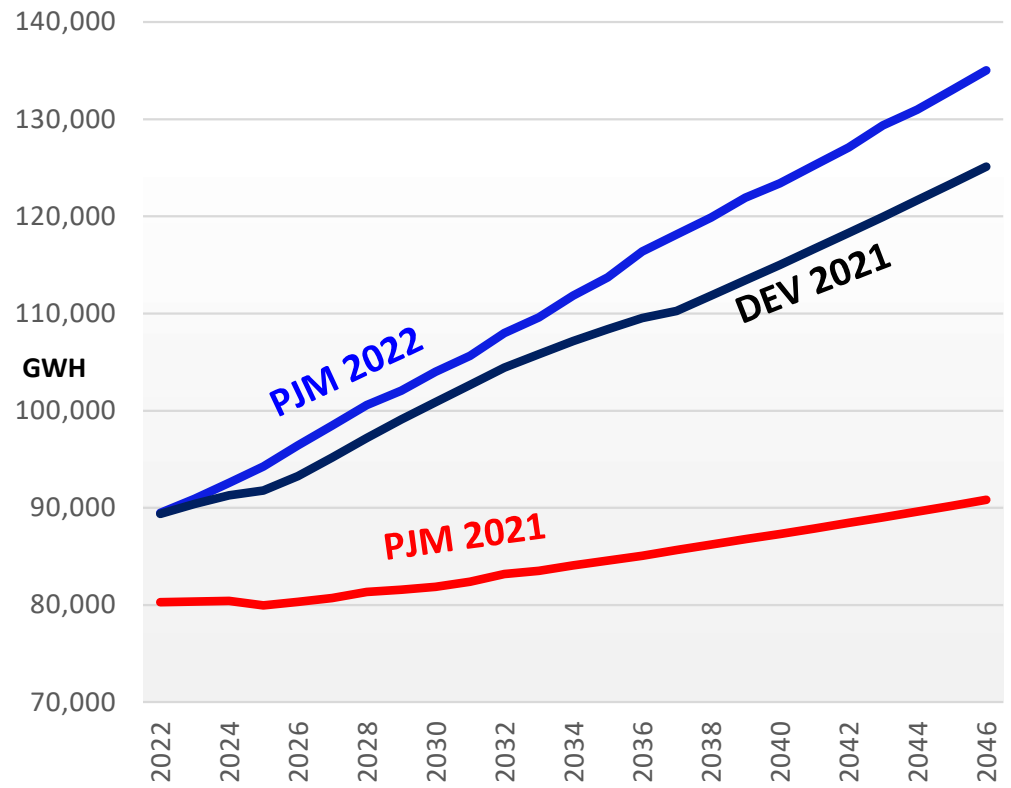
# PJM 2022 Load Forecast Overview

## Snapshot

DOM LSE Summer Coincident Peak (CP) Forecast



DOM LSE Energy Forecast



Preliminary PJM-derived 2022 LSE Forecast is subject to change pending 2022 DSM and Choice forecasts.

\* DEV Peak forecast, which focuses on DEV standalone peak, isn't directly comparable to PJM-Derived coincident peak (CP) forecast.

# Alternative Plans for 2022

	2022 Plan A	2022 Plan B	2022 Plan C (Stipulation 1)	2022 Plan D	2022 Plan E (Stipulation 2)
Unit Selection*	Least-cost optimization	VCEA development targets, then least-cost optimization	Least-cost optimization	VCEA development targets, then least-cost optimization	Least-cost optimization
Retirements	Model Optimized	Determined by Company	Match Plan B	Model-optimized and glide path to carbon-free by 2045	Model-optimized and glide path to carbon-free by 2045
Load Forecast	PJM				
Solar Capacity Factor	3-Year Average				
Solar/Storage Ownership	Least-cost	65% Utility-Owned /35% PPA			

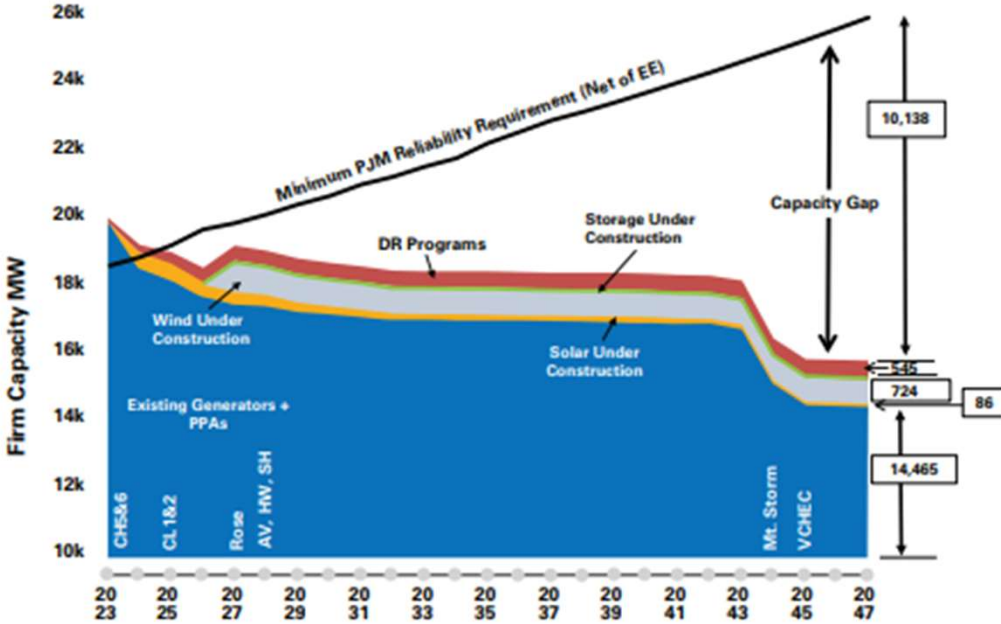


\*All plans include CVOW Commercial Project and nuclear license extensions currently pending before the Commission.  
Privileged and Confidential – Prepared at the request of Counsel.

# Executive Summary

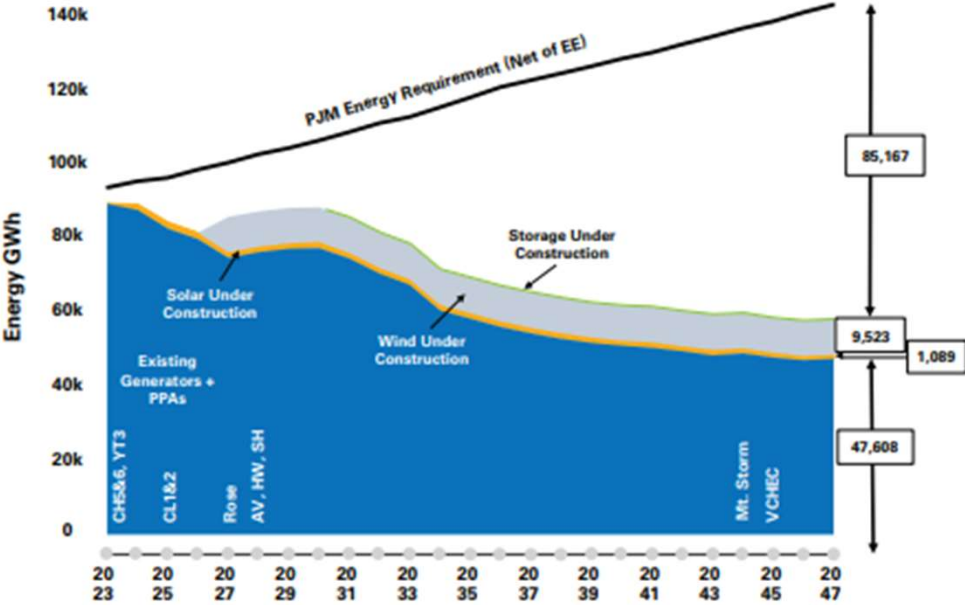
	2021 Plan B PJM LF	2022 Plan A Least Cost	2022 Plan B	2022 Plan C (Stipulation 1)	2022 Plan D	2022 Plan E (Stipulation 2)
ICF Forecast	Fed + RGGI	Fed + CO <sub>2</sub>	Fed + CO <sub>2</sub>	Fed + CO <sub>2</sub>	Fed + CO <sub>2</sub>	Fed + CO <sub>2</sub>
CO <sub>2</sub> @ Year 2047	2.2 M tons	20.8 M tons	5.6 M tons	5.4 M tons	0 M tons	0 M tons
Solar CF	21.2%	22.5%	22.5%	22.5%	22.5%	22.5%
System NPV (25yr) Total	\$45.4B	\$52.9B	\$65.9B	\$61.1B	\$71.0B	\$70.6B
Solar (mw)	14,310 15-yr	14,829 15-yr	13,692 15-yr	13,329 15-yr	13,812 15-yr	16,586 15-yr
COS+PPA+DG	17,790 25-yr	26,829 25-yr	25,692 25-yr	25,329 25-yr	27,012 25-yr	29,786 25-yr
Wind (mw)	5,174 15-yr 5,174 25-yr		2,600 15-yr 2,600 25-yr	0 15-yr 160 25-yr	3,400 15-yr 4,400 25-yr	800 15-yr 4,400 25-yr
Storage (mw)	2,713 15-yr 2,713 25-yr		2,620 15-yr 3,070 25-yr	30 15-yr 2,400 25-yr	3,220 15-yr 9,220 25-yr	4,030 15-yr 10,030 25-yr
CT/CC (mw)		1,940 15-yr 2,425 25-yr				
Nuclear			0 15-yr 1,140 25-yr	0 15-yr 2,280 25-yr	0 15-yr 2,280 25-yr	0 15-yr 2,280 25-yr
Retirements (mw)	2,561 15-yr 4,792 25-yr	2,567 15-yr 2,567 25-yr	2,561 15-yr 4,792 25-yr	2,561 15-yr 4,792 25-yr	2,561 15-yr 13,356 25-yr	2,561 15-yr 13,356 25-yr

# Current Company Capacity Position (2023 to 2047)



Notes: "PPAs" = power purchase agreements; "DR" = demand response; "EE" = energy efficiency; "CH5&6" = Chesterfield Units 5 & 6 (coal); "YT3" = Yorktown Unit 3 (oil); "CL1&2" = Clover Units 1 & 2 (coal); "Rose" = Rosemary (oil); "AV" = Altavista (biomass); "HW" = Hopewell (biomass); "SH" = Southampton (biomass); "VCHEC" = Virginia City Hybrid Energy Center (coal/gob/biomass).

# Current Company Energy Position (2023 to 2047)

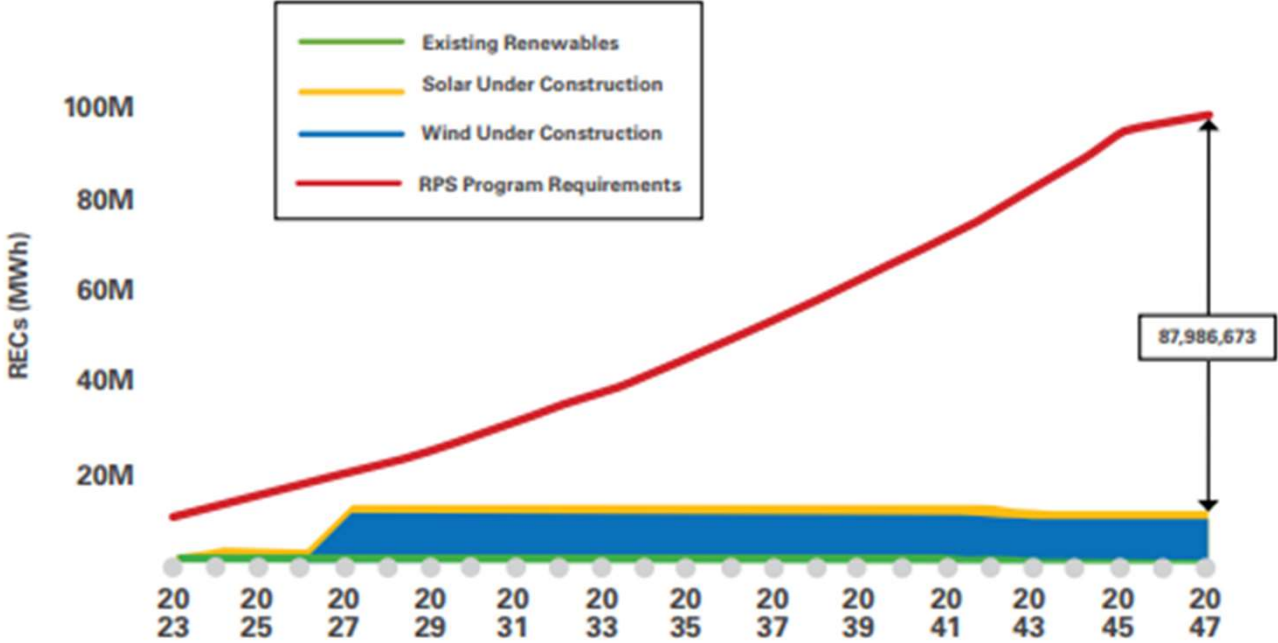


Notes: "PPAs" = power purchase agreements; "DR" = demand response; "EE" = energy efficiency; "CH5&6" = Chesterfield Units 5 & 6 (coal); "YT3" = Yorktown Unit 3 (oil); "CL1&2" = Clover Units 1 & 2 (coal); "Rose" = Rosemary (oil); "AV" = Altavista (biomass); "HW" = Hopewell (biomass); "SH" = Southampton (biomass); "VCHEC" = Virginia City Hybrid Energy Center (coal/gob/biomass).



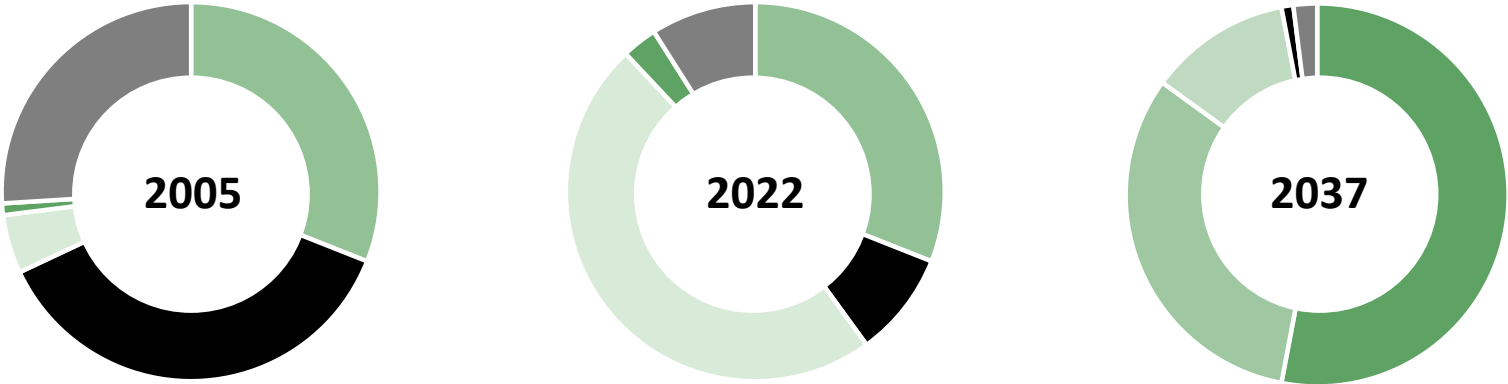
# Plan B - 2021 IRP

## REC



# Dominion Energy Virginia

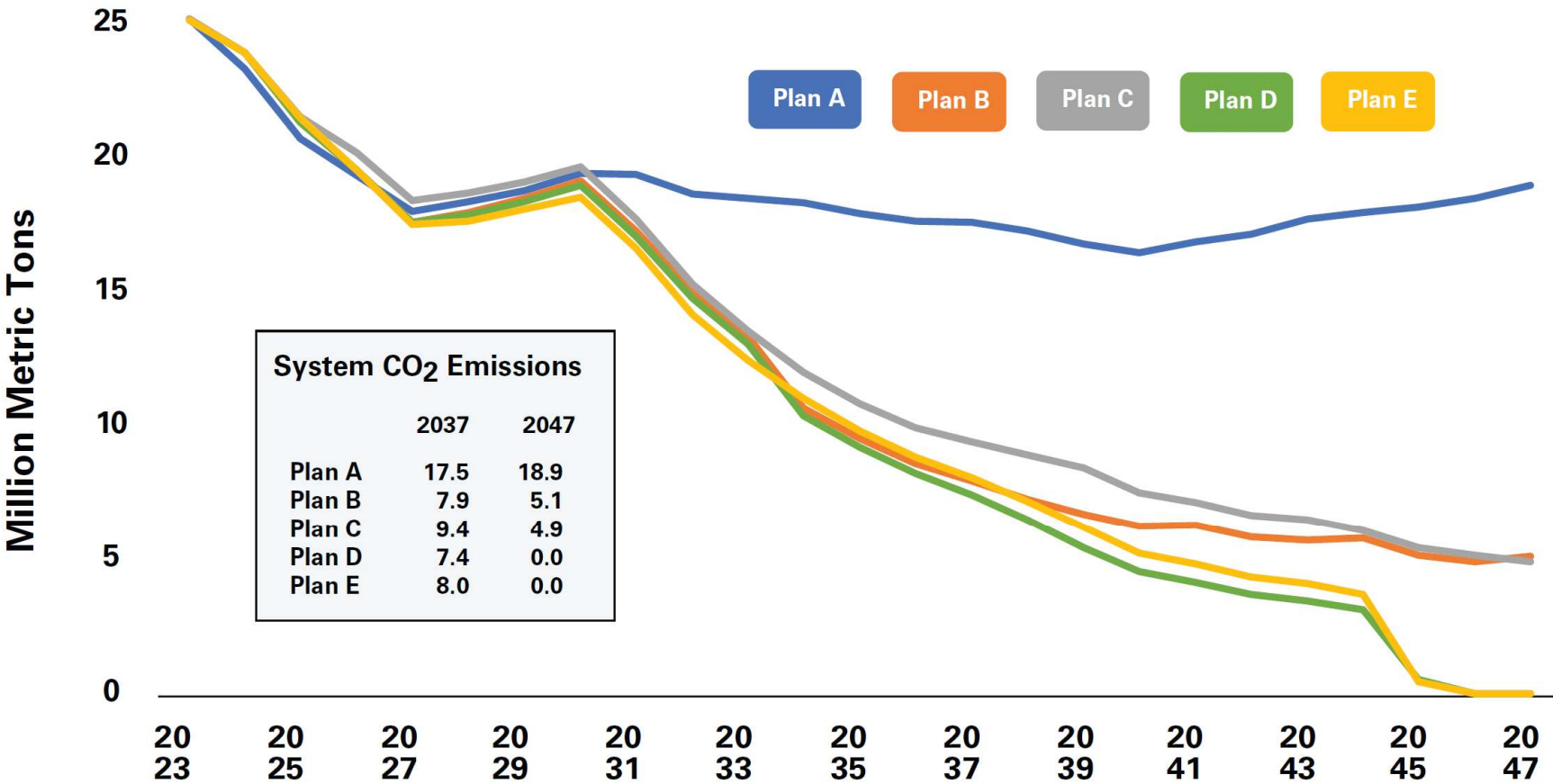
## Generation energy mix comparison 2005 to 2037 (2022 IRP Plan B)



Renewable	1%	4%	48%
Nuclear	31%	31%	27%
Natural gas	5%	45%	19%
Coal	37%	17%	1%
Other	26%	4%	5%

# System CO<sub>2</sub> Emissions

All System Fossil Emissions



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# Questions?

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# Appendix

# Sensitivities for 2022

Sensitivity	Description
DEV Load	Company Load Forecast
High Load	PJM Load Forecast +5%
Low Load	PJM Load Forecast -5%
High Fuel	ICF Developed – includes high energy, capacity, and RECs
Low Fuel	ICF Developed – includes low energy, capacity, and RECs
High Construction Cost	Company Developed +10%
Low Construction Cost	Company Developed -10%
REC Sensitivities	Evaluate RECs from PPAs and unbundled REC purchases for all plans
RGGI	ICF Developed – assumes Virginia staying in RGGI

# Load Forecast Sensitivities

	Plan B PJM Load	Plan B PJM High Load	Plan B PJM Low Load	Plan B DEV Load
NPV Total	\$65.0 M	\$69.7 M ↑	\$60.5 M ↓	\$66.9 M ↑
CO <sub>2</sub> @ Year 2047	5.8 M	6.2 M	5.9 M	6.5 M
Solar (MW) COS+PPA+DG	13,628 15-yr 25,628 25-yr	13,628 15-yr 25,628 25-yr	13,628 15-yr 25,628 25-yr	13,628 15-yr 25,628 25-yr
Wind (MW)	2,600 15-yr 2,680 25-yr	2,600 15-yr 2,600 25-yr	2,600 15-yr 2,600 25-yr	2,600 15-yr 2,680 25-yr
Storage (MW)	2,590 15-yr 3,040 25-yr	2,590 15-yr 4,030 25-yr	2,590 15-yr 2,590 25-yr	2,590 15-yr 2,740 25-yr
CT/CC (MW)	-- 15-yr -- 25-yr	-- 15-yr -- 25-yr	-- 15-yr -- 25-yr	-- 15-yr -- 25-yr
Nuclear (MW)	-- 15-yr 1,140 25-yr	-- 15-yr 1,995 25-yr	-- 15-yr -- 25-yr	-- 15-yr 1,140 25-yr
Retirements (MW)	2,561 15-yr 4,792 25-yr	2,561 15-yr 4,792 25-yr	2,561 15-yr 4,792 25-yr	2,561 15-yr 4,792 25-yr

# Price Sensitivities

	NPV Total
Plan B – Base Case	\$65.0 B
Plan B – High Fuel	\$74.5 B ↑
Plan B – Low Fuel	\$64.6 B ↓
Plan B – High Capex	\$68.6 B ↑
Plan B – Low Capex	\$61.5 B ↓
Plan B – Design CF	\$64.3 B ↓
Plan B – RGGI + Fed	\$67.6 B ↑

- High/Low Capex: +/- 10% build cost for self-build & PPA units
- High/Low Fuel: ICF Developed
- VCEA, RPS, and Load Forecast are still bidding constraints



# Plan A

## Least Cost Plan

Year	Solar COS	Solar PPA	Solar DER	Wind	Storage	Natural Gas-Fired	Nuclear	Capacity Purchases	Retirements
2023	-	-	-	-	-	-	-	200	YT3, CH5-6
2024	-	-	-	-	-	-	-	-	VCHEC, BIO
2025	-	428	1	-	-	-	-	1,100	-
2026	-	1,200	-	-	-	-	-	1,000	-
2027	-	1,200	-	-	-	-	-	-	-
2028	-	1,200	-	-	-	-	-	-	-
2029	-	1,200	-	-	-	-	-	-	-
2030	-	1,200	-	-	-	-	-	200	-
2031	-	1,200	-	-	-	-	-	600	-
2032	-	1,200	-	-	-	-	-	1,000	-
2033	-	1,200	-	-	-	-	-	1,100	-
2034	-	1,200	-	-	-	485	-	700	-
2035	-	1,200	-	-	-	485	-	500	-
2036	-	1,200	-	-	-	485	-	200	-
2037	-	1,200	-	-	-	485	-	300	-
<b>15-Year Subtotal</b>	-	<b>14,828</b>	<b>1</b>	-	-	<b>1,940</b>	-	<b>6,900</b>	-
2038	-	1,200	-	-	-	485	-	-	-
2039	-	1,200	-	-	-	-	-	100	-
2040	-	1,200	-	-	-	-	-	200	-
2041	-	1,200	-	-	-	-	-	400	-
2042	-	1,200	-	-	-	-	-	700	-
2043	-	1,200	-	-	-	-	-	1,100	-
2044	-	1,200	-	-	-	-	-	1,400	-
2045	-	1,200	-	-	-	-	-	1,800	-
2046	-	1,200	-	-	-	-	-	2,300	-
2047	-	1,200	-	-	-	-	-	2,700	-
<b>25-Year Total</b>	-	<b>26,828</b>	<b>1</b>	-	-	<b>2,425</b>	-	<b>17,600</b>	-

# Plan B

## RPS Compliant + VCEA Development Targets through 2035

Year	Solar COS	Solar PPA	Solar DER	Wind	Storage	Natural Gas-Fired	Nuclear	Capacity Purchases	Retirements
2023	-	-	-	-	-	-	-	-	YT3, CH5&6
2024	-	-	23	-	-	-	-	-	-
2025	397	428	65	-	130	-	-	-	CL1&2
2026	812	315	110	-	120	-	-	-	-
2027	585	315	120	-	120	-	-	-	Rosemary
2028	585	315	120	-	150	-	-	-	Biomass
2029	624	336	100	-	210	-	-	-	-
2030	624	336	98	-	210	-	-	-	-
2031	624	336	90	-	240	-	-	-	-
2032	624	336	70	-	270	-	-	-	-
2033	624	336	66	-	270	-	-	-	-
2034	624	336	66	2,600	300	-	-	-	-
2035	624	336	66	-	300	-	-	-	-
2036	624	336	66	-	300	-	-	-	-
2037	780	420	-	-	-	-	-	-	-
<b>15-Year Subtotal</b>	<b>8,151</b>	<b>4,481</b>	<b>1,060</b>	<b>2,600</b>	<b>2,620</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
2038	780	420	-	-	-	-	-	-	-
2039	780	420	-	-	-	-	-	-	-
2040	780	420	-	-	-	-	-	-	-
2041	780	420	-	-	-	-	-	-	-
2042	780	420	-	-	-	-	285	-	-
2043	780	420	-	-	-	-	285	-	-
2044	780	420	-	-	-	-	-	1,700	Mt Storm
2045	780	420	-	-	-	-	285	2,400	VCHEC
2046	780	420	-	-	150	-	285	2,500	-
2047	780	420	-	-	300	-	-	2,700	-
<b>25-Year Total</b>	<b>15,951</b>	<b>8,681</b>	<b>1,060</b>	<b>2,600</b>	<b>3,070</b>	<b>-</b>	<b>1,140</b>	<b>9,300</b>	<b>-</b>

# Plan C

## RPS Optimized with no forced builds

Year	Solar COS	Solar PPA	Solar DER	Wind	Storage	Natural Gas-Fired	Nuclear	Capacity Purchases	Retirements
2023	-	-	-	-	-	-	-	-	YT3, CH5&6
2024	-	-	-	-	-	-	-	-	-
2025	-	428	1	-	-	-	-	-	CL1&2
2026	78	42	-	-	-	-	-	900	-
2027	507	273	-	-	-	-	-	200	Rosemary
2028	780	420	-	-	-	-	-	100	Biomass
2029	780	420	-	-	-	-	-	300	-
2030	780	420	-	-	-	-	-	500	-
2031	780	420	-	-	-	-	-	800	-
2032	780	420	-	-	-	-	-	1,200	-
2033	780	420	-	-	-	-	-	1,300	-
2034	780	420	-	-	30	-	-	1,300	-
2035	780	420	-	-	-	-	-	1,600	-
2036	780	420	-	-	-	-	-	1,700	-
2037	780	420	-	-	-	-	-	1,900	-
<b>15-Year Subtotal</b>	<b>8,385</b>	<b>4,943</b>	<b>1</b>	<b>-</b>	<b>30</b>	<b>-</b>	<b>-</b>	<b>11,800</b>	<b>-</b>
2038	780	420	-	-	240	-	-	1,800	-
2039	780	420	-	80	180	-	-	1,800	-
2040	780	420	-	80	300	-	285	1,500	-
2041	780	420	-	-	300	-	285	1,100	-
2042	780	420	-	-	300	-	285	800	-
2043	780	420	-	-	300	-	285	700	-
2044	780	420	-	-	300	-	285	2,200	Mt Storm
2045	780	420	-	-	300	-	285	2,700	VCHEC
2046	780	420	-	-	30	-	285	2,700	-
2047	780	420	-	-	120	-	285	2,700	-
<b>25-Year Total</b>	<b>16,185</b>	<b>9,143</b>	<b>1</b>	<b>160</b>	<b>2,400</b>	<b>-</b>	<b>2,280</b>	<b>29,800</b>	<b>-</b>

## Plan D

### RPS Compliant + VCEA Development Targets through 2035

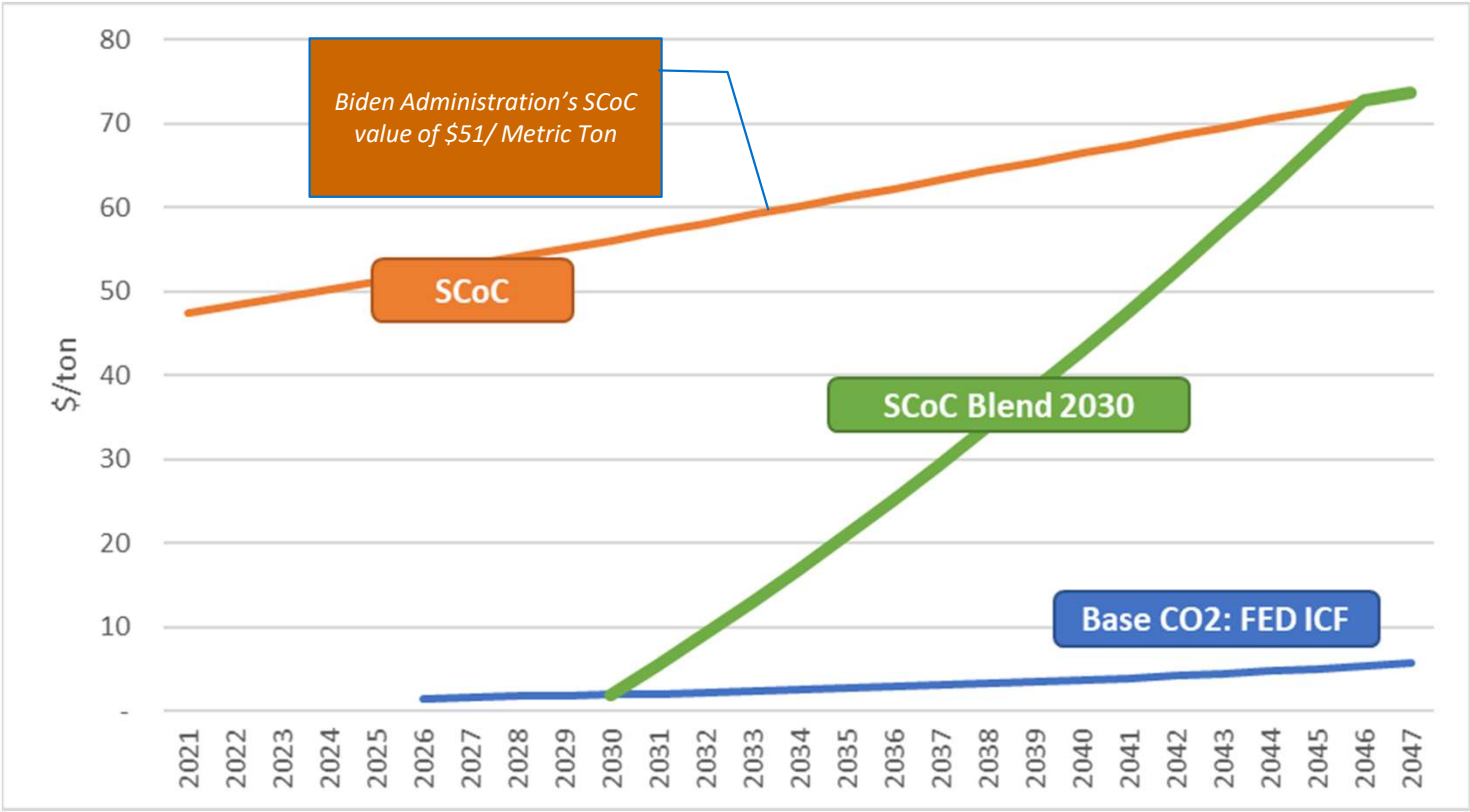
Year	Solar COS	Solar PPA	Solar DER	Wind	Storage	Natural Gas-Fired	Nuclear	Capacity Purchases	Retirements
2023	-	-	-	-	-	-	-	-	YT3, CH5&6
2024	-	-	23	-	-	-	-	-	-
2025	397	428	65	-	130	-	-	-	CL1&2
2026	812	315	110	-	120	-	-	100	-
2027	585	315	120	-	120	-	-	-	Rosemary
2028	585	315	120	80	150	-	-	-	Biomass
2029	624	336	100	80	210	-	-	-	-
2030	624	336	98	80	210	-	-	-	-
2031	624	336	90	80	240	-	-	-	-
2032	624	336	70	80	270	-	-	-	-
2033	624	336	66	80	270	-	-	-	-
2034	624	336	66	2,680	300	-	-	-	-
2035	624	336	66	80	300	-	-	-	-
2036	624	336	66	80	300	-	-	-	-
2037	780	420	120	80	600	-	-	-	SA
<b>15-Year Subtotal</b>	<b>8,151</b>	<b>4,481</b>	<b>1,180</b>	<b>3,400</b>	<b>3,220</b>	<b>-</b>	<b>-</b>	<b>100</b>	<b>-</b>
2038	780	420	120	80	600	-	-	-	CH7&8, ER, GN
2039	780	420	120	80	600	-	-	-	PP6, BG
2040	780	420	120	80	600	-	285	-	-
2041	780	420	120	80	600	-	285	-	DT
2042	780	420	120	80	600	-	285	-	-
2043	780	420	120	80	600	-	285	-	LS
2044	780	420	120	80	600	-	285	300	Mt Storm
2045	780	420	120	280	600	-	285	5,500	3x1, VCHEC, Rem
2046	780	420	120	80	600	-	285	5,200	-
2047	780	420	120	80	600	-	285	5,000	-
<b>25-Year Total</b>	<b>15,951</b>	<b>8,681</b>	<b>2,380</b>	<b>4,400</b>	<b>9,220</b>	<b>-</b>	<b>2,280</b>	<b>16,100</b>	<b>-</b>

# Plan E

## RPS Optimized with no forced builds

Year	Solar COS	Solar PPA	Solar DER	Wind	Storage	Natural Gas-Fired	Nuclear	Capacity Purchases	Retirements
2023	-	-	-	-	-	-	-	-	YT3, CH5&6
2024	-	-	8	-	-	-	-	-	-
2025	397	114	-	-	130	-	-	-	CL1&2
2026	1,007	420	120	-	300	-	-	-	-
2027	780	420	120	-	300	-	-	-	Rosemary
2028	780	420	120	80	300	-	-	-	Biomass
2029	780	420	120	80	300	-	-	-	-
2030	780	420	120	80	300	-	-	-	-
2031	780	420	120	80	300	-	-	-	-
2032	780	420	120	80	300	-	-	-	-
2033	780	420	120	80	300	-	-	-	-
2034	780	420	120	80	300	-	-	-	-
2035	780	420	120	80	300	-	-	-	-
2036	780	420	120	80	300	-	-	-	-
2037	780	420	120	80	600	-	-	-	-
<b>15-Year Subtotal</b>	<b>9,984</b>	<b>5,154</b>	<b>1,448</b>	<b>800</b>	<b>4,030</b>	-	-	-	-
2038	780	420	120	80	600	-	-	-	CH7&8, ER, GN
2039	780	420	120	80	600	-	-	-	PP6, BG
2040	780	420	120	80	600	-	285	-	-
2041	780	420	120	80	600	-	285	-	DT
2042	780	420	120	80	600	-	285	-	-
2043	780	420	120	80	600	-	285	-	LS
2044	780	420	120	80	600	-	285	-	Mt Storm
2045	780	420	120	2,880	600	-	285	4,400	3x1, VCHEC, Rem
2046	780	420	120	80	600	-	285	4,300	-
2047	780	420	120	80	600	-	285	4,200	-
<b>25-Year Total</b>	<b>17,784</b>	<b>9,354</b>	<b>2,648</b>	<b>4,400</b>	<b>10,030</b>	-	<b>2,280</b>	<b>12,900</b>	-

# CO<sub>2</sub> Pricing – ICF and Social Cost of Carbon (SCoC)



**Using the social cost of carbon is the most economic option available to show a decrease in emissions while maintaining reliability**

# Social Cost of Carbon Adder

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## Pros

- Lowers CO<sub>2</sub> emissions while keeping dispatchable units in service (reliability)
- Provides for new technology or SMR development in out years to maintain reliability
- Supports renewable CPCNs
- Recognized/supported by VCEA & VA SCC

## Cons

- Decreases our scope 1 (direct) emissions while increasing our scope 3 emissions (purchased power)
- Adds a cost to customers (NPV) - due to dispatch changes
- Potential PJM market dynamics regarding price v. cost offers

Recommendation:  
Include a SCoC adder in alternative plans B-E