

**2022-2023 JEA**

# **IRP Stakeholder Engagement Meeting Series**



# **IRP**

**INTEGRATED RESOURCE PLANNING**

A blue-tinted image of a city skyline with several skyscrapers and a bridge over water. In the bottom left corner, there is a faint, light blue compass rose with the letters N, E, and S visible.

# Welcome

**Raynetta Curry Marshall**  
*Chief Operating Officer*

# IRP Stakeholder Meeting Agenda – February 2, 2023



## 1) Welcome & Introductions

Raynetta Curry Marshall, Chief Operating Officer, JEA

## 2) November 2022 Stakeholder Meeting Recap

Laura Schepis, Chief External Affairs Officer, JEA; Cantrece Jones, Black & Veatch Consultants

## 3) Scenarios and Sensitivities

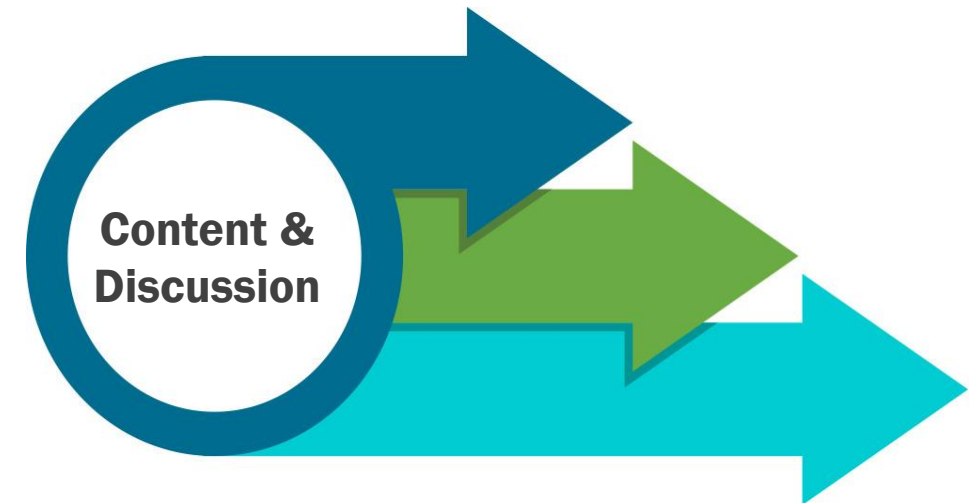
Brad Kushner, Black & Veatch Consultants

## 4) Implementation Plan

Pedro Melendez, VP Planning, Engineering & Construction, JEA

## 5) Next Steps and Open Discussion

Jay Stowe, Chief Executive Officer, JEA





A blue-tinted image of a city skyline with several skyscrapers and a bridge over water. In the bottom left corner, there is a faint, light blue compass rose with the letters N, E, and S visible.

# November 2022 Stakeholder Meeting Recap

**Laura Schepis**  
*Chief External Affairs Officer*

**Cantrece Jones**  
*Black & Veatch Consultant*

A vertical blue bar on the left side of the slide features a semi-transparent image of a city skyline with several skyscrapers and a bridge over water. At the bottom of this bar is a semi-transparent compass rose with the letters N, E, and S visible.

# Scenarios and Sensitivities

**Bradley Kushner**

*Black & Veatch Consultants*

# Refined and Expanded the Analysis

## Refinement of Solar PV, transmission system and interconnection costs

- Updated electrical transmission system and interconnection with more accurate estimates
- Overall cost of solar PV increased

## Additional Sensitivity analysis

- Each sensitivity is a change in a variable within the Current Outlook Scenario
  - Low Load Growth
  - No Load Growth
  - High Load Growth
  - High Fuel Prices
  - Regulated CO<sub>2</sub> Emissions
  - Net Zero CO<sub>2</sub> Emissions by 2050



# Resource Additions from Scenario Analysis



## Incremental Solar PV Additions

|   | Current Outlook | Economic Downturn | Efficiency + DER | Increased Electrification | Future Net Zero  | Supplemental     |
|---|-----------------|-------------------|------------------|---------------------------|------------------|------------------|
| Cumulative 2030                         | 300 MW          | 300 MW            | 1,275 MW         | 1,275 MW                  | 1,275 MW         | 1,275 MW         |
| Additional 2030-2040                    | 0 MW            | 0 MW              | 300 MW           | 450 MW                    | 2,475 MW         | 2,250 MW         |
| Additional 2040-2050                    | 0 MW            | 0 MW              | 75 MW            | 150 MW                    | 7,125 MW         | 6,975 MW         |
| <b>Total Solar PV Additions by 2050</b> | <b>300 MW</b>   | <b>300 MW</b>     | <b>1,650 MW</b>  | <b>1,875 MW</b>           | <b>10,875 MW</b> | <b>10,500 MW</b> |

## Incremental Battery Energy Storage System (BESS) Additions

|                                     | Current Outlook | Economic Downturn | Efficiency + DER | Increased Electrification | Future Net Zero  | Supplemental     |
|-------------------------------------|-----------------|-------------------|------------------|---------------------------|------------------|------------------|
| Cumulative 2030                     | 250 MW          | 0 MW              | 188 MW           | 250 MW                    | 824 MW           | 563 MW           |
| Additional 2030-2040                | 0 MW            | 0 MW              | 225 MW           | 188 MW                    | 7,575 MW         | 7,750 MW         |
| Additional 2040-2050                | 289 MW          | 612 MW            | 612 MW           | 451 MW                    | 10,325 MW        | 10,438 MW        |
| <b>Total BESS Additions by 2050</b> | <b>539 MW</b>   | <b>612 MW</b>     | <b>1,025 MW</b>  | <b>889 MW</b>             | <b>18,724 MW</b> | <b>18,751 MW</b> |

## Incremental Natural Gas Additions

|  | Current Outlook | Economic Downturn | Efficiency + DER | Increased Electrification | Future Net Zero | Supplemental  |
|--|-----------------|-------------------|------------------|---------------------------|-----------------|---------------|
| Cumulative 2030                            | 571 MW          | 571 MW            | 571 MW           | 571 MW                    | 0 MW            | 461 MW        |
| Additional 2030-2040                       | 0 MW            | 0 MW              | 0 MW             | 0 MW                      | 0 MW            | 0 MW          |
| Additional 2040-2050                       | 472 MW          | 0 MW              | 582 MW           | 928 MW                    | 0 MW            | 0 MW          |
| <b>Total Natural Gas Additions by 2050</b> | <b>1,043 MW</b> | <b>571 MW</b>     | <b>1,153 MW</b>  | <b>1,499 MW</b>           | <b>0 MW</b>     | <b>461 MW</b> |



# Resource Additions from Sensitivity Analysis (Current Outlook)



## Incremental Solar PV Additions

|   | Low Load      | No Load Growth | High Load     | High Fuel       | Regulated CO2 | Net Zero         |
|---|---------------|----------------|---------------|-----------------|---------------|------------------|
| Cumulative 2030                         | 225 MW        | 225 MW         | 300 MW        | 1,275 MW        | 300 MW        | 1,275 MW         |
| Additional 2030-2040                    | 0 MW          | 75 MW          | 0 MW          | 300 MW          | 0 MW          | 2,775 MW         |
| Additional 2040-2050                    | 0 MW          | 0 MW           | 0 MW          | 150 MW          | 0 MW          | 7,800 MW         |
| <b>Total Solar PV Additions by 2050</b> | <b>225 MW</b> | <b>300 MW</b>  | <b>300 MW</b> | <b>1,725 MW</b> | <b>300 MW</b> | <b>11,850 MW</b> |

## Incremental Battery Energy Storage System (BESS) Additions

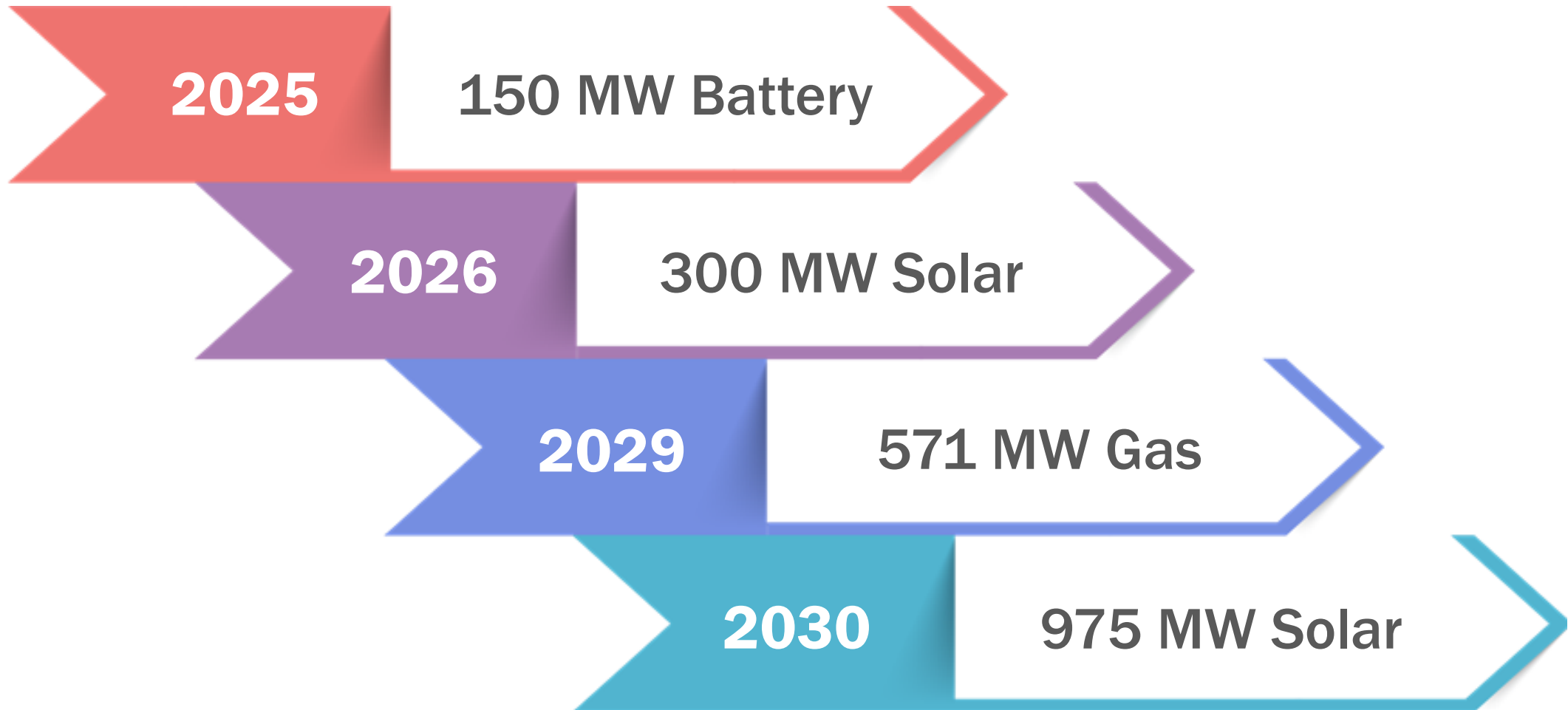
|                                     | Low Load      | No Load Growth | High Load     | High Fuel     | Regulated CO2 | Net Zero         |
|-------------------------------------|---------------|----------------|---------------|---------------|---------------|------------------|
| Cumulative 2030                     | 0 MW          | 250 MW         | 400 MW        | 275 MW        | 275 MW        | 450 MW           |
| Additional 2030-2040                | 0 MW          | 0 MW           | 0 MW          | 0 MW          | 0 MW          | 4,075 MW         |
| Additional 2040-2050                | 388 MW        | 150 MW         | 538 MW        | 289 MW        | 314 MW        | 13,414 MW        |
| <b>Total BESS Additions by 2050</b> | <b>388 MW</b> | <b>400 MW</b>  | <b>938 MW</b> | <b>564 MW</b> | <b>589 MW</b> | <b>17,939 MW</b> |

## Incremental Natural Gas Additions

|  | Low Load      | No Load Growth | High Load       | High Fuel       | Regulated CO2   | Net Zero    |
|--|---------------|----------------|-----------------|-----------------|-----------------|-------------|
| Cumulative 2030                            | 571 MW        | 571 MW         | 571 MW          | 571 MW          | 571 MW          | 0 MW        |
| Additional 2030-2040                       | 0 MW          | 0 MW           | 236 MW          | 0 MW            | 0 MW            | 0 MW        |
| Additional 2040-2050                       | 236 MW        | 0 MW           | 917 MW          | 471 MW          | 471 MW          | 0 MW        |
| <b>Total Natural Gas Additions by 2050</b> | <b>807 MW</b> | <b>571 MW</b>  | <b>1,724 MW</b> | <b>1,042 MW</b> | <b>1,042 MW</b> | <b>0 MW</b> |



# Most Common/Frequent Near-Term Resource Additions



A composite image on the left side of the slide. The top portion shows a city skyline with several skyscrapers and a bridge over a body of water. The bottom portion shows a large, semi-circular compass rose with cardinal directions (N, E, S, W) and intermediate directions (NE, SE, SW, NW) marked. The entire image has a blue color overlay.

# Implementation Plan

**Pedro Melendez**

*VP, Planning, Engineering & Construction*

# Implementation Plan

IRP →



## Develop IRP Action Plan

Finalize modeling and create 2023 IRP Report

Align recommendations with an action plan



## JEA Solar Sites Development

Initiate RFP for 4-74.9MW PPA or Design/Build with Contracted O&M



## Combined Cycle Feasibility

Identify design specifics for new Natural Gas combined cycle and develop RFP and "need for power process"



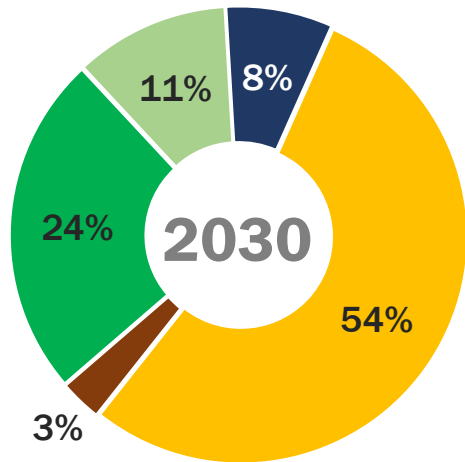
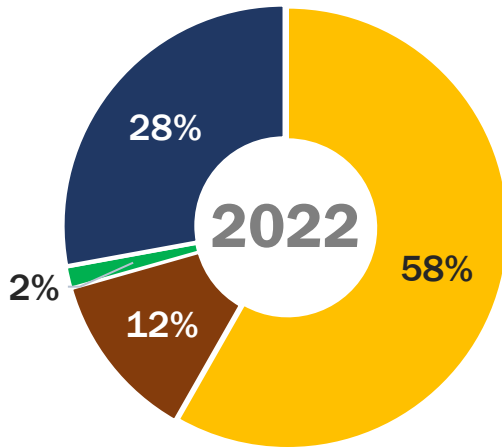
## Capital Improvement and Long-term Plan

Conduct electric system analysis and identify capital improvements

Incorporate results in the Ten-Year Site Plan (TYSP)

# Current and Potential Net Energy Mix

## Net Energy Mix



■ Natural Gas ■ Coal/Petcoke ■ Renewables ■ Nuclear ■ Purchase Power

## JEA IRP modeling results:

- **35% non-carbon emitting energy resources by 2030**
  - 1275 MW Solar
  - 200 MW Nuclear
- **571 MW of higher efficiency gas resource**
- **JEA's CO<sub>2</sub> emissions reduction to approximately 3,700,000 Tons by 2030**
  - Reduction of approximately 35% from 2022 CO<sub>2</sub> emissions
    - 75% from 2005 CO<sub>2</sub> emissions



# Future Net Energy Mix

Between 2030 to 2040 the scenarios have dispersed results ranging up to 10,225 MW

- Solar additions up to 2,475 MW
- Battery additions up to 7,750 MW

Studies needed to better inform a longer-term portfolio

- Energy resources availability
- Market trends and supply chain
- Electric system integration
- Environmental regulations

Next IRP in 3-5 years should provide additional alternatives to continue serving JEA customers



# Next Steps and Open Discussion

**Jay Stowe**

*Chief Executive Officer*





# Next Steps and Open Discussion



## Presentation of IRP Report

*May/June 2023*



# Reference Material





# Common Resource Additions from Scenario Analysis



Total of up to 1,275 MW of Solar PV by 2030 and 10,875 MW of Solar PV by 2050

## Scenarios

|   | Current Outlook | Economic Downturn | Efficiency + DER | Increased Electrification | Future Net Zero  | Supplemental     |
|---|-----------------|-------------------|------------------|---------------------------|------------------|------------------|
| 2025                                    |                 |                   |                  |                           |                  |                  |
| 2026                                    | 150MW Solar PV  | 150MW Solar PV    | 300MW Solar PV   | 300MW Solar PV            | 300MW Solar PV   | 300MW Solar PV   |
| 2027                                    |                 |                   |                  |                           |                  |                  |
| 2028                                    |                 |                   |                  |                           |                  |                  |
| 2029                                    |                 | 150MW Solar PV    |                  |                           |                  |                  |
| 2030                                    | 150MW Solar PV  |                   | 975MW Solar PV   | 975MW Solar PV            | 975MW Solar PV   | 975MW Solar PV   |
| <b>Total Solar PV Additions by 2030</b> | <b>300 MW</b>   | <b>300 MW</b>     | <b>1,275 MW</b>  | <b>1,275 MW</b>           | <b>1,275 MW</b>  | <b>1,275 MW</b>  |
| Solar PV Additions by 2040              | 0 MW            | 0 MW              | 300 MW           | 450 MW                    | 2,475 MW         | 2,250 MW         |
| Solar PV Additions by 2050              | 0 MW            | 0 MW              | 75 MW            | 150 MW                    | 7,125 MW         | 6,975 MW         |
| <b>Total Solar PV Additions by 2050</b> | <b>300 MW</b>   | <b>300 MW</b>     | <b>1,650 MW</b>  | <b>1,875 MW</b>           | <b>10,875 MW</b> | <b>10,500 MW</b> |

# Common Resource Additions from Scenario Analysis



Total of up to 824 MW of Battery Energy Storage Systems (BESS) by 2030 and 18,724 MW of BESS by 2050

|                                     | Scenarios       |                   |                                 |                           |                                  |                  |
|-------------------------------------|-----------------|-------------------|---------------------------------|---------------------------|----------------------------------|------------------|
|                                     | Current Outlook | Economic Downturn | Efficiency + DER                | Increased Electrification | Future Net Zero                  | Supplemental     |
| 2025                                | 250MW 4hr BESS  |                   | 63MW 1hr BESS<br>125MW 4hr BESS | 200MW 4hr BESS            | 262MW 1hr BESS<br>150MW 4hr BESS | 225MW 4hr BESS   |
| 2026                                |                 |                   |                                 |                           |                                  |                  |
| 2027                                |                 |                   |                                 |                           |                                  |                  |
| 2028                                |                 |                   |                                 | 50MW 4hr BESS             |                                  |                  |
| 2029                                |                 |                   |                                 |                           | 150MW 4hr BESS                   |                  |
| 2030                                |                 |                   |                                 |                           | 262MW 1hr BESS                   | 338MW 1hr BESS   |
| <b>Total BESS Additions by 2030</b> | <b>250 MW</b>   | <b>0 MW</b>       | <b>188 MW</b>                   | <b>250 MW</b>             | <b>824 MW</b>                    | <b>563 MW</b>    |
| <b>Add'l BESS Additions by 2040</b> | <b>0 MW</b>     | <b>0 MW</b>       | <b>225 MW</b>                   | <b>188 MW</b>             | <b>7,575 MW</b>                  | <b>7,750 MW</b>  |
| <b>Add'l BESS Additions by 2050</b> | <b>289 MW</b>   | <b>612 MW</b>     | <b>612 MW</b>                   | <b>451 MW</b>             | <b>10,325 MW</b>                 | <b>10,438 MW</b> |
| <b>Total BESS Additions by 2050</b> | <b>539 MW</b>   | <b>612 MW</b>     | <b>1,025 MW</b>                 | <b>889 MW</b>             | <b>18,724 MW</b>                 | <b>18,751 MW</b> |

# Common Resource Additions from Scenario Analysis



Total of up to 571 MW of Natural Gas by 2030 and 1,499 MW of Natural Gas by 2050

## Scenarios

|                                     | Current Outlook | Economic Downturn | Efficiency + DER | Increased Electrification | Future Net Zero | Supplemental  |
|-------------------------------------|-----------------|-------------------|------------------|---------------------------|-----------------|---------------|
| 2025                                |                 |                   |                  |                           |                 |               |
| 2026                                |                 |                   |                  |                           |                 |               |
| 2027                                |                 |                   |                  |                           |                 |               |
| 2028                                |                 |                   |                  |                           |                 |               |
| 2029                                | 571 MW 1x1 CC   |                   | 571 MW 1x1 CC    | 571 MW 1x1 CC             |                 | 461 MW 1X0 SC |
| 2030                                |                 | 571 MW 1x1 CC     |                  |                           |                 |               |
| Total Natural Gas Additions by 2030 | 571 MW          | 571 MW            | 571 MW           | 571 MW                    | 0 MW            | 461 MW        |
| Add'l Natural Gas Additions by 2040 | 0 MW            | 0 MW              | 0 MW             | 0 MW                      | 0 MW            | 0 MW          |
| Add'l Natural Gas Additions by 2050 | 472 MW          | 0 MW              | 582 MW           | 928 MW                    | 0 MW            | 0 MW          |
| Total Natural Gas Additions by 2050 | 1,043 MW        | 571 MW            | 1,153 MW         | 1,499 MW                  | 0 MW            | 461 MW        |

# Common Resource Additions from Sensitivity Analysis



Total of up to 1,275 MW of Solar PV by 2030 and 11,850 MW of Solar PV by 2050

Sensitivities (Within Current Outlook Scenario)

|                                  | Low Load       | No Load Growth | High Load      | High Fuel      | Regulated CO2  | Net Zero       |
|----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 2025                             |                |                |                |                |                |                |
| 2026                             | 75MW Solar PV  |                | 300MW Solar PV | 300MW Solar PV | 150MW Solar PV | 225MW Solar PV |
| 2027                             |                |                |                |                |                | 75MW Solar PV  |
| 2028                             |                |                |                |                |                |                |
| 2029                             |                |                |                |                |                |                |
| 2030                             | 150MW Solar PV | 225MW Solar PV |                | 975MW Solar PV | 150MW Solar PV | 975MW Solar PV |
| Total Solar PV Additions by 2030 | 225 MW         | 225 MW         | 300 MW         | 1,275 MW       | 300 MW         | 1,275 MW       |
| Solar PV Additions by 2040       | 0 MW           | 75 MW          | 0 MW           | 300 MW         | 0 MW           | 2,775 MW       |
| Solar PV Additions by 2050       | 0 MW           | 0 MW           | 0 MW           | 150 MW         | 0 MW           | 7,800 MW       |
| Total Solar PV Additions by 2050 | 225 MW         | 225 MW         | 300 MW         | 1,725 MW       | 300 MW         | 11,850 MW      |



# Common Resource Additions from Sensitivity Analysis



Total of up to 450 MW of Battery Energy Storage Systems (BESS) by 2030 and 17,939 MW of BESS by 2050

Sensitivities (Within Current Outlook Scenario)

|                              | Low Load | No Load Growth | High Load                        | High Fuel                       | Regulated CO2                   | Net Zero                         |
|------------------------------|----------|----------------|----------------------------------|---------------------------------|---------------------------------|----------------------------------|
| 2025                         |          | 250MW 4hr BESS | 150MW 1hr BESS<br>250MW 4hr BESS | 25MW 1hr BESS<br>250MW 4hr BESS | 25MW 1hr BESS<br>250MW 4hr BESS | 300MW 1hr BESS<br>150MW 4hr BESS |
| 2026                         |          |                |                                  |                                 |                                 |                                  |
| 2027                         |          |                |                                  |                                 |                                 |                                  |
| 2028                         |          |                |                                  |                                 |                                 |                                  |
| 2029                         |          |                |                                  |                                 |                                 |                                  |
| 2030                         |          |                |                                  |                                 |                                 |                                  |
| Total BESS Additions by 2030 | 0 MW     | 250 MW         | 400 MW                           | 275 MW                          | 275 MW                          | 450 MW                           |
| Add'l BESS Additions by 2040 | 0 MW     | 0 MW           | 0 MW                             | 0 MW                            | 0 MW                            | 4,075 MW                         |
| Add'l BESS Additions by 2050 | 388 MW   | 150 MW         | 538 MW                           | 289 MW                          | 314 MW                          | 13,414 MW                        |
| Total BESS Additions by 2050 | 388 MW   | 400 MW         | 938 MW                           | 564 MW                          | 589 MW                          | 17,939 MW                        |

# Common Resource Additions from Sensitivity Analysis



Total of up to 571 MW of Natural Gas by 2030 and 1,724 MW of Natural Gas by 2050

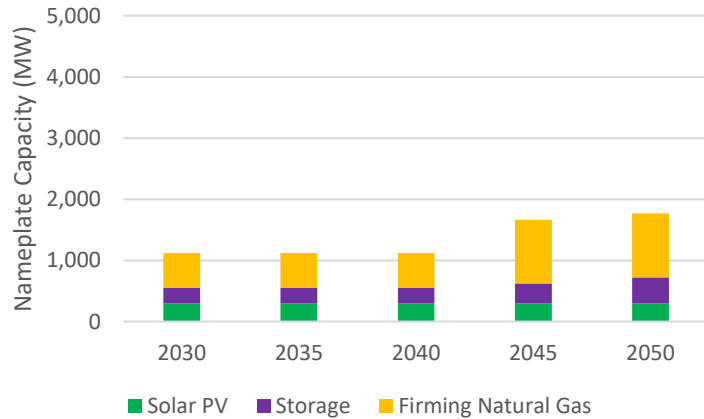
Sensitivities (Within Current Outlook Scenario)

|                                     | Low Load      | No Load Growth | High Load     | High Fuel     | Regulated CO2 | Net Zero |
|-------------------------------------|---------------|----------------|---------------|---------------|---------------|----------|
| 2025                                |               |                |               |               |               |          |
| 2026                                |               |                |               |               |               |          |
| 2027                                |               |                |               |               |               |          |
| 2028                                |               |                |               |               |               |          |
| 2029                                | 571 MW 1x1 CC | 571 MW 1x1 CC  | 571 MW 1x1 CC | 571 MW 1x1 CC | 571 MW 1x1 CC |          |
| 2030                                |               |                |               |               |               |          |
| Total Natural Gas Additions by 2030 | 571 MW        | 571 MW         | 571 MW        | 571 MW        | 571 MW        | 0 MW     |
| Add'l Natural Gas Additions by 2040 | 0 MW          | 0 MW           | 236 MW        | 0 MW          | 0 MW          | 0 MW     |
| Add'l Natural Gas Additions by 2050 | 236 MW        | 0 MW           | 917 MW        | 471 MW        | 471 MW        | 0 MW     |
| Total Natural Gas Additions by 2050 | 807 MW        | 571 MW         | 1,724 MW      | 1,042 MW      | 1,042 MW      | 0 MW     |

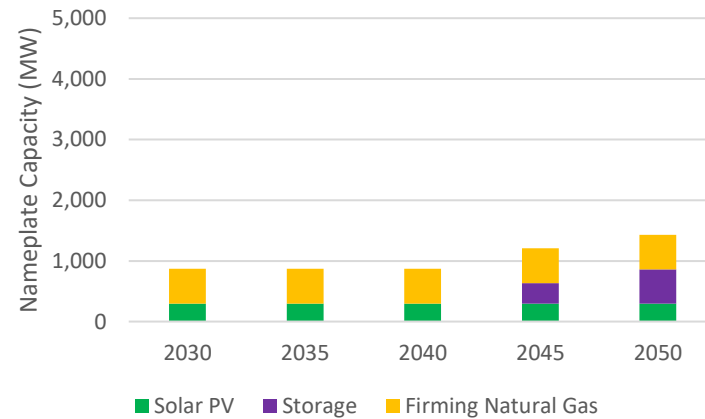
# Scenarios - New Resource Additions - MW Capacity



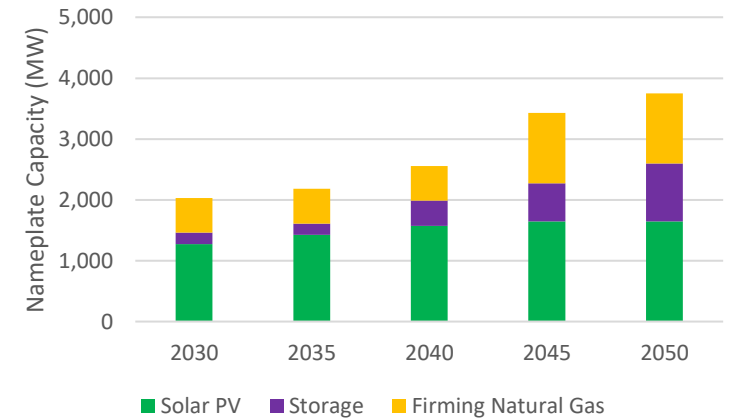
Current Outlook



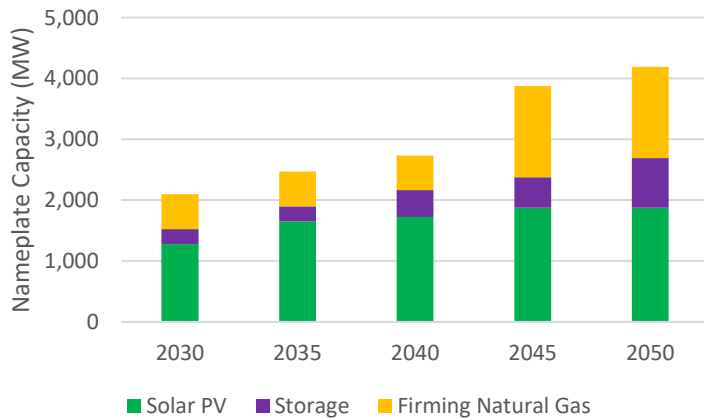
Economic Downturn



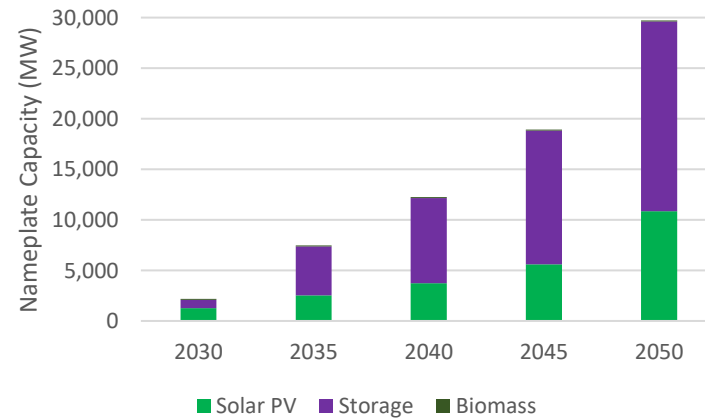
Efficiency + DER



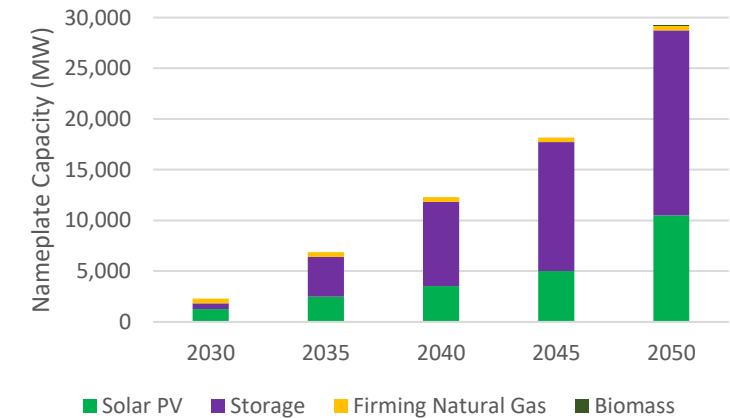
Increased Electrification



Future Net Zero



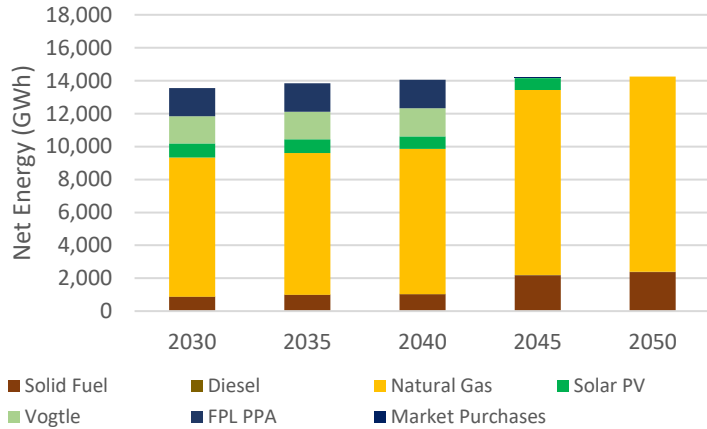
Supplemental Scenario



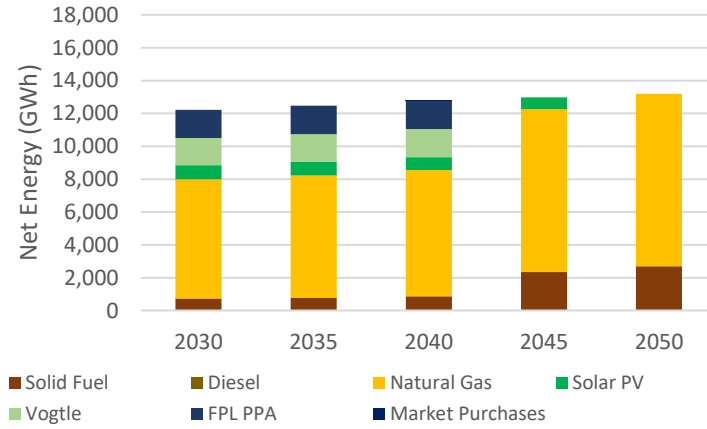
# Scenarios - Net Energy (GWh) by Resource



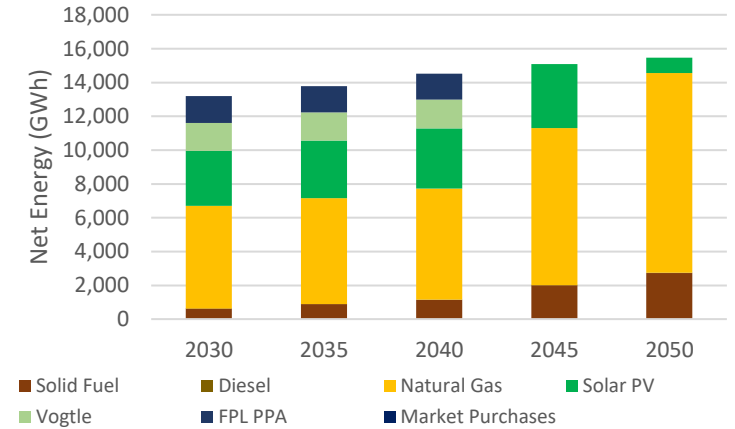
Current Outlook



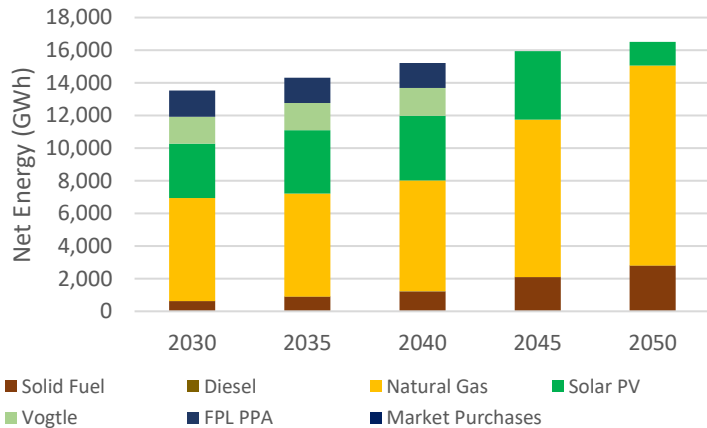
Economic Downturn



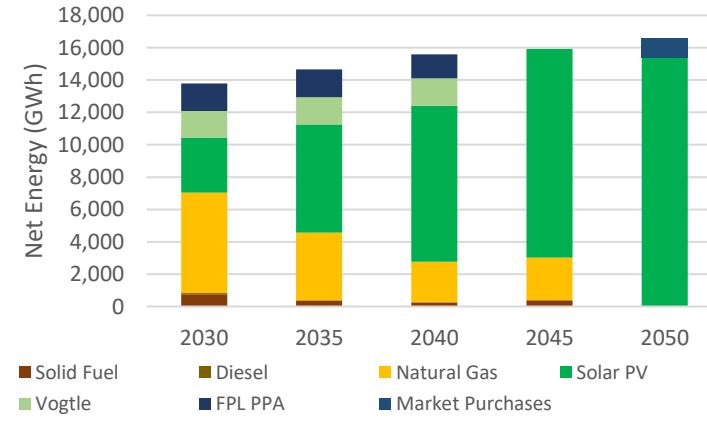
Efficiency + DER



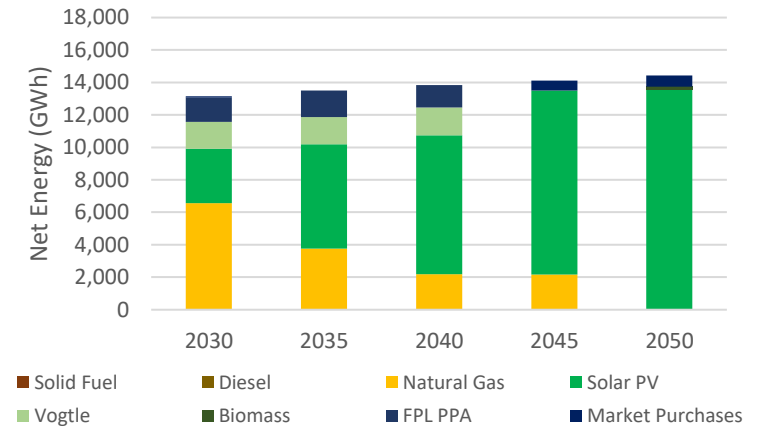
Increased Electrification



Future Net Zero

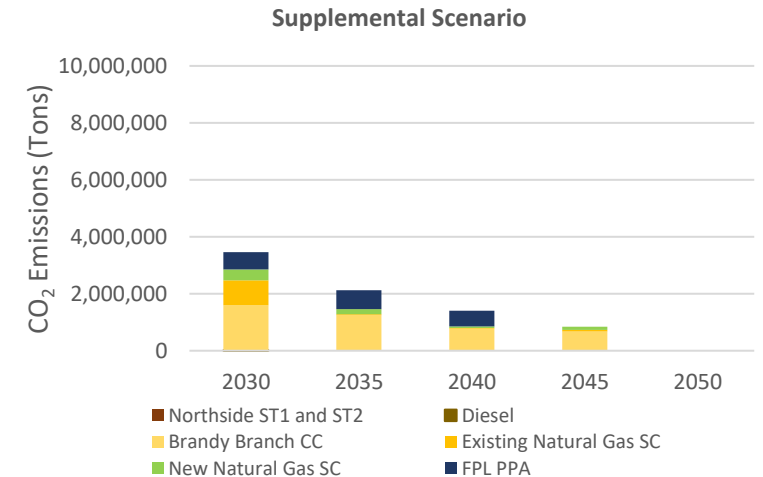
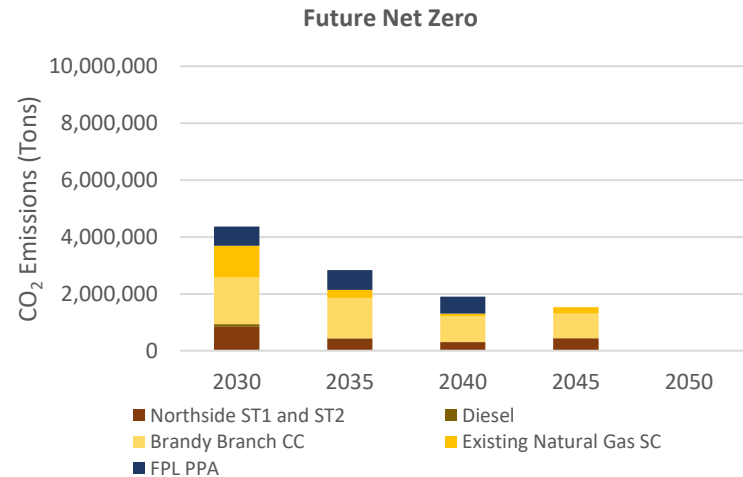
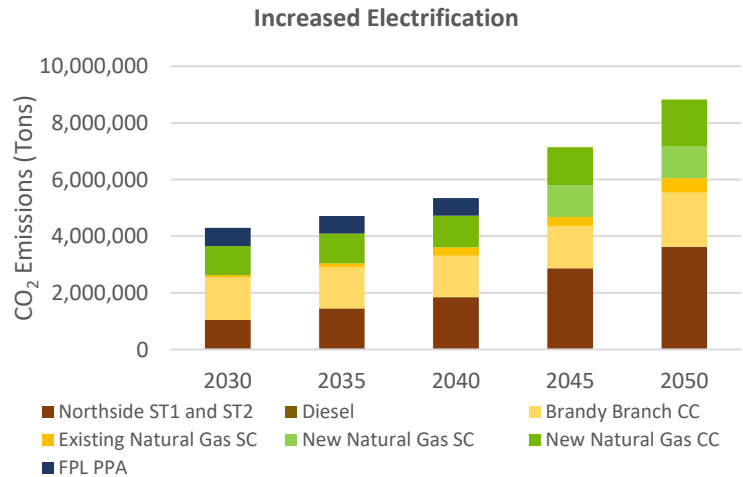
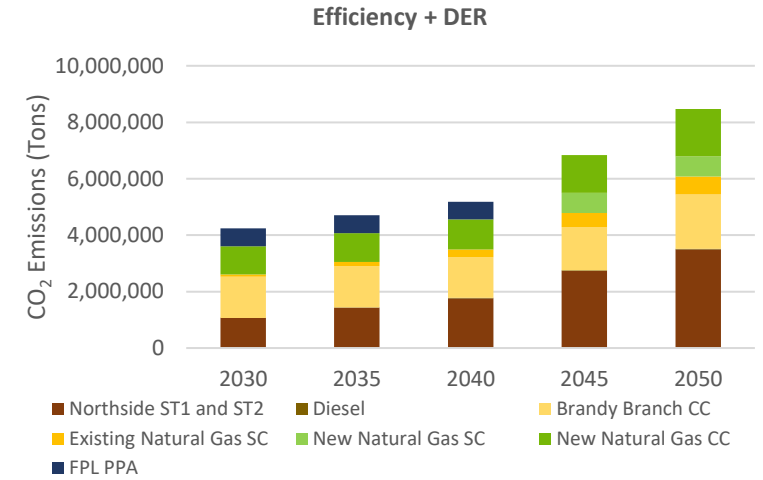
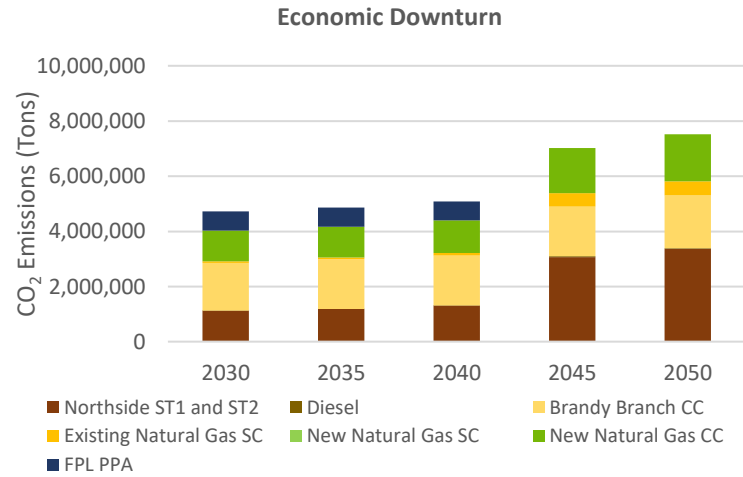
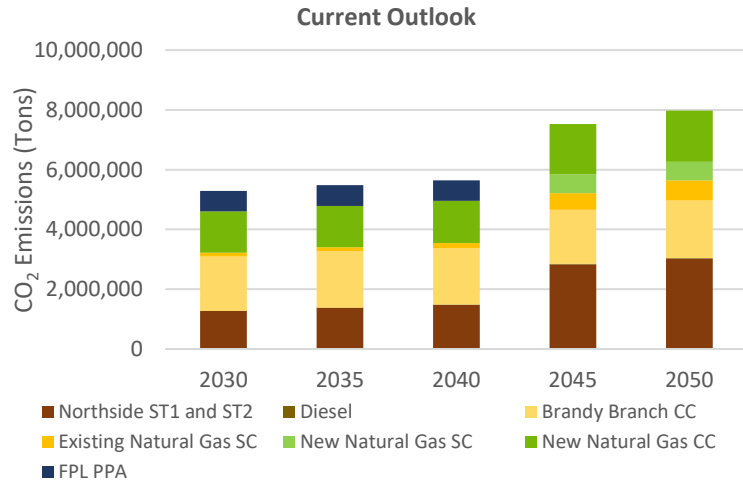


Supplemental Scenario

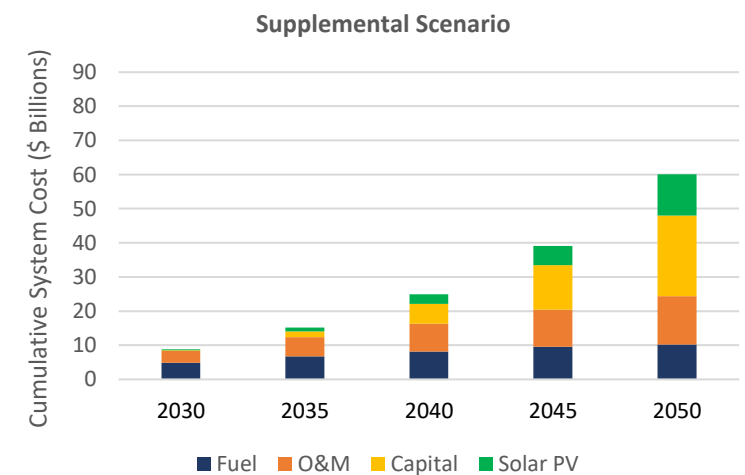
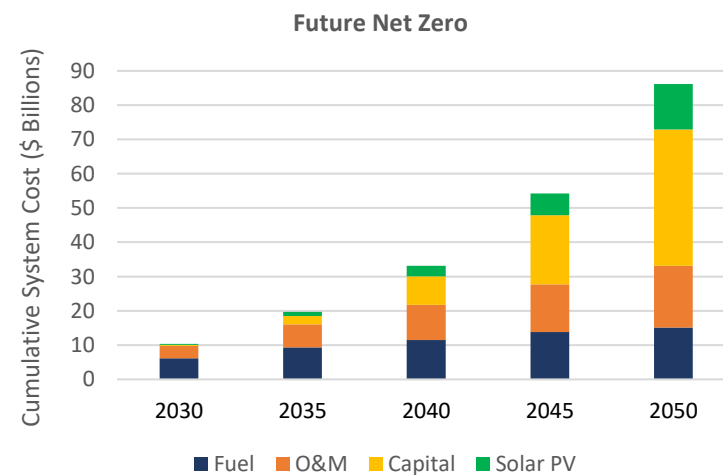
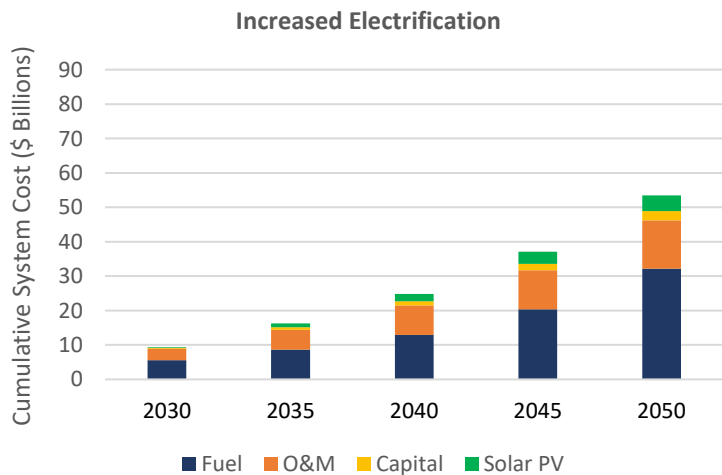
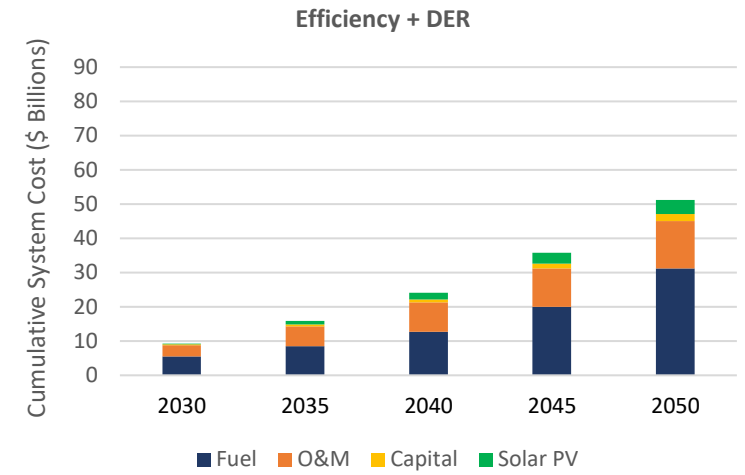
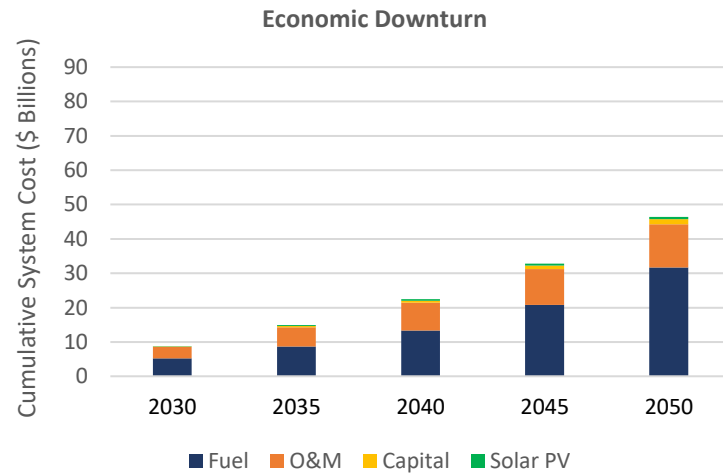
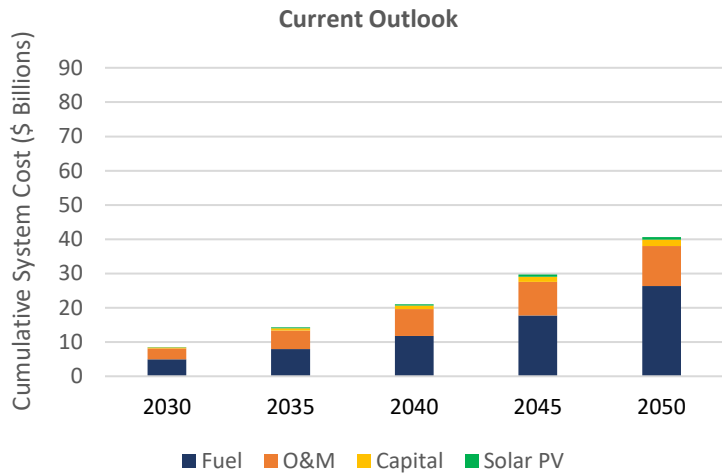




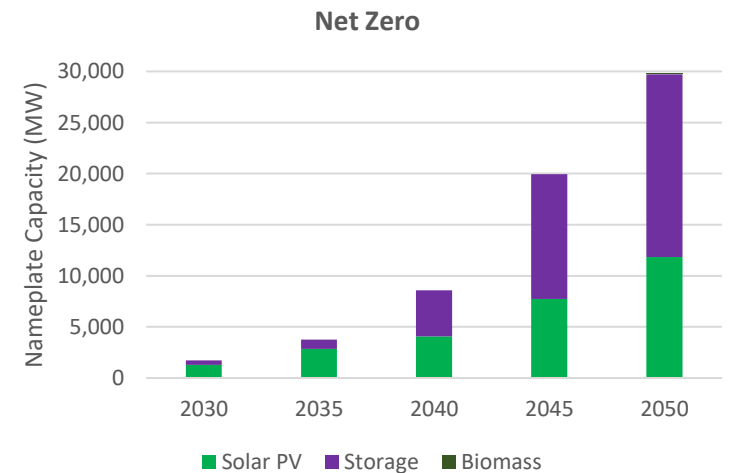
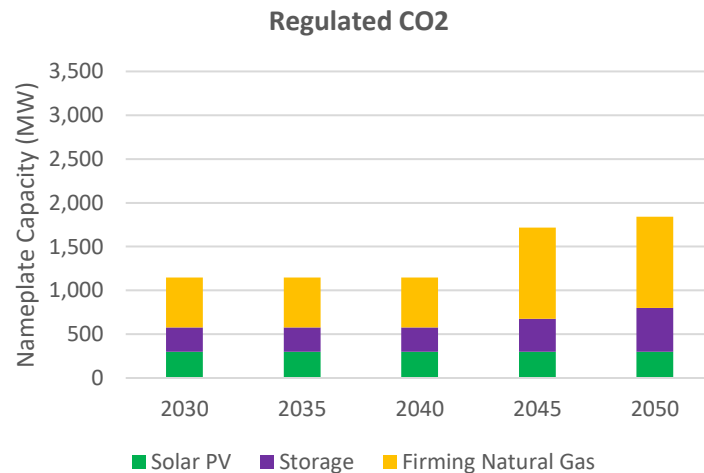
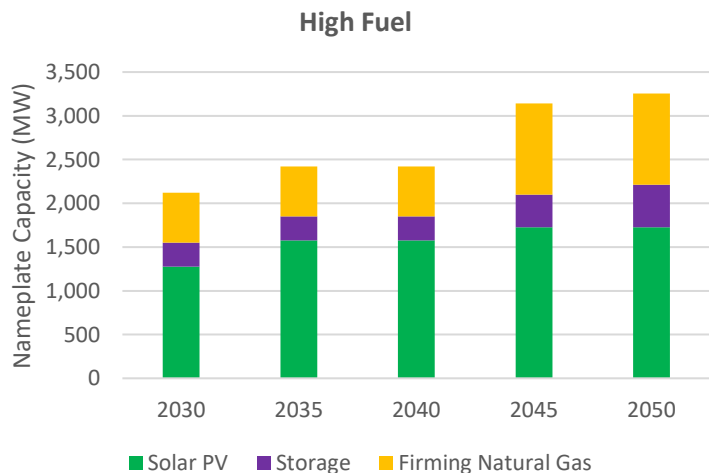
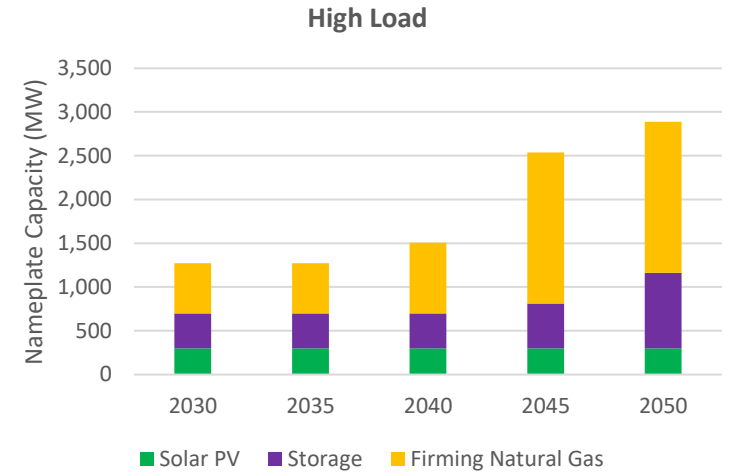
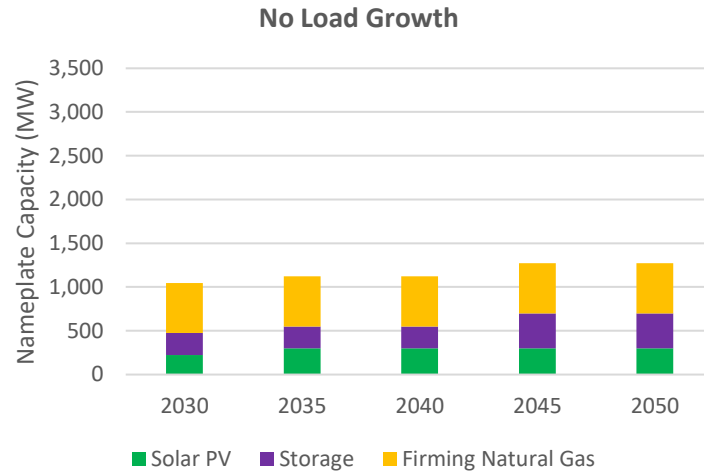
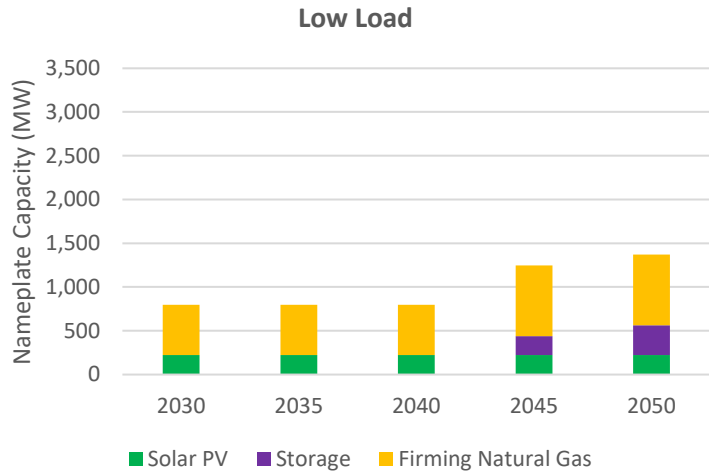
# Scenarios - CO<sub>2</sub> Emissions



# Scenarios - Cumulative System Costs



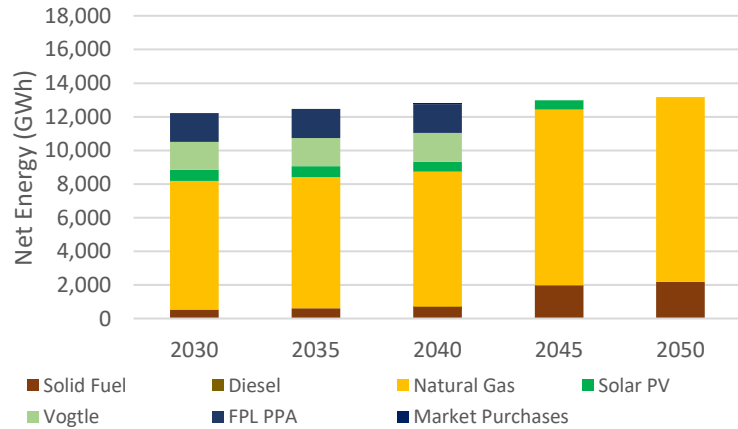
# Sensitivities - New Resource Additions - MW Capacity



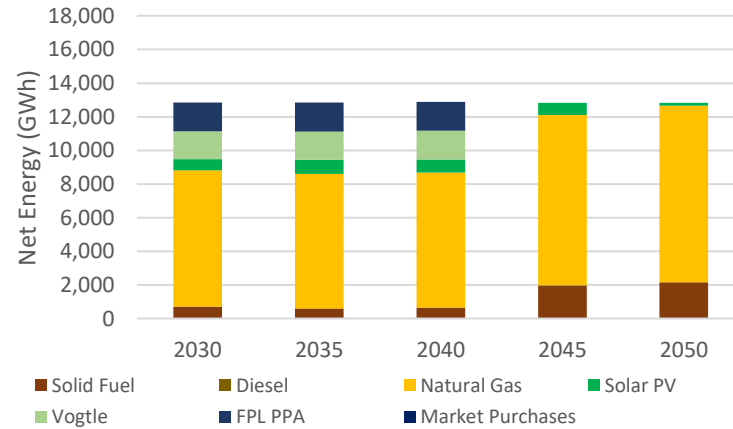
# Sensitivities - Net Energy (GWh) by Resource



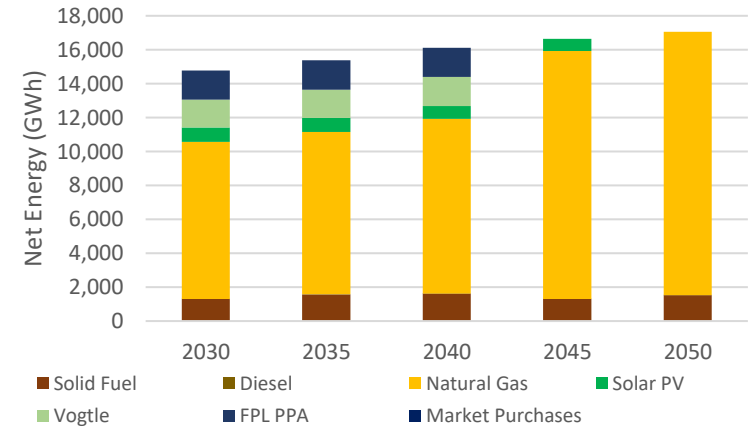
Low Load



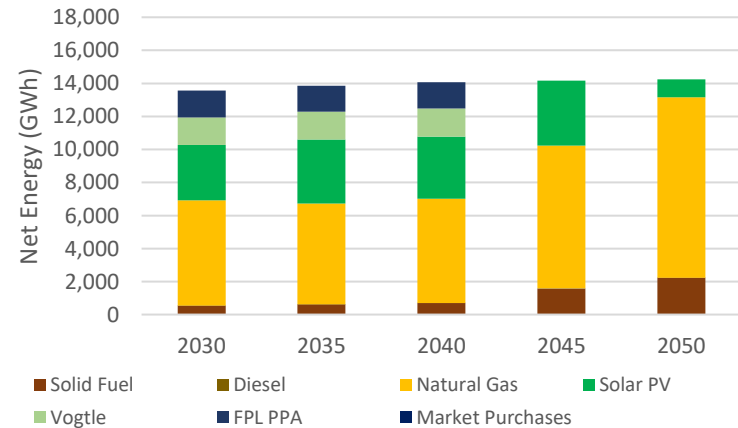
No Load Growth



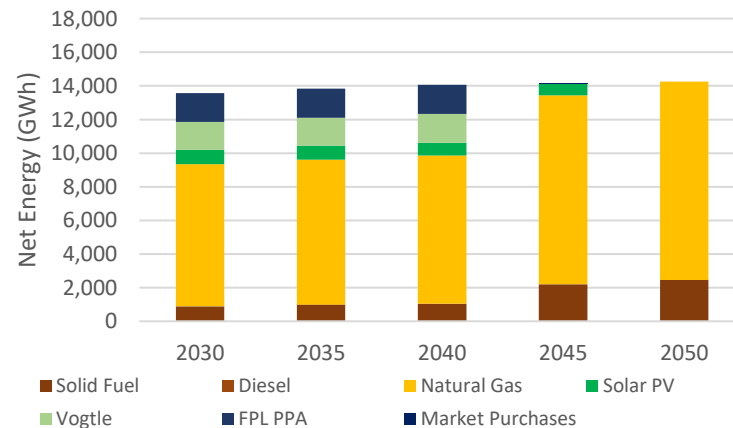
High Load



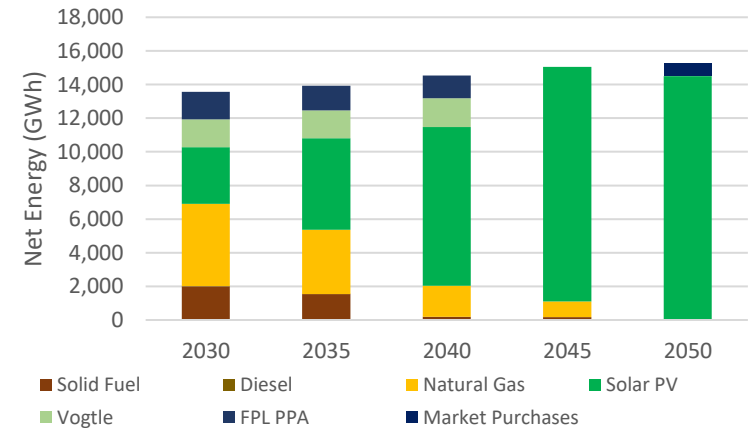
High Fuel



Regulated CO2

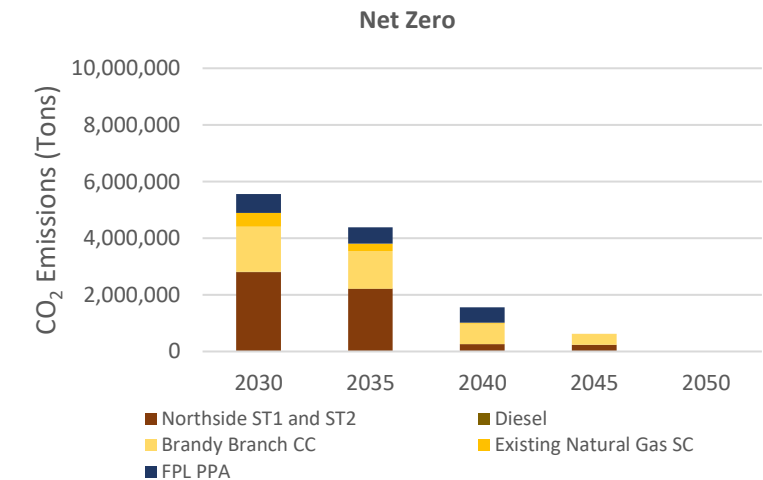
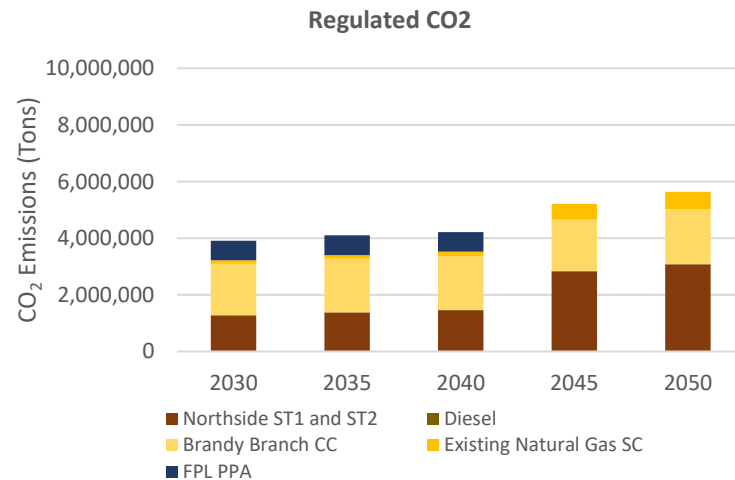
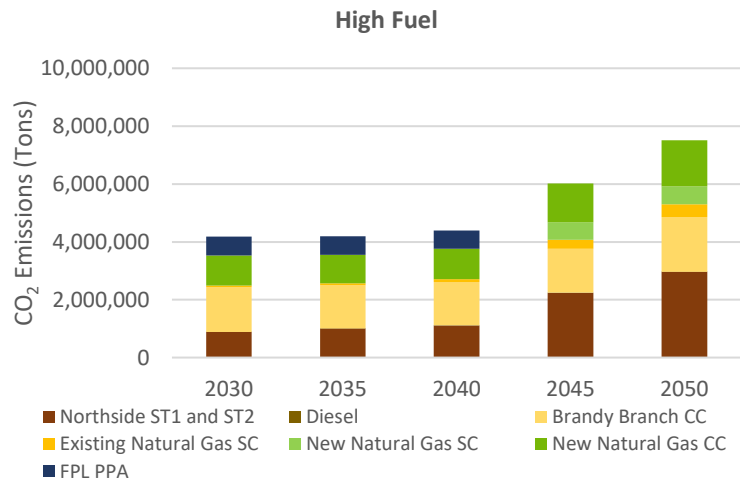
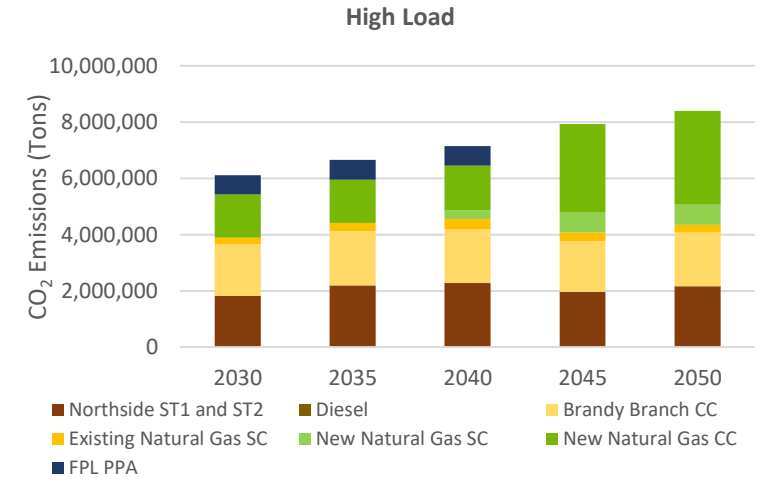
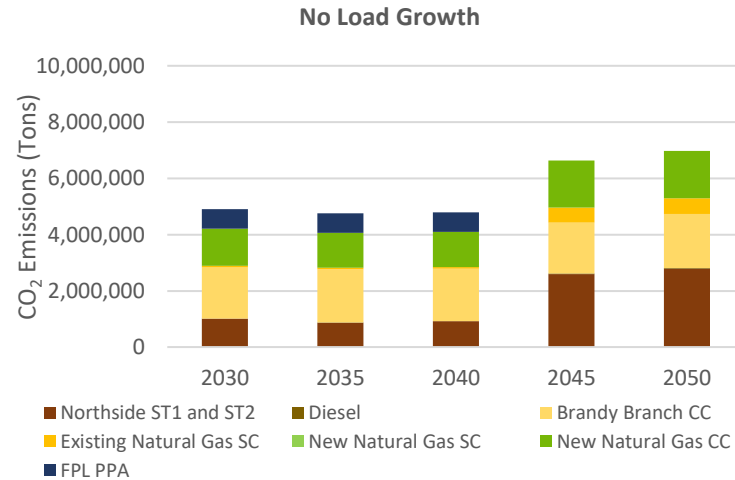
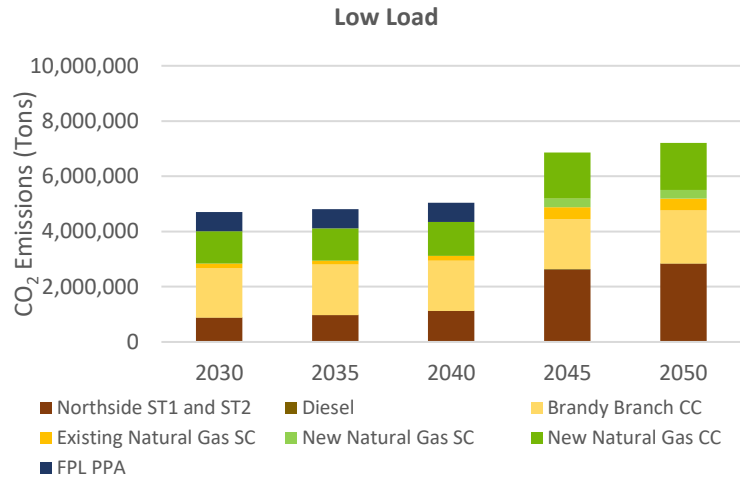


Net Zero





# Sensitivities - CO<sub>2</sub> Emissions



# Sensitivities - Cumulative System Costs

