

Aggressive Environmental

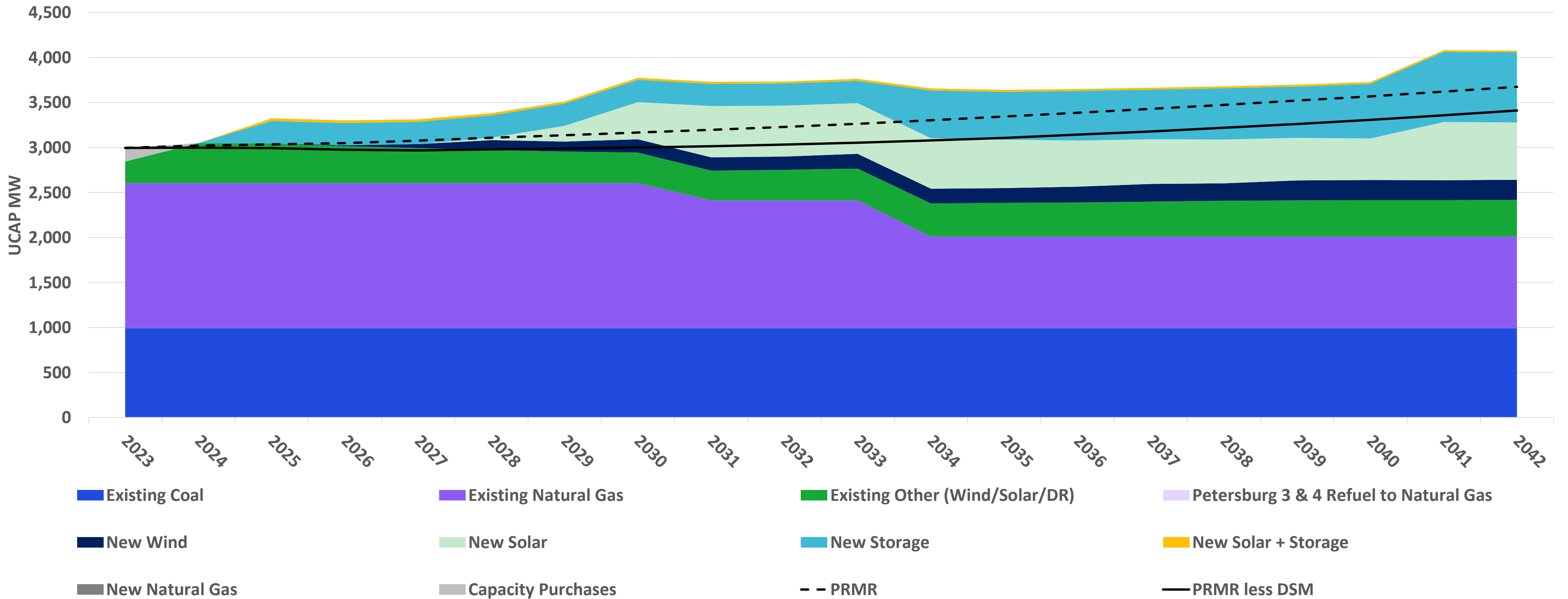
		Scenarios
		Aggressive Environmental
<i>20-Year PVRR (2023\$MM, 2023-2042)</i>		
Generation Strategies	No Early Retirement	\$11,349
	Pete Refuel to 100% Gas (est. 2025)	\$11,181
	One Pete Unit Retires (2026)	\$11,470
	Both Pete Units Retire (2026 & 2028)	\$11,145
	“Clean Energy Strategy” Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$11,184
	Encompass Optimization without predefined Strategy – Selects Pete 4 Refuel in 2027	\$10,994

A. No Early Retirement

		Scenarios			
		No Environmental Action	Current Trends	Aggressive Environmental	Decarbonized Economy
Generation Strategy: <i>No Early Retirement</i>				\$11,349	

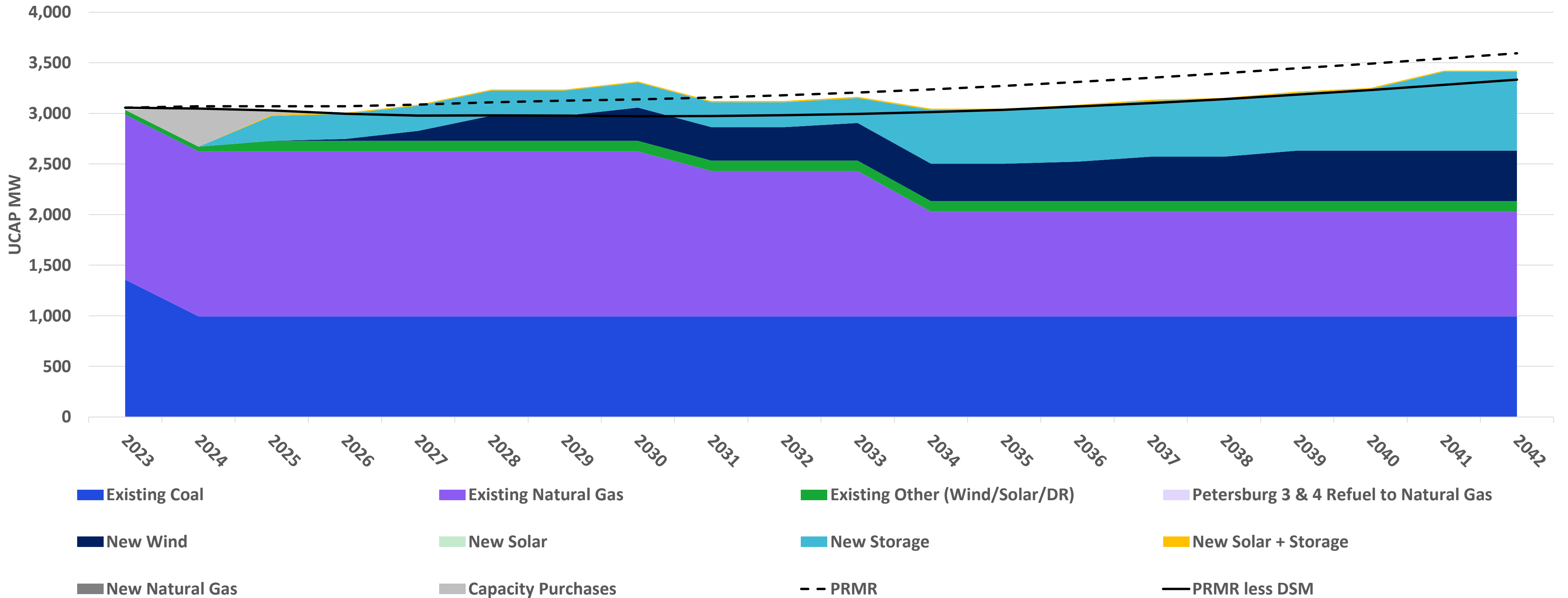
No Early Retirement: Aggressive Environmental

Firm Unforced Capacity Position – Summer



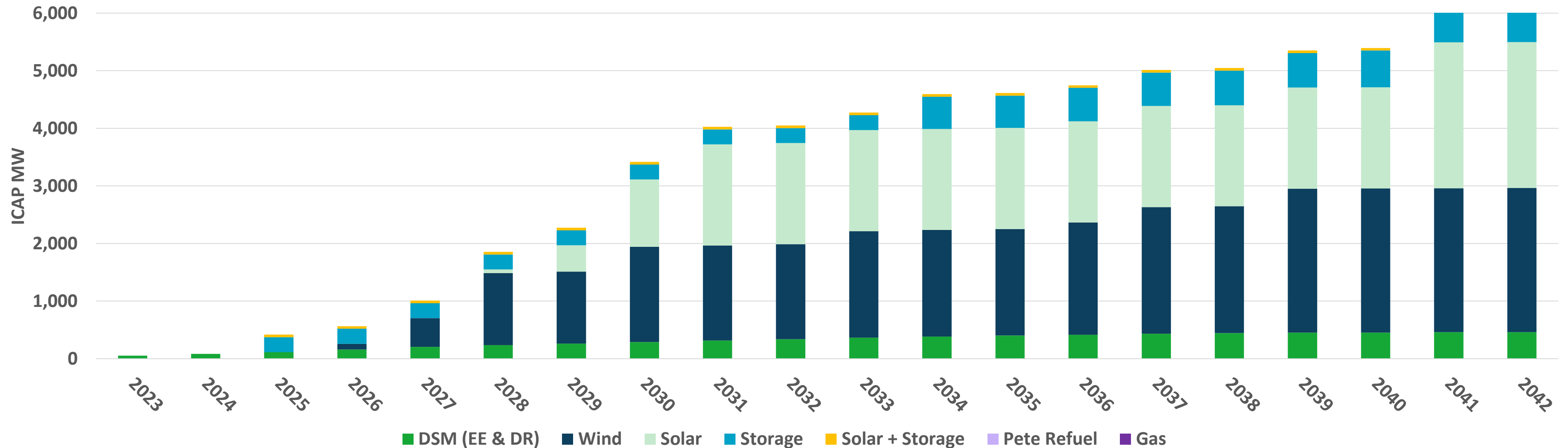
No Early Retirement: Aggressive Environmental

Firm Unforced Capacity Position – Winter



No Early Retirement: Aggressive Environmental

Installed Capacity Cumulative Additions (MW)

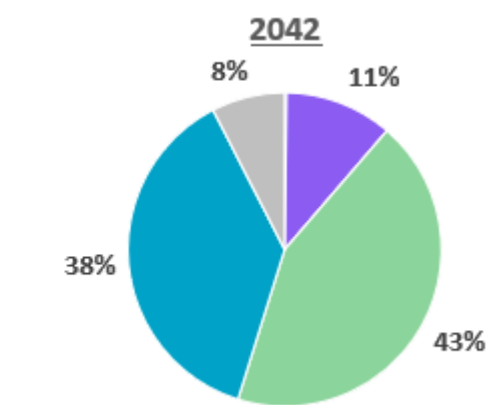
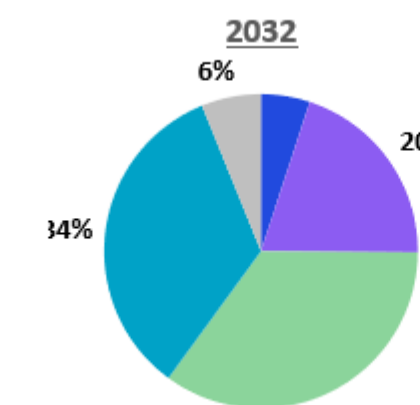
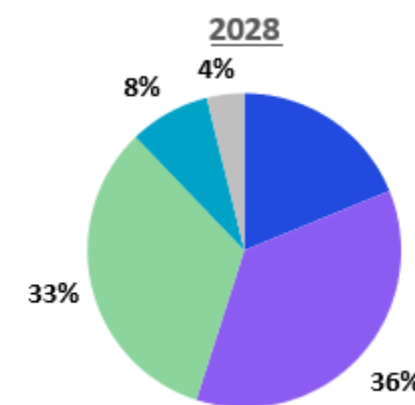
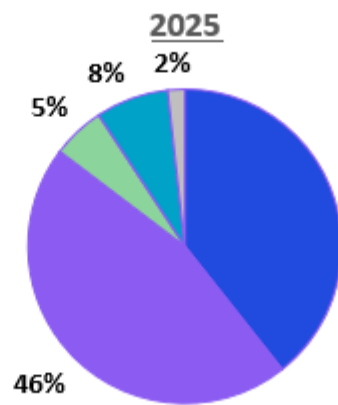
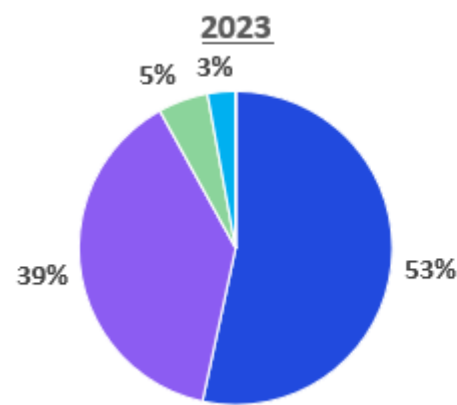
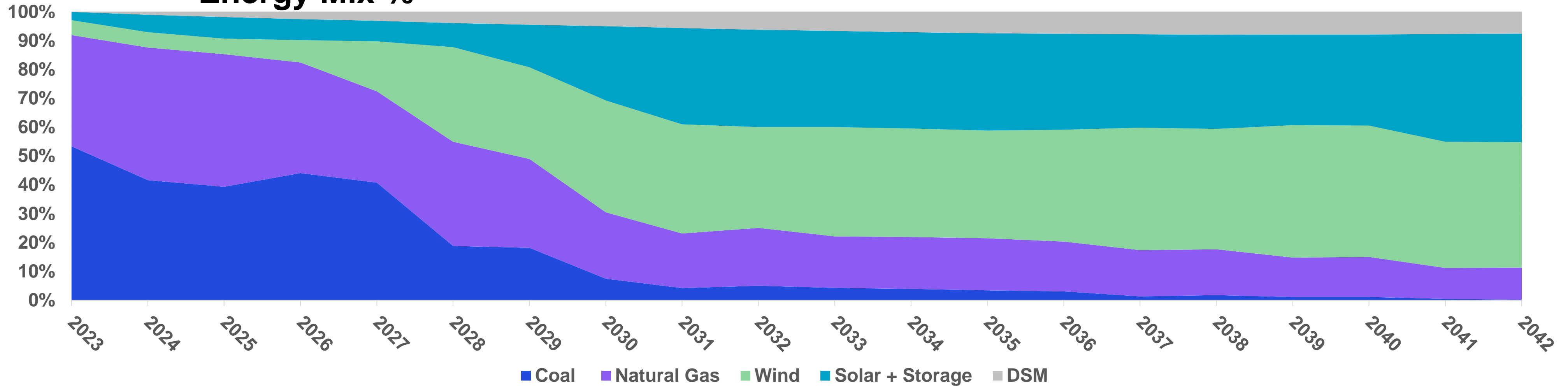


Installed Capacity Incremental Additions (MW): 2023 - 2028

	2023	2024	2025	2026	2027	2028
Wind	0	0	0	100	400	750
Solar	0	0	0	0	0	65
Storage	0	0	260	0	0	0
Solar + Storage	0	0	45	0	0	0
Gas	0	0	0	0	0	0

No Early Retirement: Aggressive Environmental

Energy Mix %



Thermal MWh %	92%	Thermal MWh %	85%	Thermal MWh %	55%	Thermal MWh %	25%	Thermal MWh %	11%
Renewable/DSM MWh %	8%	Renewable/DSM MWh %	15%	Renewable/DSM MWh %	45%	Renewable/DSM MWh %	75%	Renewable/DSM MWh %	89%

No Early Retirement: Aggressive Environmental

Portfolio Overview

Retirements

Harding Street:

- HS ST5 Nat Gas: 2030
- HS ST6 Nat Gas: 2030
- HS ST7 Nat Gas: 2033
- **Total Nat Gas Retired MW: 618 MW**

Replacement Additions by 2042

- DSM: 462 MW
- Wind: 2,500 MW
- Solar: 2,535 MW
- Storage: 820 MW
- Solar + Storage: 45 MW
- Thermal: 0 MW

Current Trends PVRR Summary

20-Year PVRR (2023\$MM, 2023-2042)

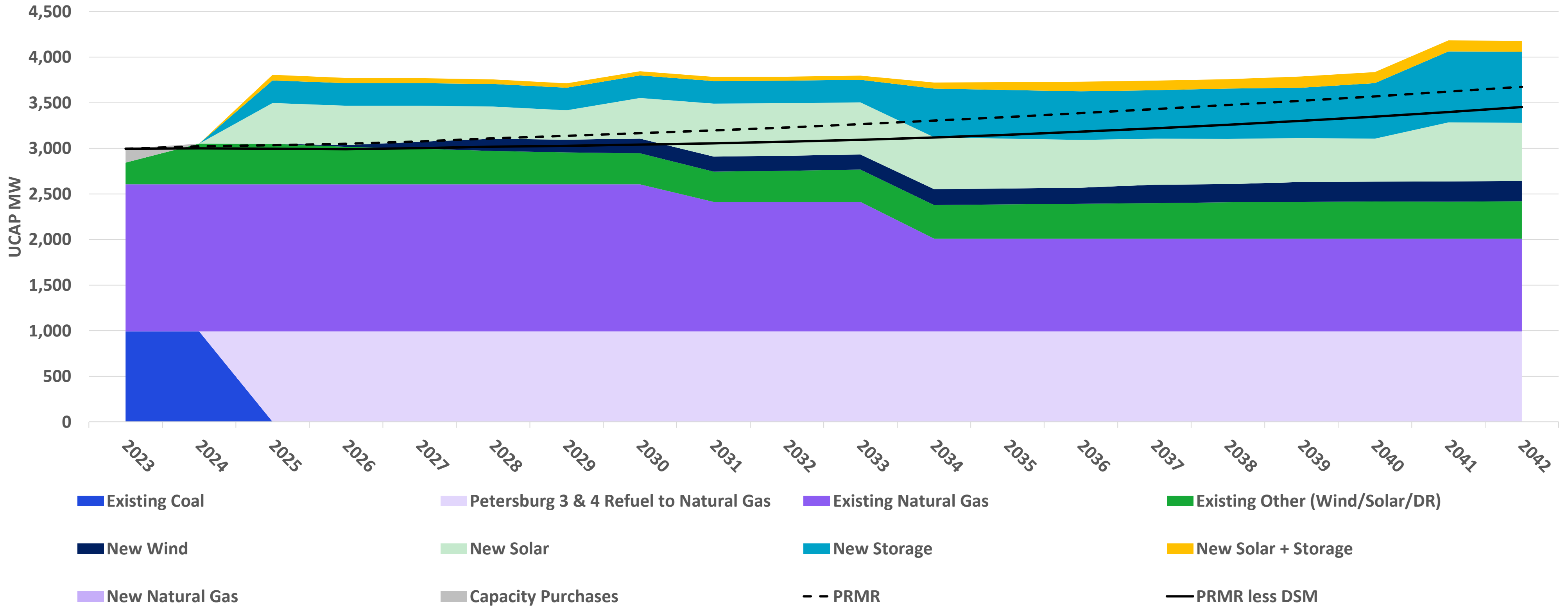
	Scenarios
	Aggressive Environmental
No Early Retirement	\$11,349
Pete Refuel to 100% Gas (est. 2025)	\$11,181
One Pete Unit Retires (2026)	\$11,470
Both Pete Units Retire (2026 & 2028)	\$11,145
"Clean Energy Strategy" Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$11,184
Encompass Optimization without predefined Strategy	\$10,994

B. Pete Refuel by 2025

<i>20-Year PVRR (2023\$MM, 2023-2042)</i> Generation Strategy: Pete Refuel to 100% Gas (est. 2025)	Scenarios			
	No Environmental Action	Current Trends	Aggressive Environmental	Decarbonized Economy
			\$11,181	

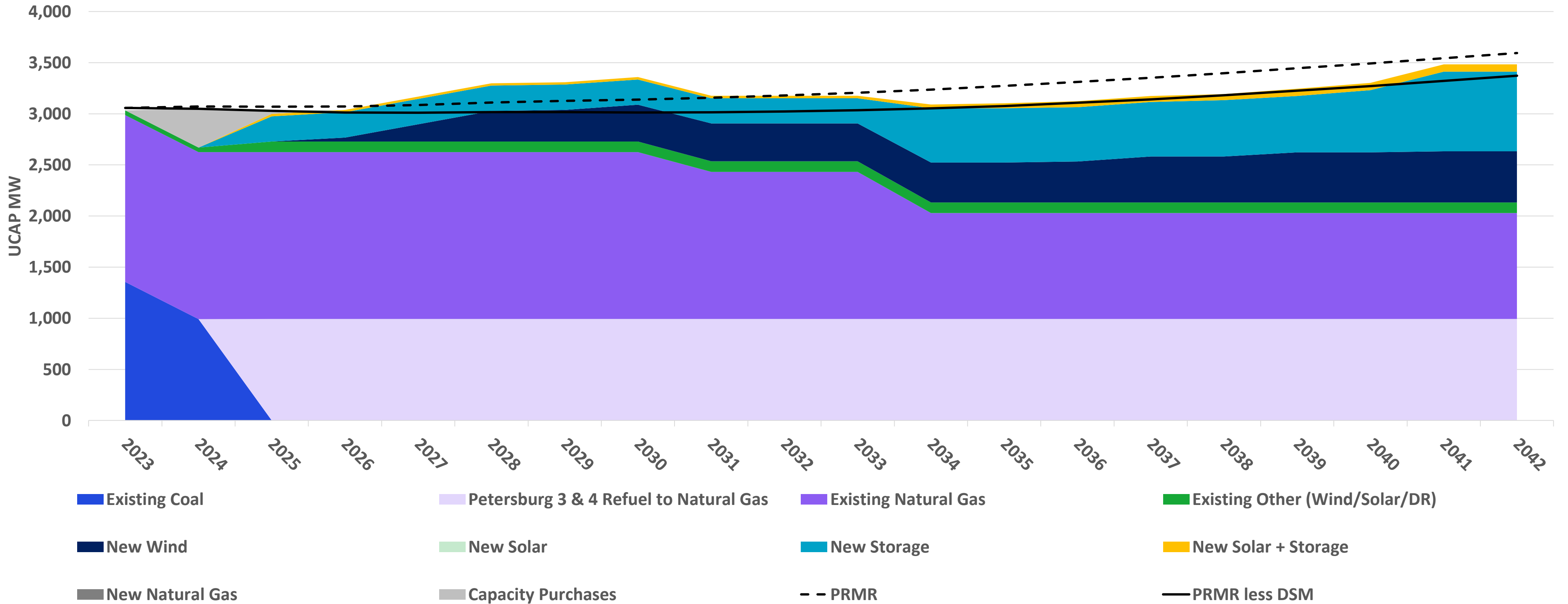
Pete 3 & 4 Refuel in 2025: Aggressive Environmental

Firm Unforced Capacity Position – Summer



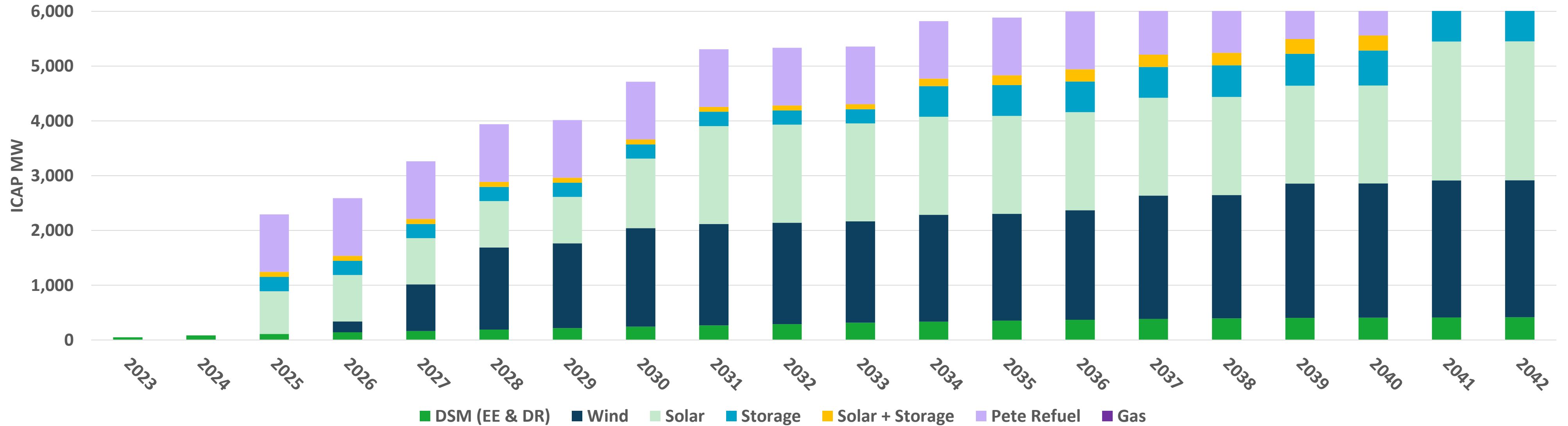
Pete 3 & 4 Refuel in 2025: Aggressive Environmental

Firm Unforced Capacity Position – Winter



Pete 3 & 4 Refuel in 2025: Aggressive Environmental

Installed Capacity Cumulative Additions (MW)

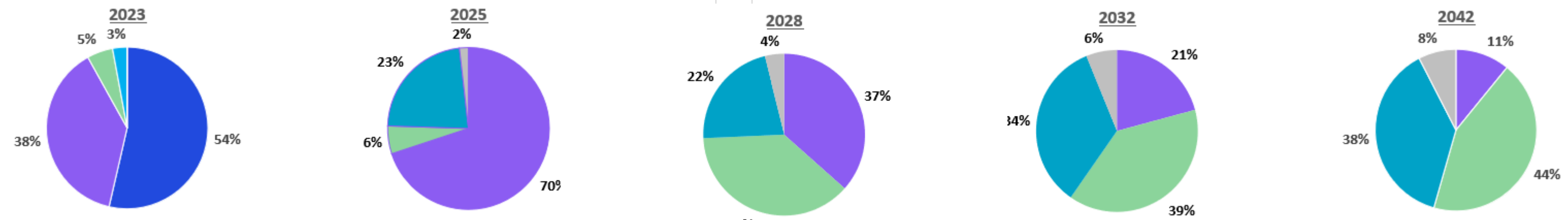
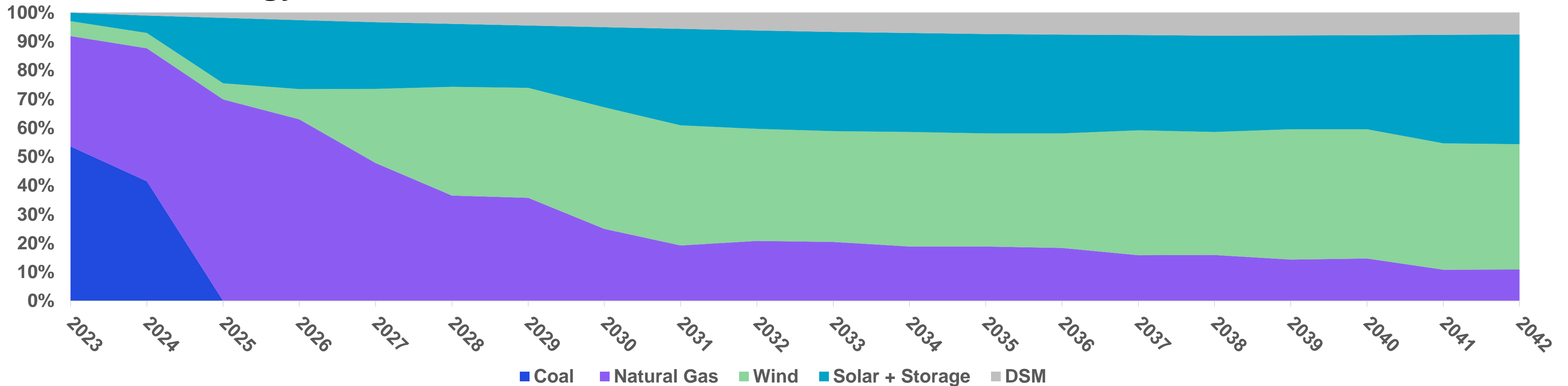


Installed Capacity Incremental Additions (MW): 2023 - 2028

	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>
Wind	0	0	0	200	650	650
Solar	0	0	780	65	0	0
Storage	0	0	260	0	0	0
Solar + Storage	0	0	90	0	0	0
Pete Refuel	0	0	1,052	0	0	0
Gas	0	0	0	0	0	0

Pete 3 & 4 Refuel in 2025: Aggressive Environmental

Energy Mix %



Thermal MWh %	92%	Thermal MWh %	70%	Thermal MWh %	37%	Thermal MWh %	21%	Thermal MWh %	11%
Renewable/DSM MWh %	8%	Renewable/DSM MWh %	30%	Renewable/DSM MWh %	63%	Renewable/DSM MWh %	79%	Renewable/DSM MWh %	89%

Pete 3 & 4 Refuel in 2025: Aggressive Environmental

Portfolio Overview

Retirements

Petersburg:

- Pete 3 & 4 Coal: 2025 Refuel with Nat Gas
- **Total Refueled MW: 1,040 MW**

Harding Street:

- HS ST5 Nat Gas: 2030
- HS ST6 Nat Gas: 2030
- HS ST7 Nat Gas: 2033
- **Total Nat Gas Retired MW: 618 MW**

Replacement Additions by 2042

- DSM: 415 MW
- Wind: 2,500 MW
- Solar: 2,535 MW
- Storage: 820 MW
- Solar + Storage: 270 MW
- Thermal: 0
- Pete 3 & 4 Refueled to Nat Gas: 1,052 MW

Current Trends PVRR Summary

20-Year PVRR (2023\$MM, 2023-2042)

	Scenarios
	Aggressive Environmental
No Early Retirement	\$11,349
Pete Refuel to 100% Gas (est. 2025)	\$11,181
One Pete Unit Retires (2026)	\$11,470
Both Pete Units Retire (2026 & 2028)	\$11,145
"Clean Energy Strategy" Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$11,184
Encompass Optimization without predefined Strategy	\$10,994

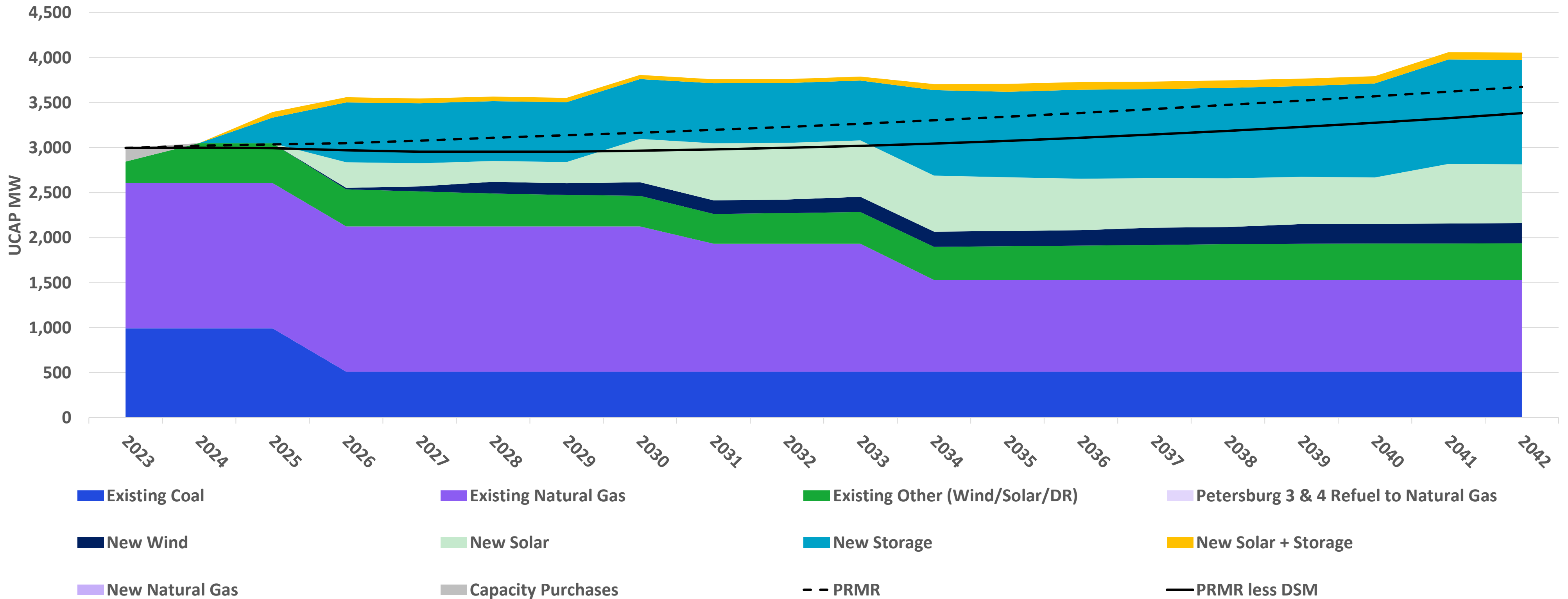
C. One Pete Unit Retires (2026)

*20-Year PVRR
(2023\$MM, 2023-2042)*
**Generation Strategy:
One Pete Unit Retires
(2026)**

Scenarios			
No Environmental Action	Current Trends	Aggressive Environmental	Decarbonized Economy
		\$11,470	

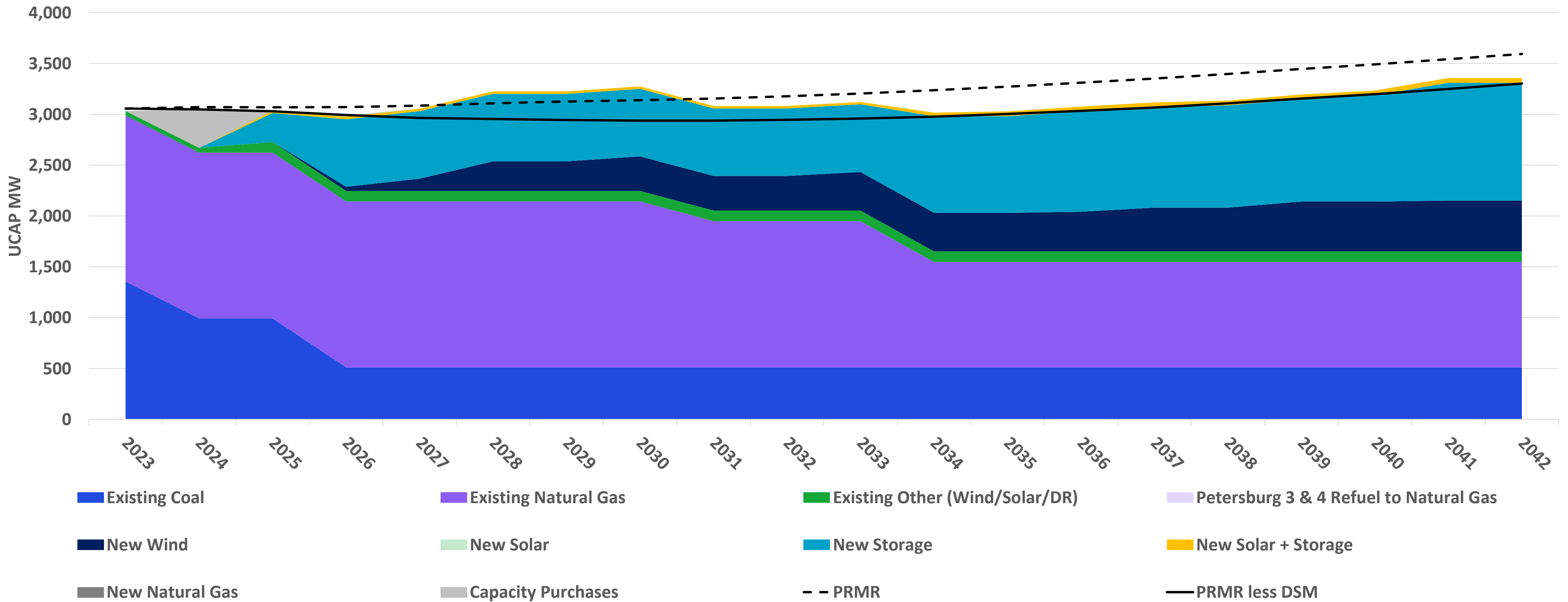
One Pete Unit Retires (2026): Aggressive Environmental

Firm Unforced Capacity Position – Summer



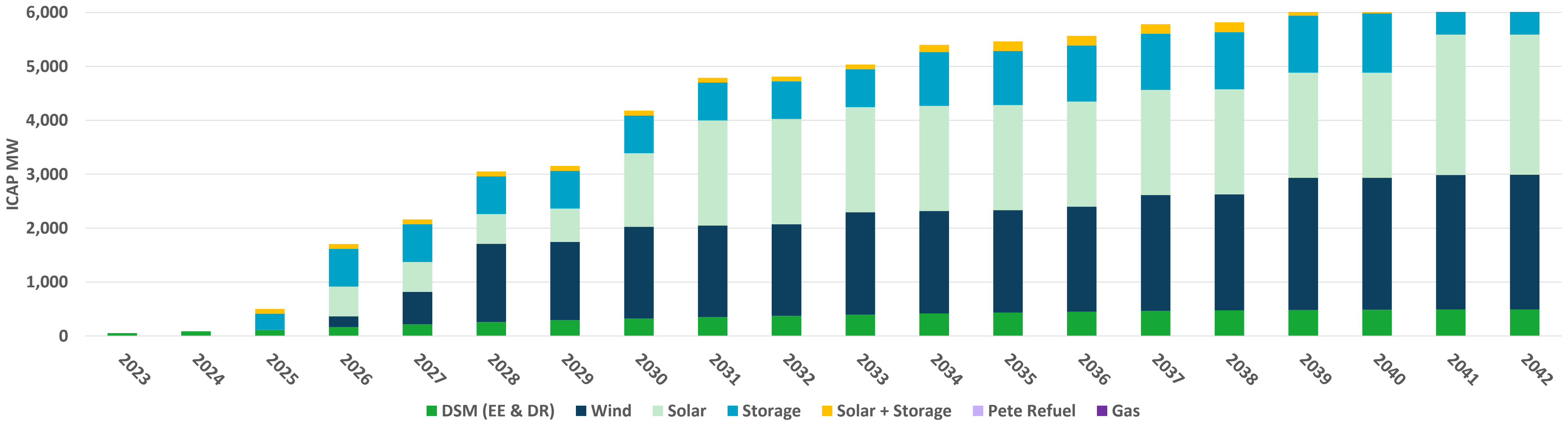
One Pete Unit Retires (2026): Aggressive Environmental

Firm Unforced Capacity Position – Winter



One Pete Unit Retires (2026): Aggressive Environmental

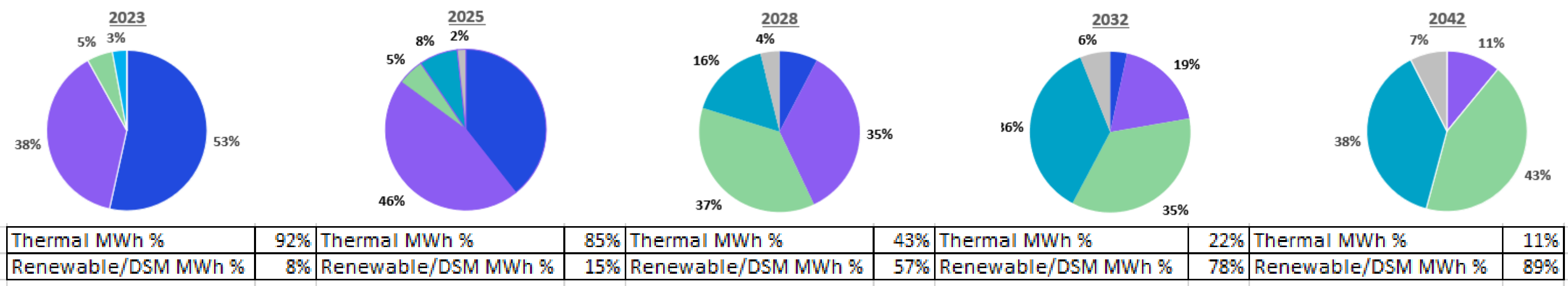
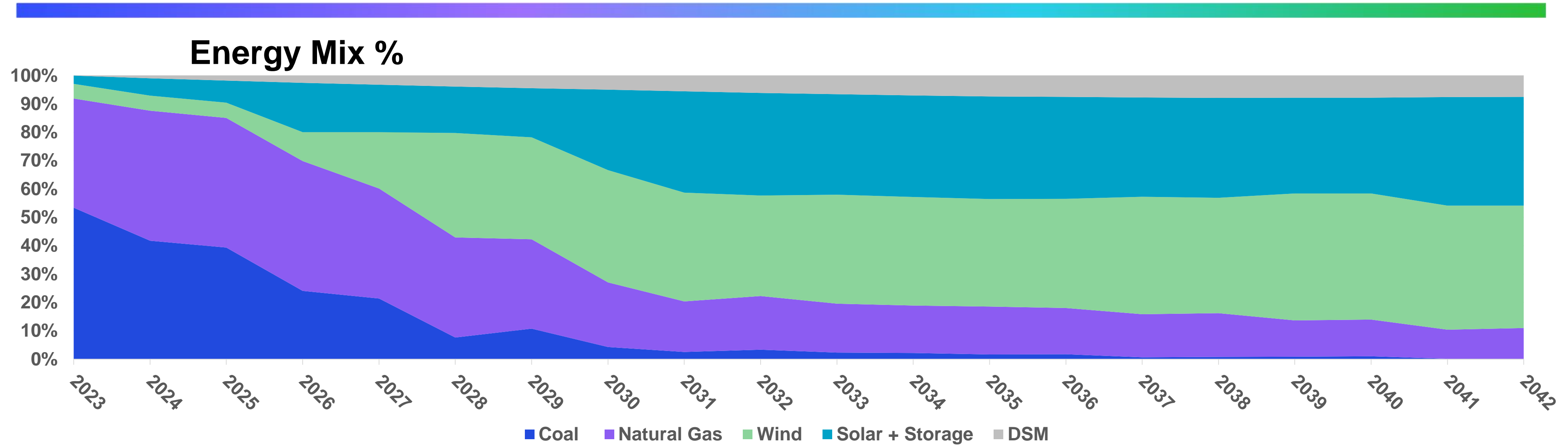
Installed Capacity Cumulative Additions (MW)



Installed Capacity Incremental Additions (MW): 2023 - 2028

	2023	2024	2025	2026	2027	2028
Wind	0	0	0	200	400	850
Solar	0	0	0	553	0	0
Storage	0	0	300	400	0	0
Solar + Storage	0	0	90	0	0	0
Gas	0	0	0	0	0	0

One Pete Unit Retires (2026): Aggressive Environmental



One Pete Unit Retires (2026): Aggressive Environmental

Portfolio Overview

Retirements

Petersburg:

- Pete 3 Coal: 2026
- **Total Coal Retired MW: 520 MW**

Harding Street:

- HS ST5 Nat Gas: 2030
- HS ST6 Nat Gas: 2030
- HS ST7 Nat Gas: 2033
- **Total Nat Gas Retired MW: 618 MW**

Replacement Additions by 2042

- DSM: 490 MW
- Wind: 2,500 MW
- Solar: 2,600 MW
- Storage: 1,240 MW
- Solar + Storage: 180 MW
- Thermal: 0 MW

Current Trends PVRR Summary

20-Year PVRR (2023\$MM, 2023-2042)

	Scenarios
	Aggressive Environmental
No Early Retirement	\$11,349
Pete Refuel to 100% Gas (est. 2025)	\$11,181
One Pete Unit Retires (2026)	\$11,470
Both Pete Units Retire (2026 & 2028)	\$11,145
"Clean Energy Strategy" Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$11,184
Encompass Optimization without predefined Strategy	\$10,994

D. Both Pete Units Retire (2026 & 2028)

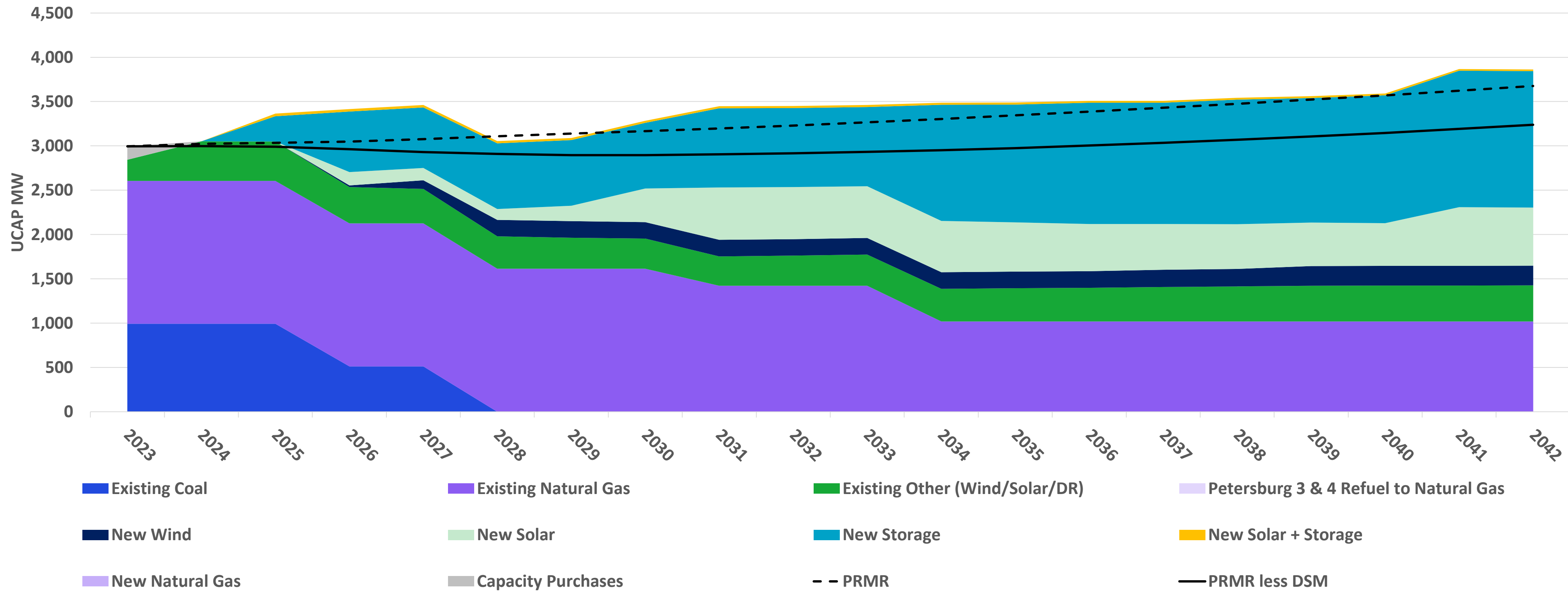
*20-Year PVRR
(2023\$MM, 2023-2042)*
**Generation Strategy:
Both Pete Units Retire
(2026 & 2028)**

Scenarios			
No Environmental Action	Current Trends	Aggressive Environmental	Decarbonized Economy
		\$11,145	

Both Pete Units Retire: Aggressive Environmental

2026 & 2028

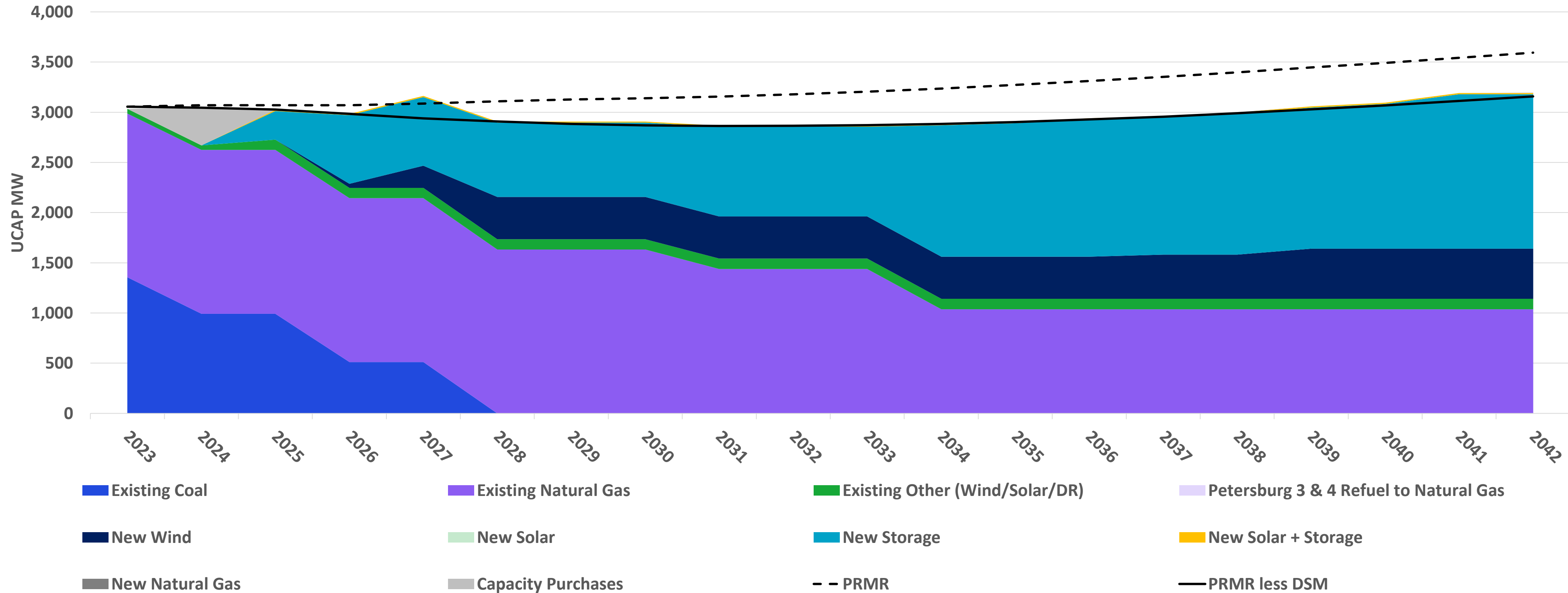
Firm Unforced Capacity Position – Summer



Both Pete Units Retire: Aggressive Environmental

2026 & 2028

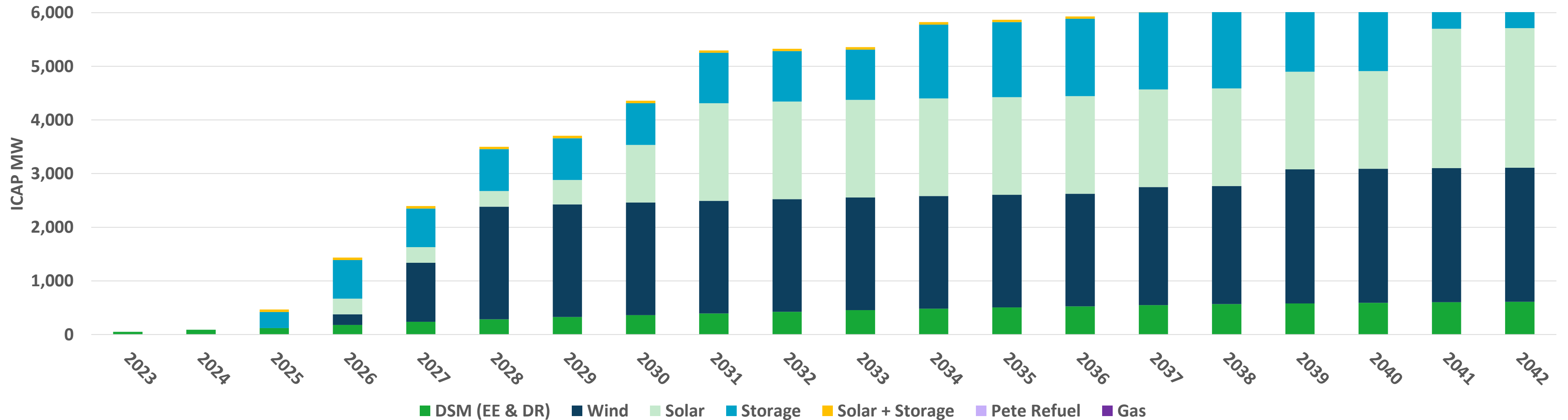
Firm Unforced Capacity Position – Winter



Both Pete Units Retire: Aggressive Environmental

2026 & 2028

Installed Capacity Cumulative Additions (MW)



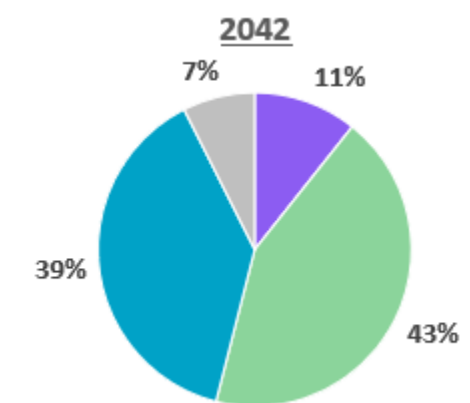
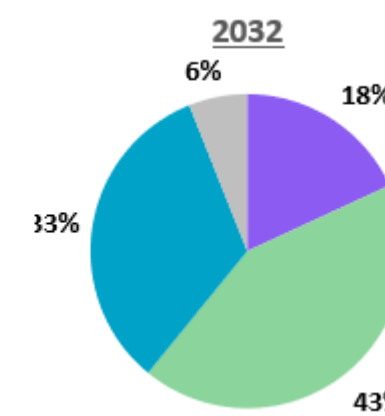
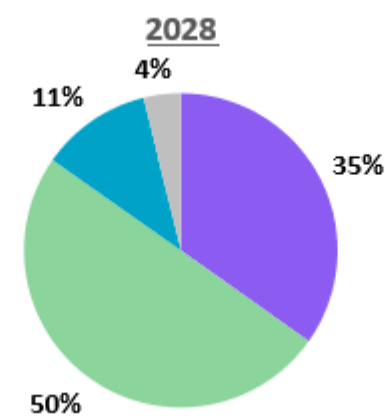
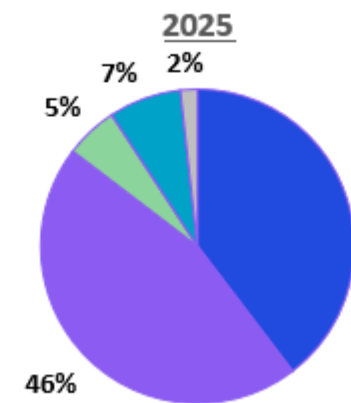
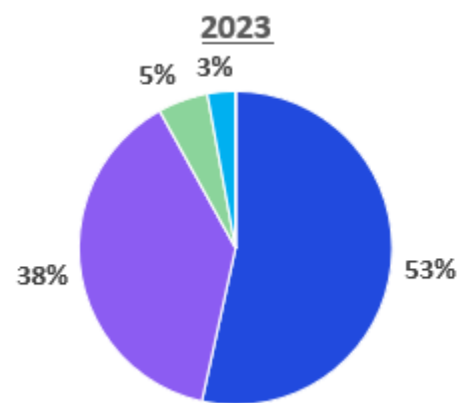
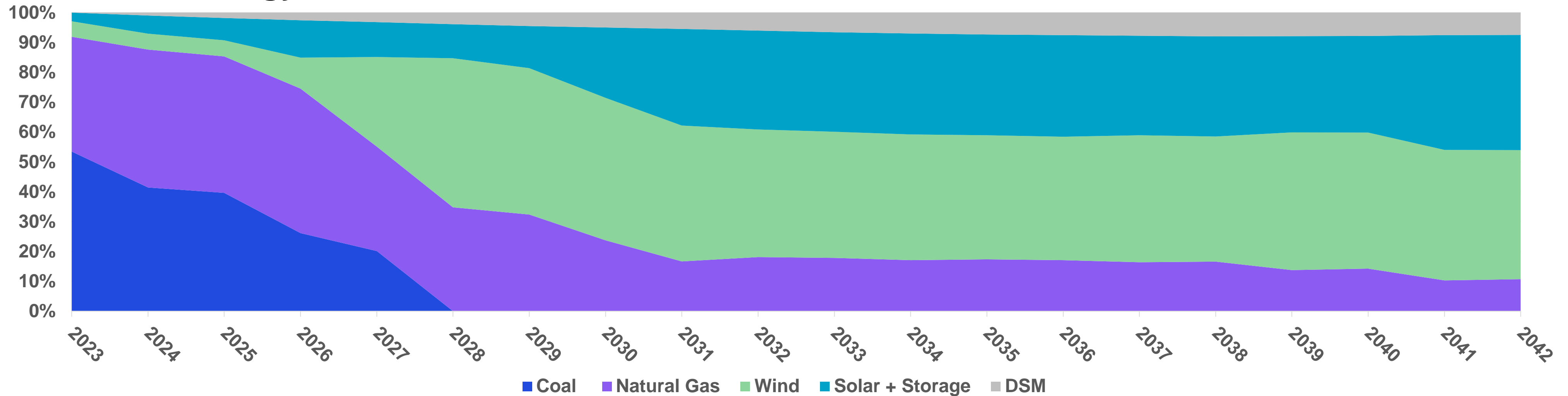
Installed Capacity Incremental Additions (MW): 2023 – 2028

	2023	2024	2025	2026	2027	2028
Wind	0	0	0	200	900	1,000
Solar	0	0	0	293	0	0
Storage	0	0	300	420	0	60
Solar + Storage	0	0	45	0	0	0
Gas	0	0	0	0	0	0

Both Pete Units Retire: Aggressive Environmental

2026 & 2028

Energy Mix %



Thermal MWh %	92%	Thermal MWh %	85%	Thermal MWh %	35%	Thermal MWh %	18%	Thermal MWh %	11%
Renewable/DSM MWh %	8%	Renewable/DSM MWh %	15%	Renewable/DSM MWh %	65%	Renewable/DSM MWh %	82%	Renewable/DSM MWh %	89%

Both Pete Units Retire: Aggressive Environmental

2026 & 2028

Portfolio Overview

Retirements

Petersburg:

- Pete 3 Coal: 2026
- Pete 4 Coal: 2028
- **Total Coal Retired MW: 1,040 MW**

Harding Street:

- HS ST5 Nat Gas: 2030
- HS ST6 Nat Gas: 2030
- HS ST7 Nat Gas: 2033
- **Total Nat Gas Retired MW: 618 MW**

Replacement Additions by 2042

- DSM: 610 MW
- Wind: 2,500 MW
- Solar: 2,600 MW
- Storage: 1,620 MW
- Solar + Storage: 45 MW
- Thermal: 0 MW

Current Trends PVRR Summary

20-Year PVRR (2023\$MM, 2023-2042)

	Scenarios
	Aggressive Environmental
No Early Retirement	\$11,349
Pete Refuel to 100% Gas (est. 2025)	\$11,181
One Pete Unit Retires (2026)	\$11,470
Both Pete Units Retire (2026 & 2028)	\$11,145
"Clean Energy Strategy" Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$11,184
Encompass Optimization without predefined Strategy	\$10,994

E. Clean Energy Strategy

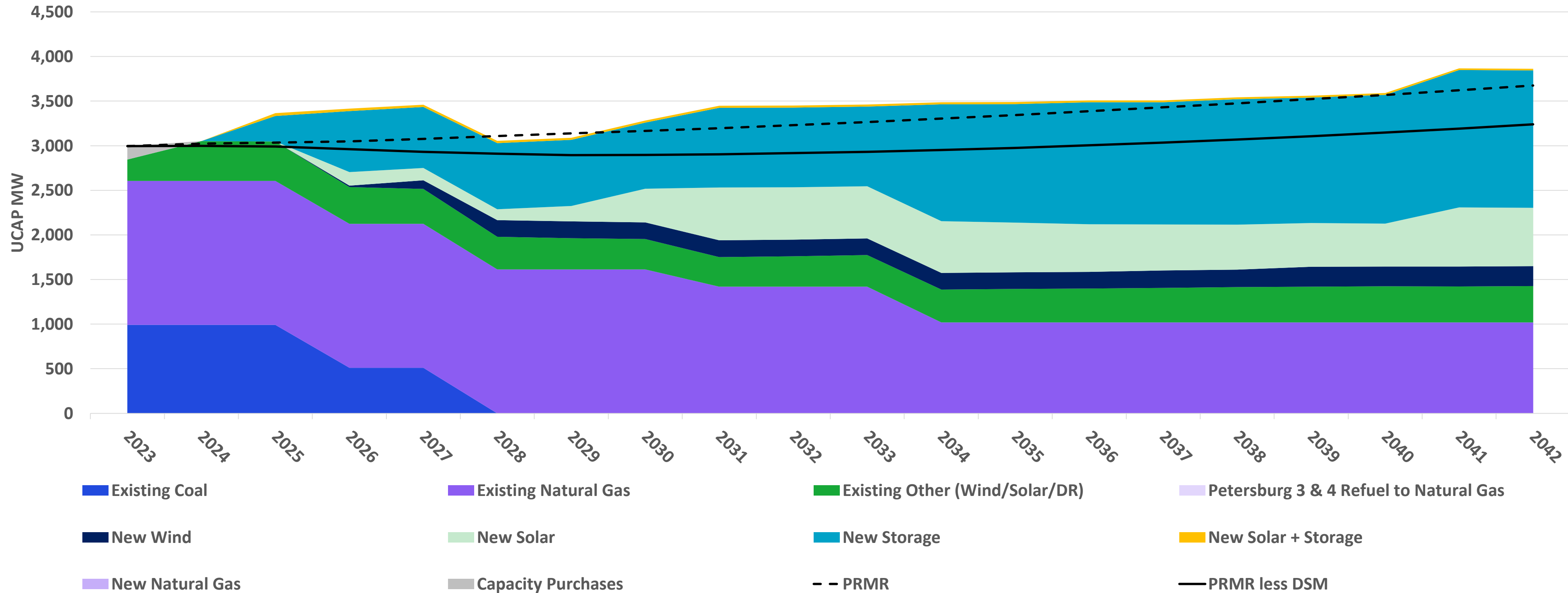
Retire & Replace Pete with Clean Energy

20-Year PVRR (2023\$MM, 2023-2042)	Scenarios			
	No Environmental Action	Current Trends	Aggressive Environmental	Decarbonized Economy
Generation Strategy: <i>“Clean Energy Strategy”</i> <i>Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)</i>			\$11,184	

Clean Energy Strategy: Aggressive Environmental

Retire & Replace Pete with Clean Energy

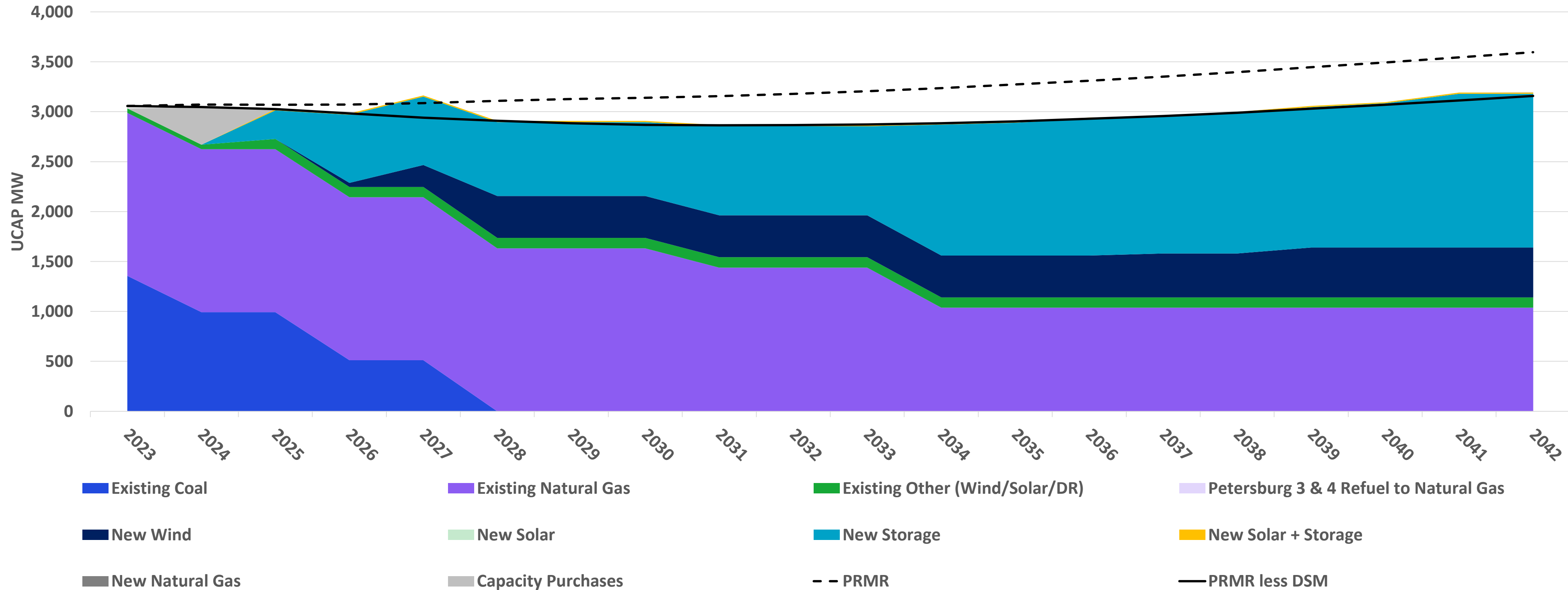
Firm Unforced Capacity Position – Summer



Clean Energy Strategy: Aggressive Environmental

Retire & Replace Pete with Clean Energy

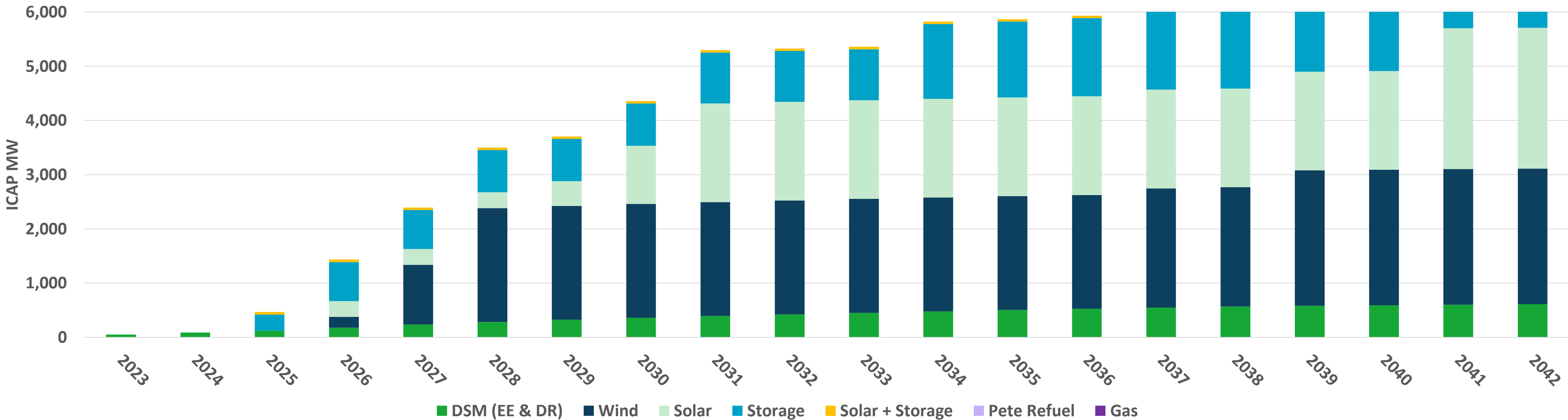
Firm Unforced Capacity Position – Winter



Clean Energy Strategy: Aggressive Environmental

Retire & Replace Pete with Clean Energy

Installed Capacity Cumulative Additions (MW)



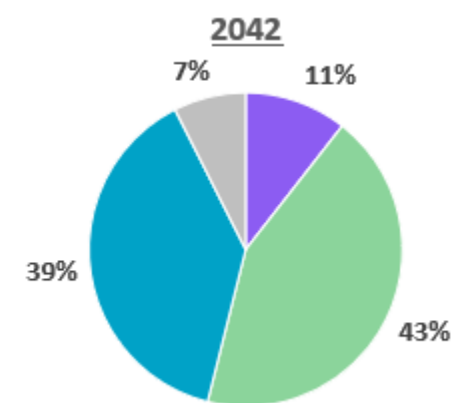
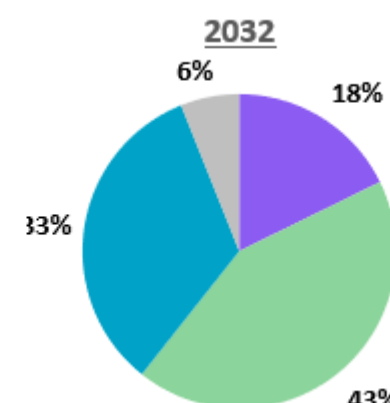
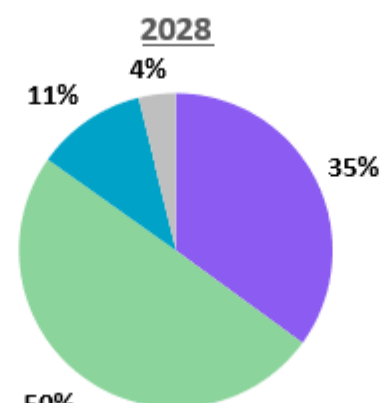
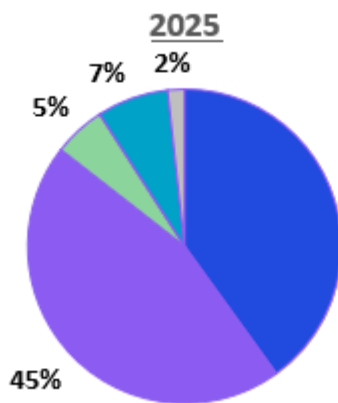
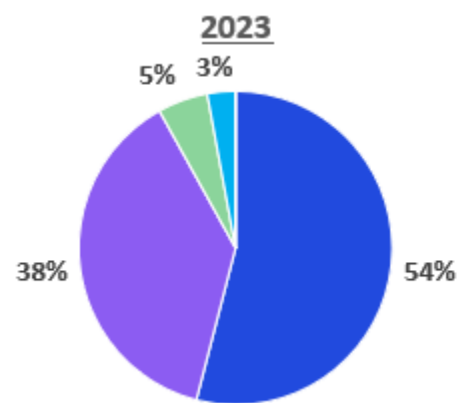
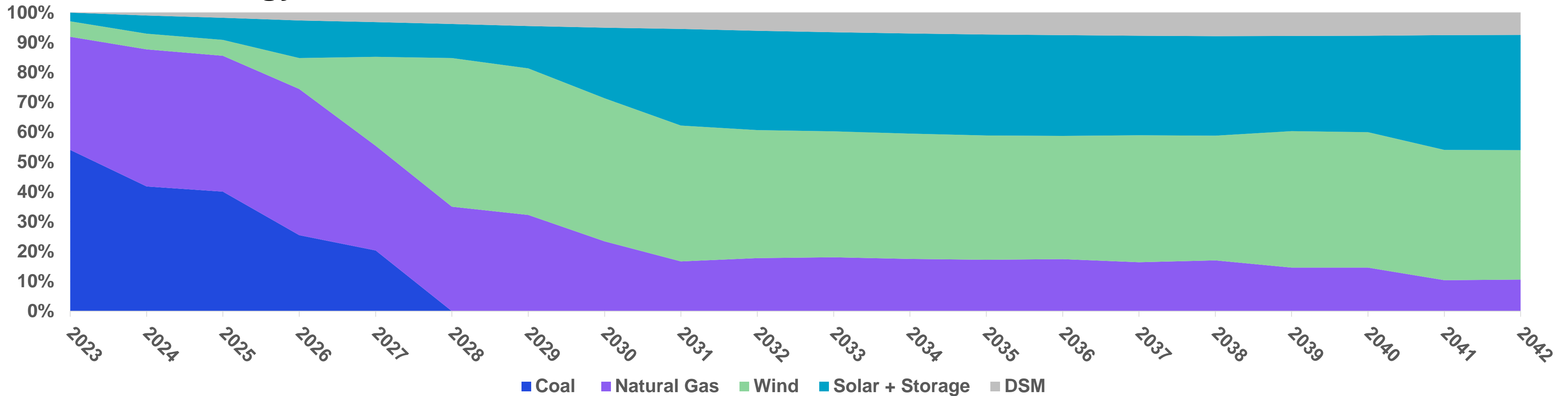
Installed Capacity Incremental Additions (MW): 2023 – 2028

	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>
Wind	0	0	0	200	900	1,000
Solar	0	0	0	293	0	0
Storage	0	0	300	420	0	60
Solar + Storage	0	0	45	0	0	0
Gas	0	0	0	0	0	0

Clean Energy Strategy: Aggressive Environmental

Retire & Replace Pete with Clean Energy

Energy Mix %



Thermal MWh %	92%	Thermal MWh %	86%	Thermal MWh %	35%	Thermal MWh %	18%	Thermal MWh %	11%
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Clean Energy Strategy: Aggressive Environmental

Retire & Replace Pete with Clean Energy

Portfolio Overview

Retirements

Petersburg:

- Pete 3 Coal: 2026
- Pete 4 Coal: 2028
- **Total Coal Retired MW: 1,040 MW**

Harding Street:

- HS ST5 Nat Gas: 2030
- HS ST6 Nat Gas: 2030
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Replacements by 2042

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Current Trends PVRR Summary

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Encompass Optimization without predefined Strategy	\$10,994

F. Encompass Optimization

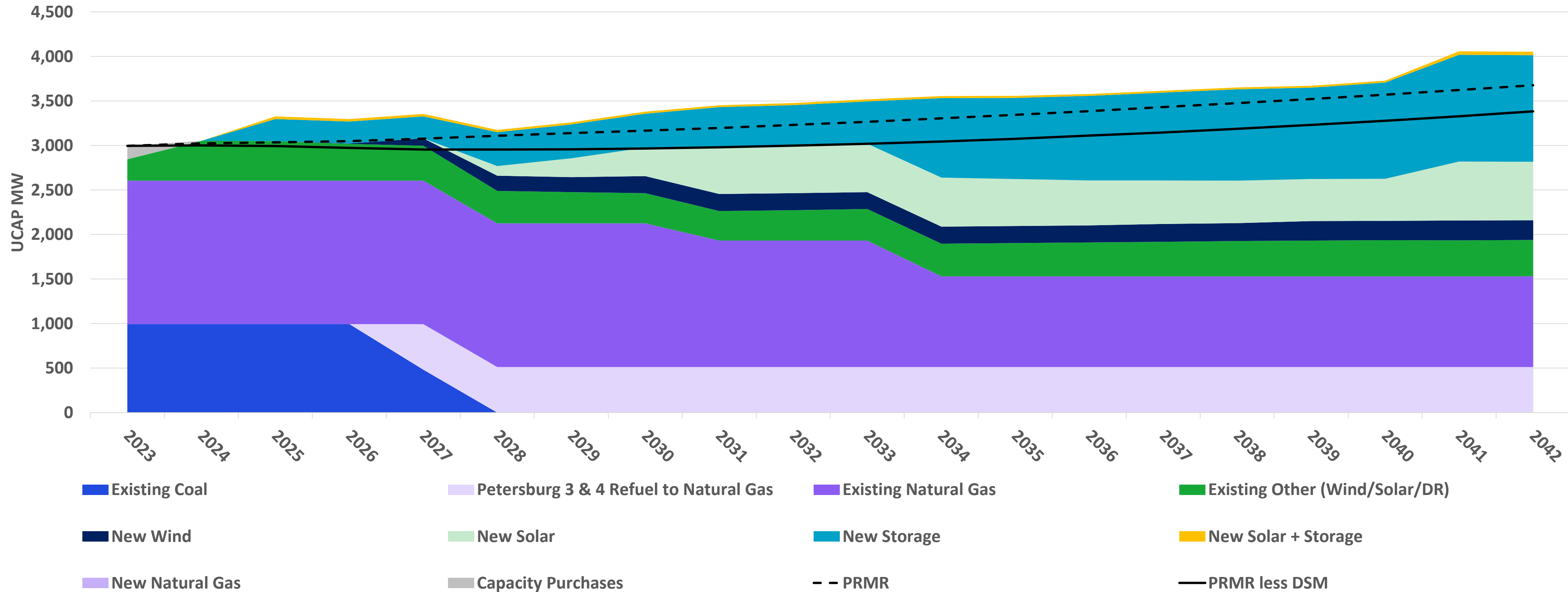
Selects Pete 3 Refuel in 2025 & Pete 4 Refuel in 2027

20-Year PVRR (2023\$MM, 2023-2042) Generation Strategy: Encompass Optimization without predefined Strategy – Selects Pete 4 Refuel in 2027	Scenarios			
	No Environmental Action	Current Trends	Aggressive Environmental	Decarbonized Economy
			\$10,994	

Encompass Optimization: Aggressive Environmental

Selects Pete 4 Refuel in 2027

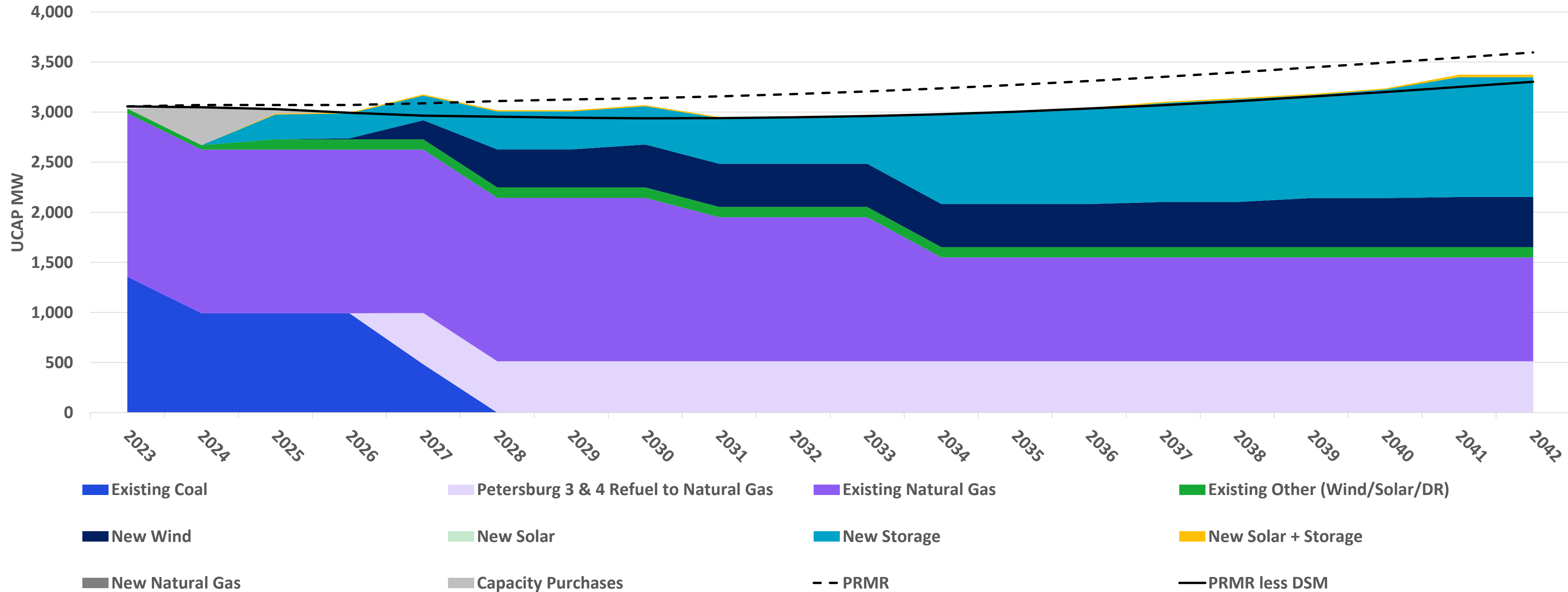
Firm Unforced Capacity Position – Summer



Encompass Optimization: Aggressive Environmental

Selects Pete 4 Refuel in 2027

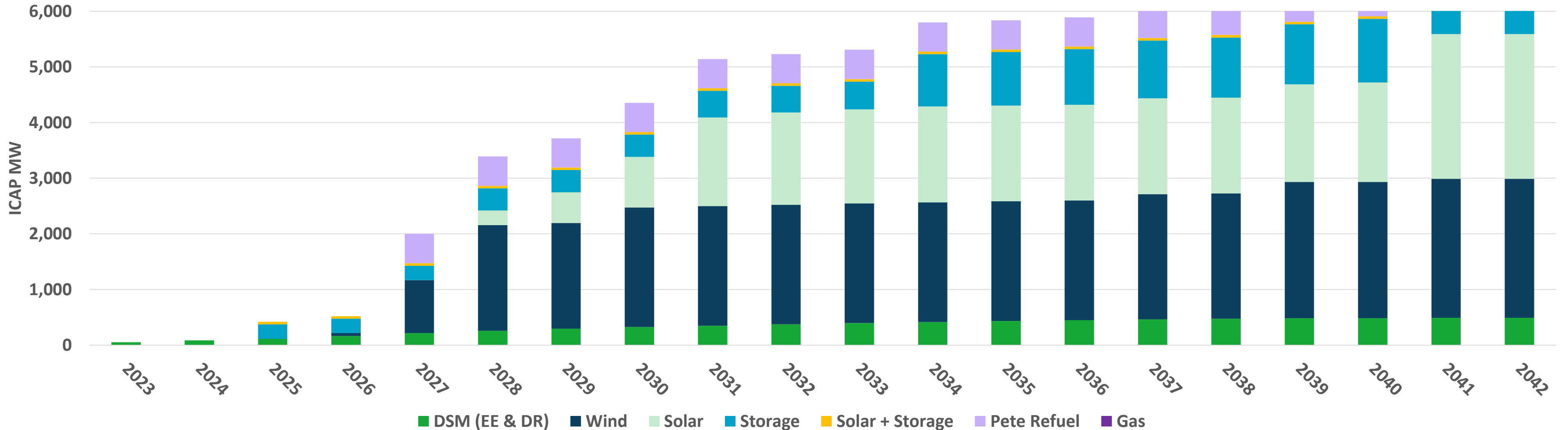
Firm Unforced Capacity Position – Winter



Encompass Optimization: Aggressive Environmental

Selects Pete 4 Refuel in 2027

Installed Capacity Cumulative Additions (MW)



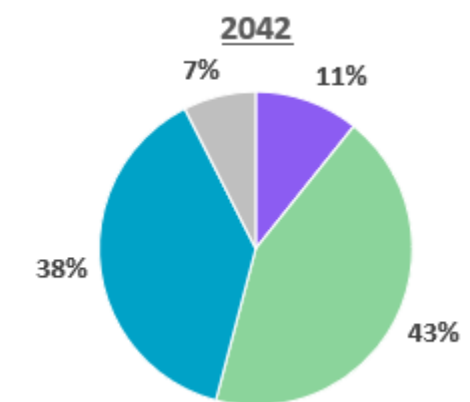
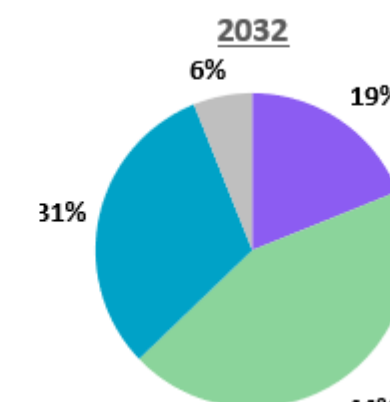
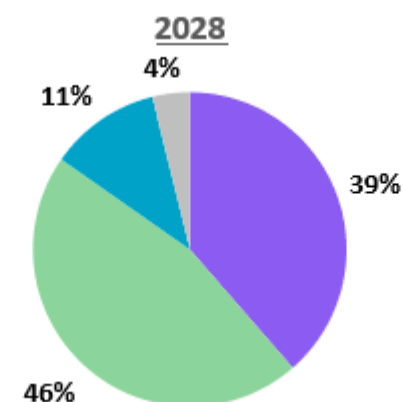
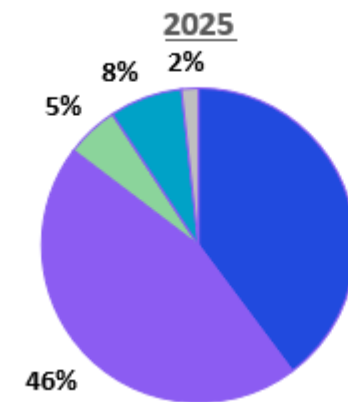
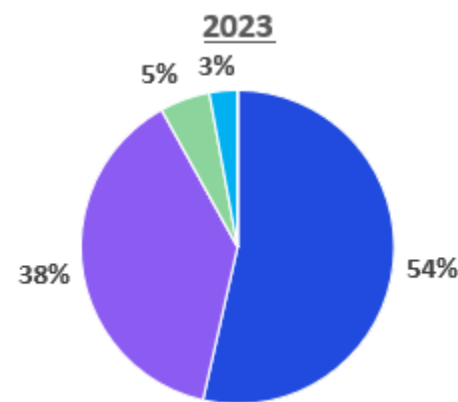
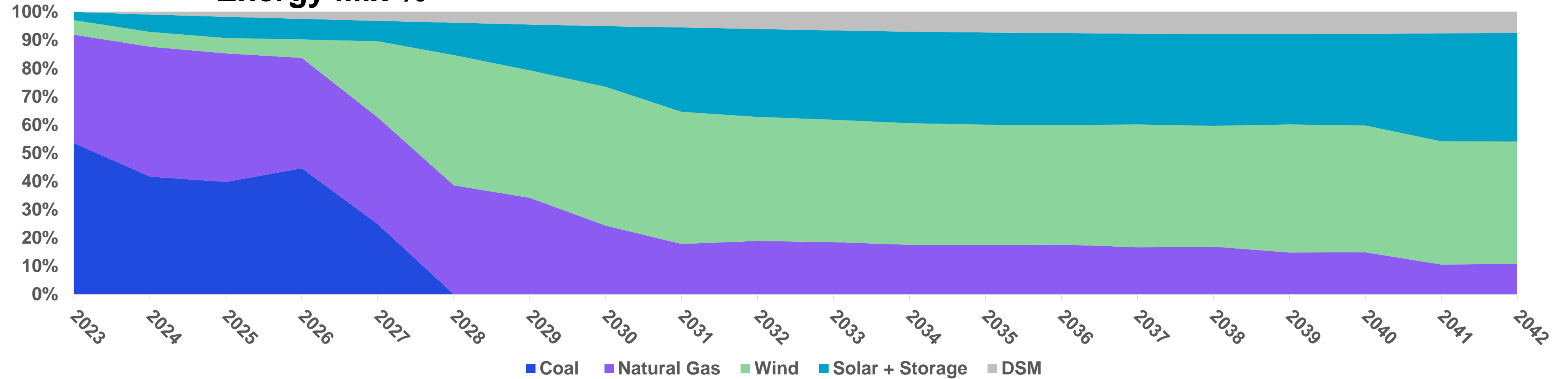
Installed Capacity Incremental Additions (MW): 2023 - 2028

	<u>2023</u>	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>
Wind	0	0	0	50	900	950
Solar	0	0	0	0	0	260
Storage	0	0	260	0	0	140
Solar + Storage	0	0	45	0	0	0
Pete Refuel	0	0	0	0	526	0
Gas	0	0	0	0	0	0

Encompass Optimization: Aggressive Environmental

Selects Pete 4 Refuel in 2027

Energy Mix %



Thermal MWh %	92%	Thermal MWh %	85%	Thermal MWh %	39%	Thermal MWh %	19%	Thermal MWh %	11%
Renewable/DSM MWh %	8%	Renewable/DSM MWh %	15%	Renewable/DSM MWh %	61%	Renewable/DSM MWh %	81%	Renewable/DSM MWh %	89%

Encompass Optimization: Aggressive Environmental

Selects Pete 4 Refuel in 2027

Portfolio Overview

Retirements

Petersburg:

- Pete 3 Coal: 2028 – Retired 520 MW
- Pete 4 Coal: 2026 – Refueled 520 MW

Harding Street:

- HS ST5 Nat Gas: 2030
- HS ST6 Nat Gas: 2030
- HS ST7 Nat Gas: 2033
- **Total Nat Gas Retired MW: 618 MW**

Replacement Additions by 2042

- DSM: 490 MW
- Wind: 2,500 MW
- Solar: 2,600 MW
- Storage: 1,260 MW
- Solar + Storage: 90 MW
- Thermal: 0
- Pete 4 Refueled to Nat Gas: 526 MW

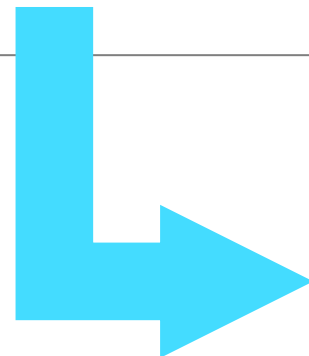
Current Trends PVRR Summary

20-Year PVRR (2023\$MM, 2023-2042)

	Scenarios
	Aggressive Environmental
No Early Retirement	\$11,349
Pete Refuel to 100% Gas (est. 2025)	\$11,181
One Pete Unit Retires (2026)	\$11,470
Both Pete Units Retire (2026 & 2028)	\$11,145
"Clean Energy Strategy" Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$11,184
Encompass Optimization without predefined Strategy	\$10,994

Portfolio Matrix

20-Year PVRR (2023\$MM, 2023-2042)		Scenarios			
		No Environmental Action	Current Trends (Reference Case)	Aggressive Environmental	Decarbonized Economy
Generation Strategies	No Early Retirement	\$7,111	\$9,572	\$11,349	\$9,917
	Pete Refuel to 100% Gas (est. 2025)	\$6,621	\$9,330	\$11,181	\$9,546
	One Pete Unit Retires (2026)	\$7,462	\$9,773	\$11,470	\$9,955
	Both Pete Units Retire (2026 & 2028)	\$7,425	\$9,618	\$11,145	\$9,923
	"Clean Energy Strategy" Both Pete Units Retire and Replaced with Wind, Solar & Storage (2026 & 2028)	\$9,211	\$9,711	\$11,184	\$9,690
	Encompass Optimization without predefined Strategy	\$6,610	\$9,262	\$10,994	\$9,572



Encompass Optimization Results by Scenario:

Refuels Petersburg Units 3 & 4 in 2025	Refuels Petersburg Unit 3 in 2025 & Refuels Petersburg Unit 4 in 2027	Refuels Petersburg Unit 4 in 2027	Refuels Petersburg Unit 3 in 2025 & Refuels Petersburg Unit 4 in 2027
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