2020 Tolk Analysis: Session 3 of the 1st Technical Conference

10/23/2020

Today's Meeting Agenda

1. Modeling parameters for Harrington Station
   - A. Background & NAAQS compliance
   - B. Harrington operating on gas
   - C. Economic Analysis

Agenda for Future Technical Conferences

1. Tolk Analysis – Retirement dates and operating scenarios
2. Value of Tolk water rights
3. Modeling Parameters

BACKGROUND & NAAQS COMPLIANCE

Background

- NM Rate Case Stipulation states "*SPS also commits to running at least one scenario in which all of SPS's coal-burning units are retired or replaced before 2030*"
- Harrington Station:
  - Three coal-fired units: each ~340MW
  - Located North of Amarillo, Texas
  - Units 1 – 3 are scheduled to retire 2036, 2038 & 2040, respectively
- SPS intend to run <u>every</u> scenario in the Tolk Analysis in which all three Harrington units are converted to operate on natural gas by <u>2025</u>

NAAQS

- The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (including SO2)
- The TCEQ classified the area as Attainment/Unclassifiable due to a lack of monitoring data in the area
- In December 2016, TCEQ installed an SO2 monitor in the vicinity of Harrington Station to collect ambient air data
- Readings from the monitor exceed the standards
- Harrington emits ~99% of the SO2 emissions in Potter County
- Emphasis will be on SPS to produce implementation plan
- Anticipated compliance date: By 2025
- Agreed Order October 2020

Compliance Solutions

- Installation of environmental controls on three units*
- Early retirement of all three units (EOY 2024)
- Conversion of all three units to natural gas
- Combination of the above

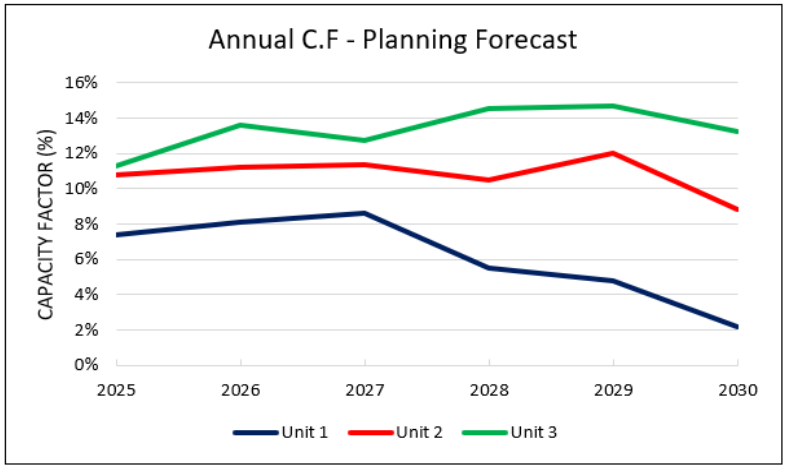
**Installation of environmental controls is cost prohibitive. Based on feedback from previous technical conferences environmental controls will not be presented today*

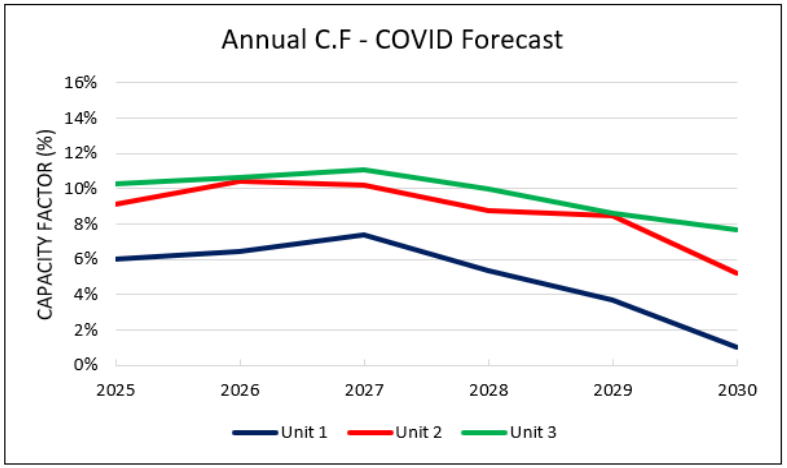
HARRINGTON OPERATING ON GAS

Harrington on Gas

- Fuel change only
- Low cost solution to:
  - Meet NAAQs compliance
  - Continue to provide over 1,000MW of year-round capacity
- System reliability benefits
- After the conversion to gas, the Harrington units act as “peaking” generation
  - Low capacity factors
  - Provide energy during times of high demand or low renewable output

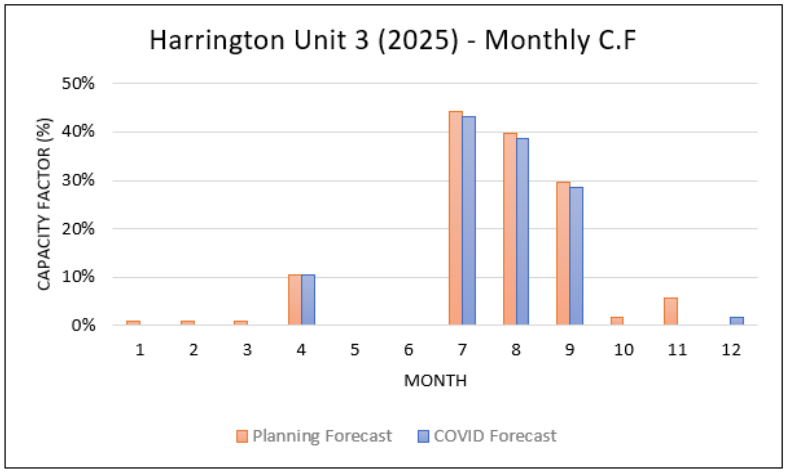
Low Annual Capacity Factors

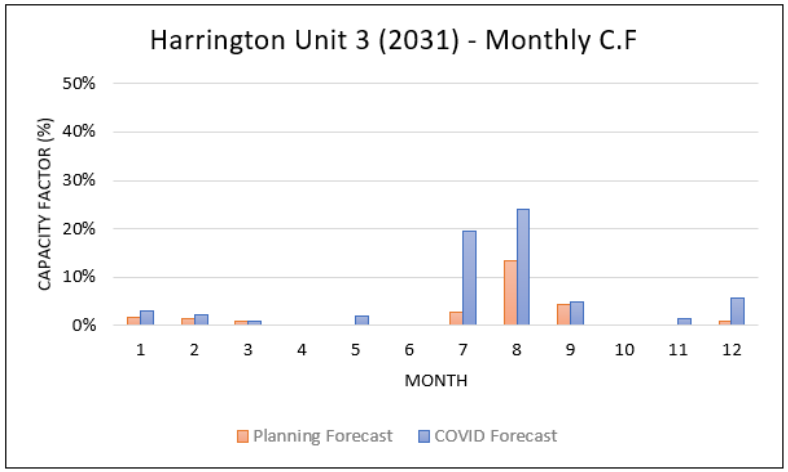




- The Harrington Units will provide “peaking generation” with projected capacity factors <10 - 15% depending on load forecast

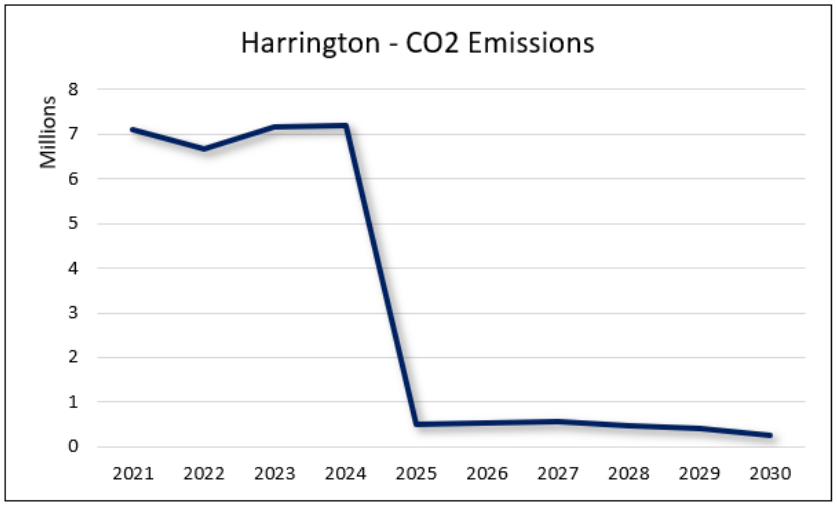
Capacity Factors by Month





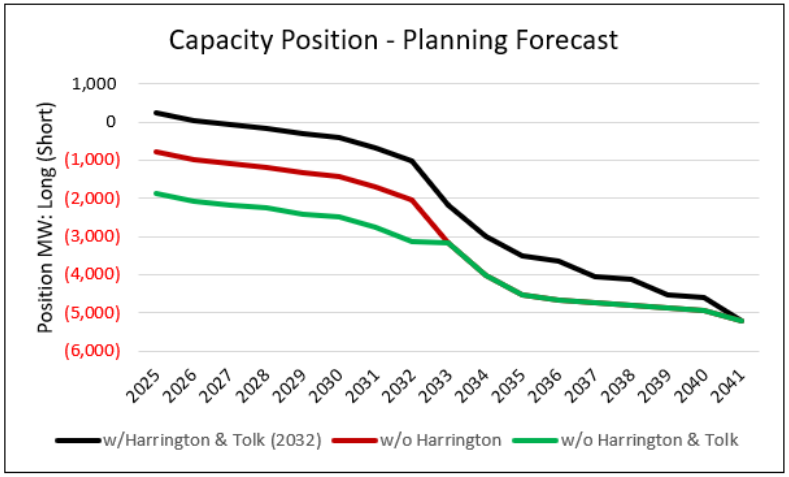
- In the near term, Harrington will provide generation during the peak Summer months
- Harrington will support the integration of new renewables by providing energy during hours of low renewable generation

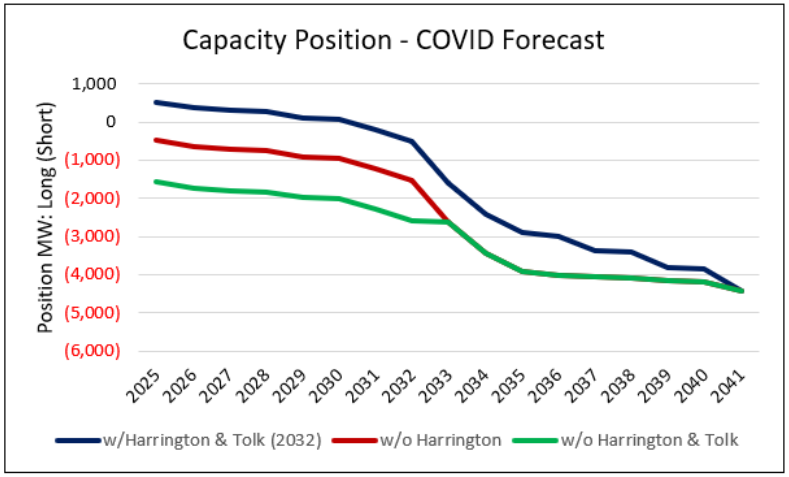
Harrington Annual CO2 Emissions



- Converting Harrington to gas lowers CO2 emissions by ~95% over a 10-year period
- Reduction is the result of lower CO2 intensity and a low capacity factor

Summer Capacity Position





- Including Tolk & Harrington, SPS has sufficient capacity until between 2027 & 2031 depending on load forecast
- Retiring Harrington EOY 2024 will create an immediate capacity need of between ~500MW and 800MW, rising to between ~1,000MW and 1,400MW by 2030
- Retiring both Tolk and Harrington EOY 2024 will create an immediate capacity need of between ~1,600MW and 1,900MW rising to between ~2,000MW and 2,400MW by 2030

Retiring Gas Generation

- SPS's entire fleet of gas steam generation (1,624MW) is scheduled to retire by EOY 2034
- 1,138MW is scheduled to retire by EOY 2030
- Harrington Station provides 1,021MW of capacity
- Tolk Station provides 1,069MW of capacity
- Potentially 3,228MW of thermal generation could be retired by 2030
- SPS owns 4,335MW of thermal generation
- Retiring this amount of thermal generation will require new thermal generation

Economic Analysis

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Economic Analysis

Planning Forecast		
PVRR Production Cost	Delta ($M)	NPV ($M) 2021-2049
Convert Units to Gas	$0	$16,045
Early Retirement (2024)	$116	$16,161

COVID Forecast		
PVRR Production Cost	Delta ($M)	NPV ($M) 2021-2049
Convert Units to Gas	$0	$13,951
Early Retirement (2024)	$76	$14,027

- Converting the units to gas saves between $76M - $116M (PVRR) when compared to an early retirement
- The Encompass model:
  - Added more new renewable generation by 2031 when converting the units to gas
  - Added an additional combined cycle unit when retiring Harrington EOY2024

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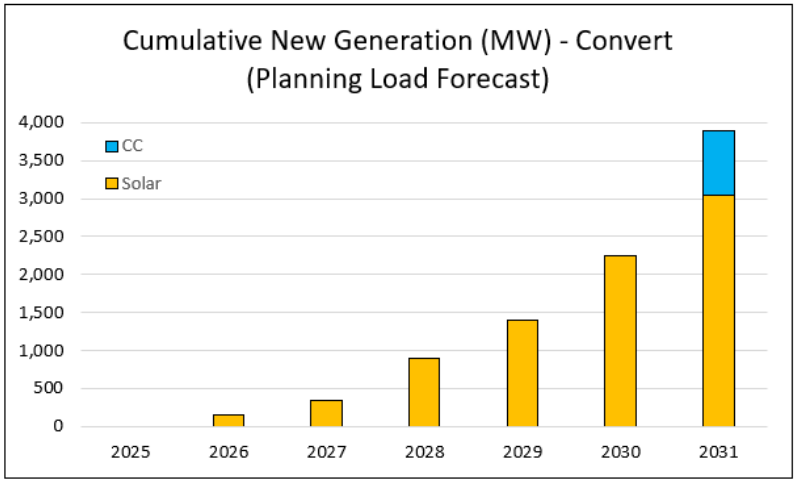
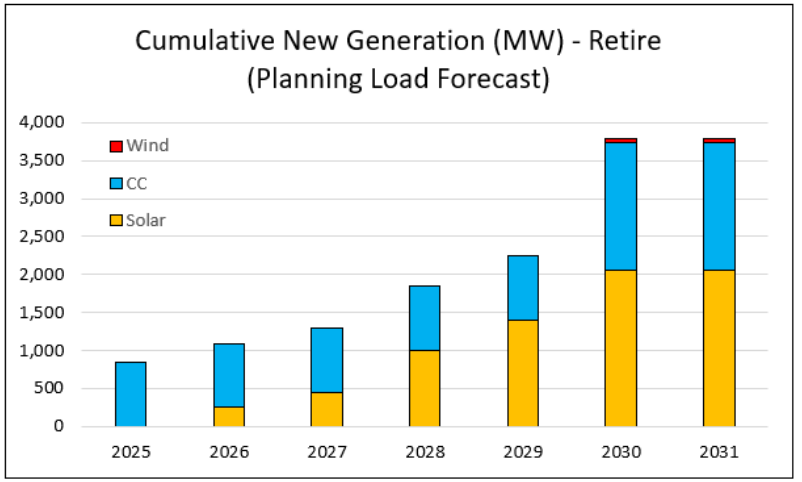
Expansion Plans – Planning Forecast





- When converting to gas (left graph), the Encompass model added 3,050MW of new solar and a combined cycle by EOY 2031
- When retiring the Harrington Units (right graph), the Encompass model added 2,050MW of solar, 50MW of wind and two combined cycles by EOY 2031

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Expansion Plans – COVID Forecast

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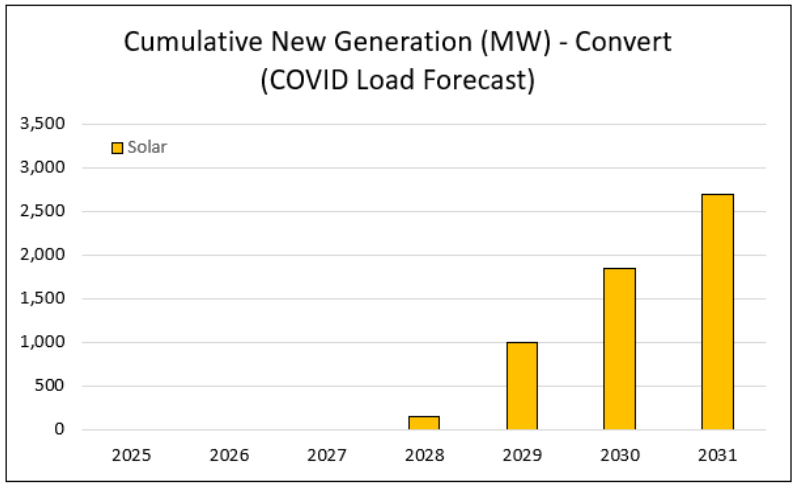

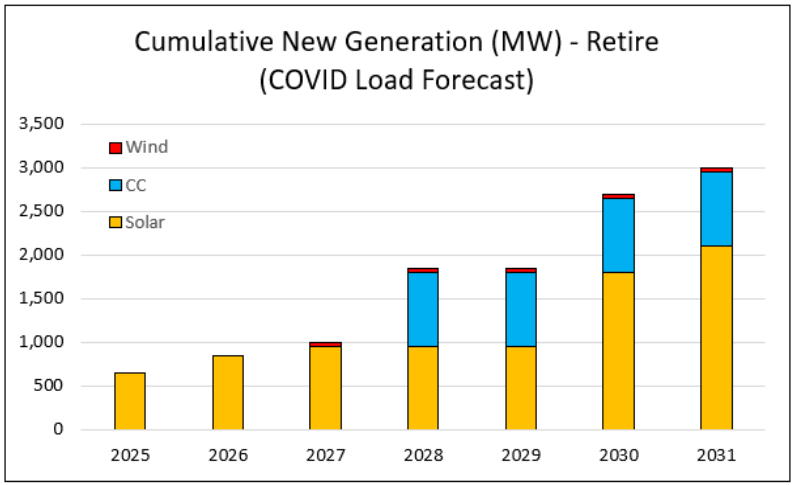

- When converting to gas (left graph), the Encompass model added 2,700MW of solar by EOY 2031
- When retiring the Harrington Units (right graph), the Encompass model added 2,100MW of solar, 50MW of wind and a combined cycle by EOY 2031

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Economic Analysis (w/o CC)

Planning Forecast		
PVRR Production Cost	Delta ($M)	NPV ($M) 2021-2049
Convert Units to Gas	$0	$16,045
Early Retirement (2024)	$116	$16,161
Early Retirement (2024) - No CC	$364	$16,409

COVID Forecast		
PVRR Production Cost	Delta ($M)	NPV ($M) 2021-2049
Convert Units to Gas	$0	$13,951
Early Retirement (2024)	$76	$14,027
Early Retirement (2024) - No CC	$206	$14,157

- The economic analysis was recalculated restricting encompass from adding a combined cycle before EOY 2030
- Converting the units to gas saves between $206M - $364M (PVRR) when compared to an early retirement

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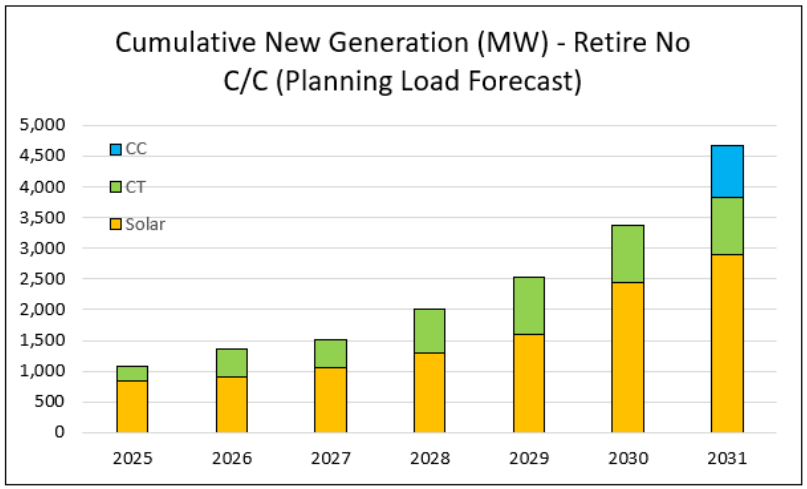
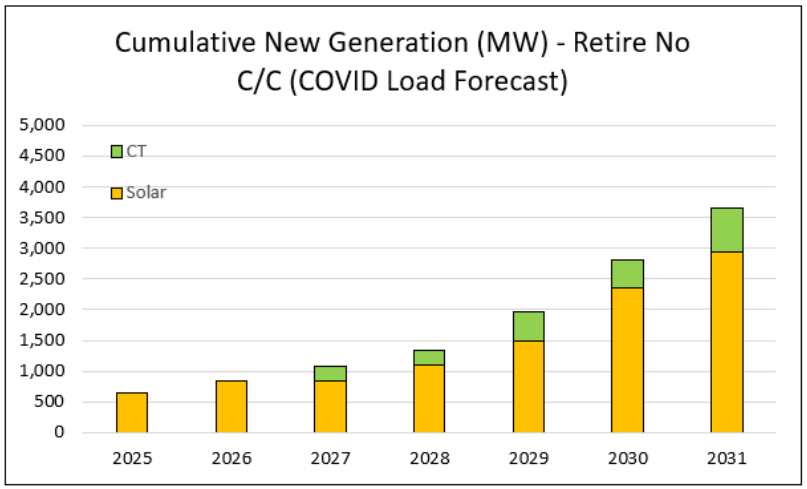
Expansion Plan w/o CC before 2030





- Depending on the load forecast, when retiring Harrington and restricting the model from adding a CC before EOY 2030, it added between:
- 2,900MW of solar, 4 CTs and 1 combined cycle, and
- 2,950MW of solar and 3 CTs

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Economic Analysis (w/o CC/CT)

Planning Forecast		
PVRR Production Cost	Delta ($M)	NPV ($M) 2021-2049
Convert Units to Gas	$0	$16,045
Early Retirement (2024)	$116	$16,161
Early Retirement (2024) - No CC	$364	$16,409
Early Retirement (2024) - No CT/CC	$1,345	$17,390

COVID Forecast		
PVRR Production Cost	Delta ($M)	NPV ($M) 2021-2049
Convert Units to Gas	$0	$13,951
Early Retirement (2024)	$76	$14,027
Early Retirement (2024) - No CC	$206	$14,157
Early Retirement (2024) - No CT/CC	$397	$14,348

- The economic analysis was once again re-run restricting encompass from selecting a combined cycle or combustion turbines before EOY 2030
- Converting the units to gas saves between $397M - $1,345M (PVRR) when compared to an early retirement

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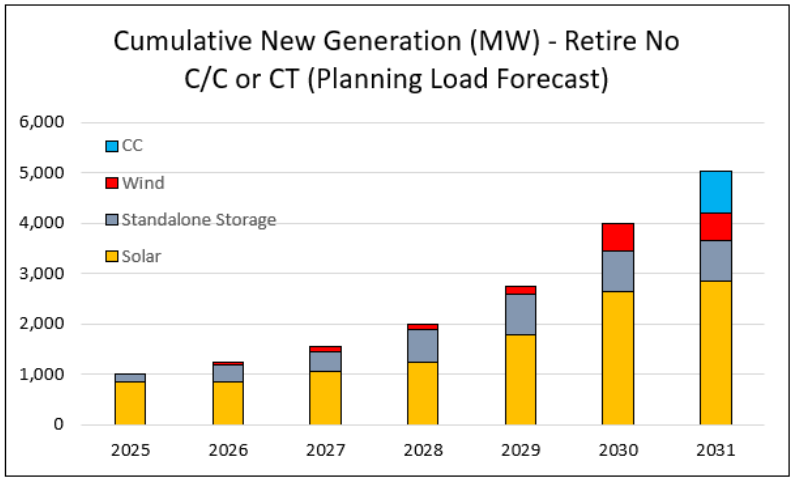
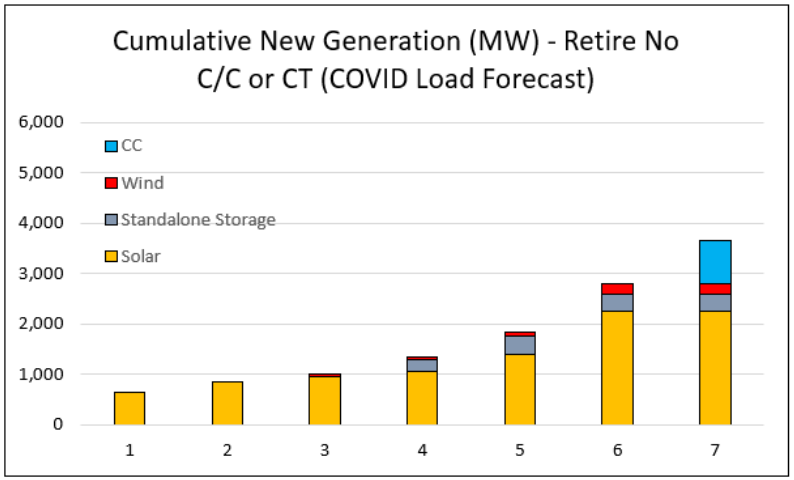
Expansion Plan w/o CC/CT before 2030





- Depending on the load forecast, when retiring Harrington and restricting the model from adding a CC or CTs before EOY 2030, it added between:
- 800MW of storage, 550MW of wind, 2,850MW of solar, and a CC in 2031
- 350MW of storage, 200MW of wind, 2,250MW of solar, and a CC in 2031

Summary

- Converting the Harrington Units to operate on natural gas:
  - Is a low cost and low risk solution for NAAQs compliance
  - Is the lowest cost alternative compared to other compliance strategies
  - Provides year-round capacity and generation, benefitting the integration of additional renewables onto the SPS system
  - Carbon Emissions at Harrington Station are reduced by ~95% over a 10-year period