Scenario Explorer

Temperature Explorer Documentation
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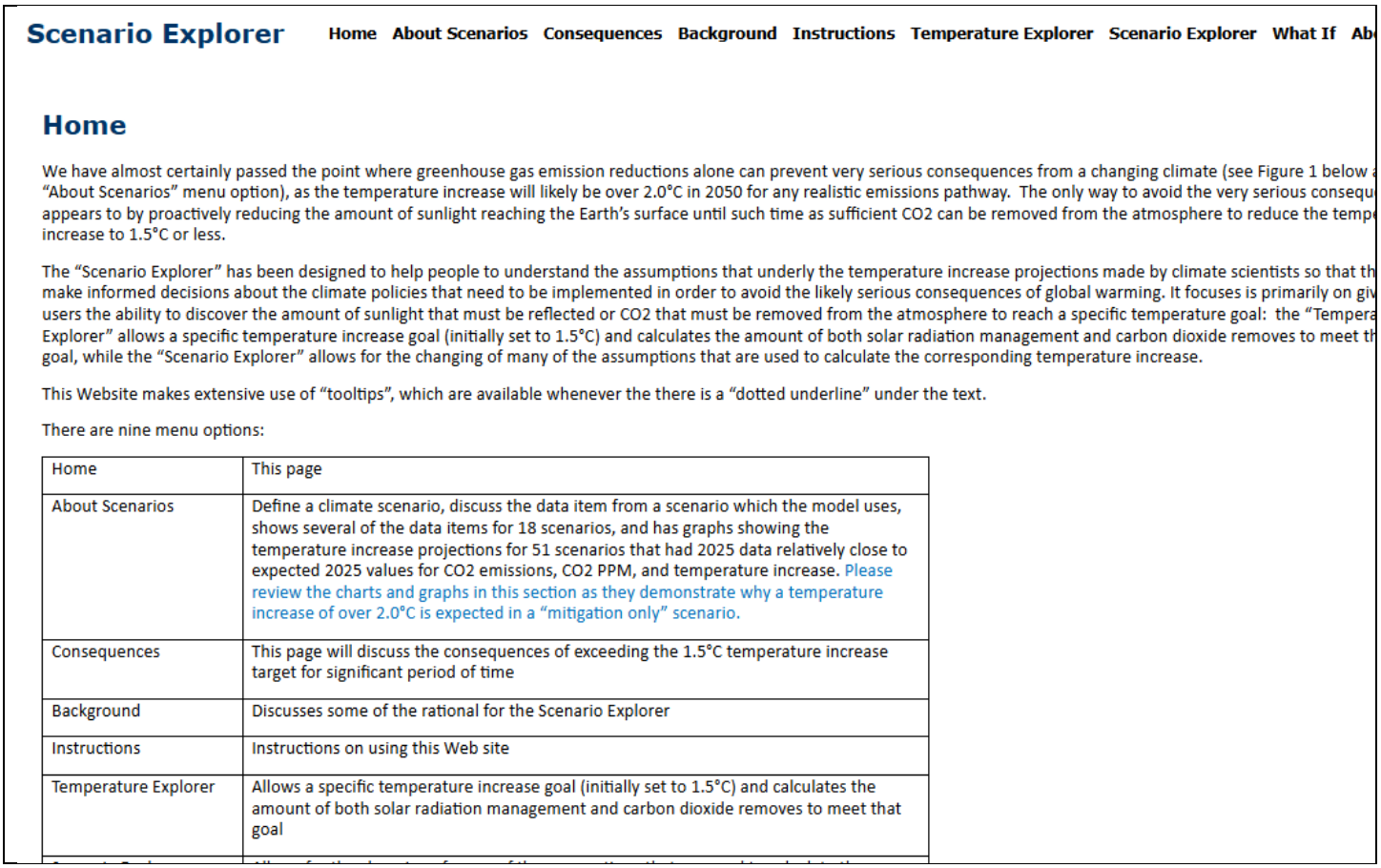
February 25, 2025

Welcome to the Scenario Explorer. This document will introduce you to the "Temperature Explorer" mode, which can be used to explore any number of scenarios simultaneously.

The URL for the Scenario Explorer is www.scenesp.org. The Scenario Explorer Website will initially display the "Home" page.



Scenario Explorer Home About Scenarios Consequences Background Instructions Temperature Explorer Scenario Explorer What If Ab

Home

We have almost certainly passed the point where greenhouse gas emission reductions alone can prevent very serious consequences from a changing climate (see Figure 1 below a "About Scenarios" menu option), as the temperature increase will likely be over 2.0°C in 2050 for any realistic emissions pathway. The only way to avoid the very serious consequ appears to by proactively reducing the amount of sunlight reaching the Earth's surface until such time as sufficient CO2 can be removed from the atmosphere to reduce the temp increase to 1.5°C or less.

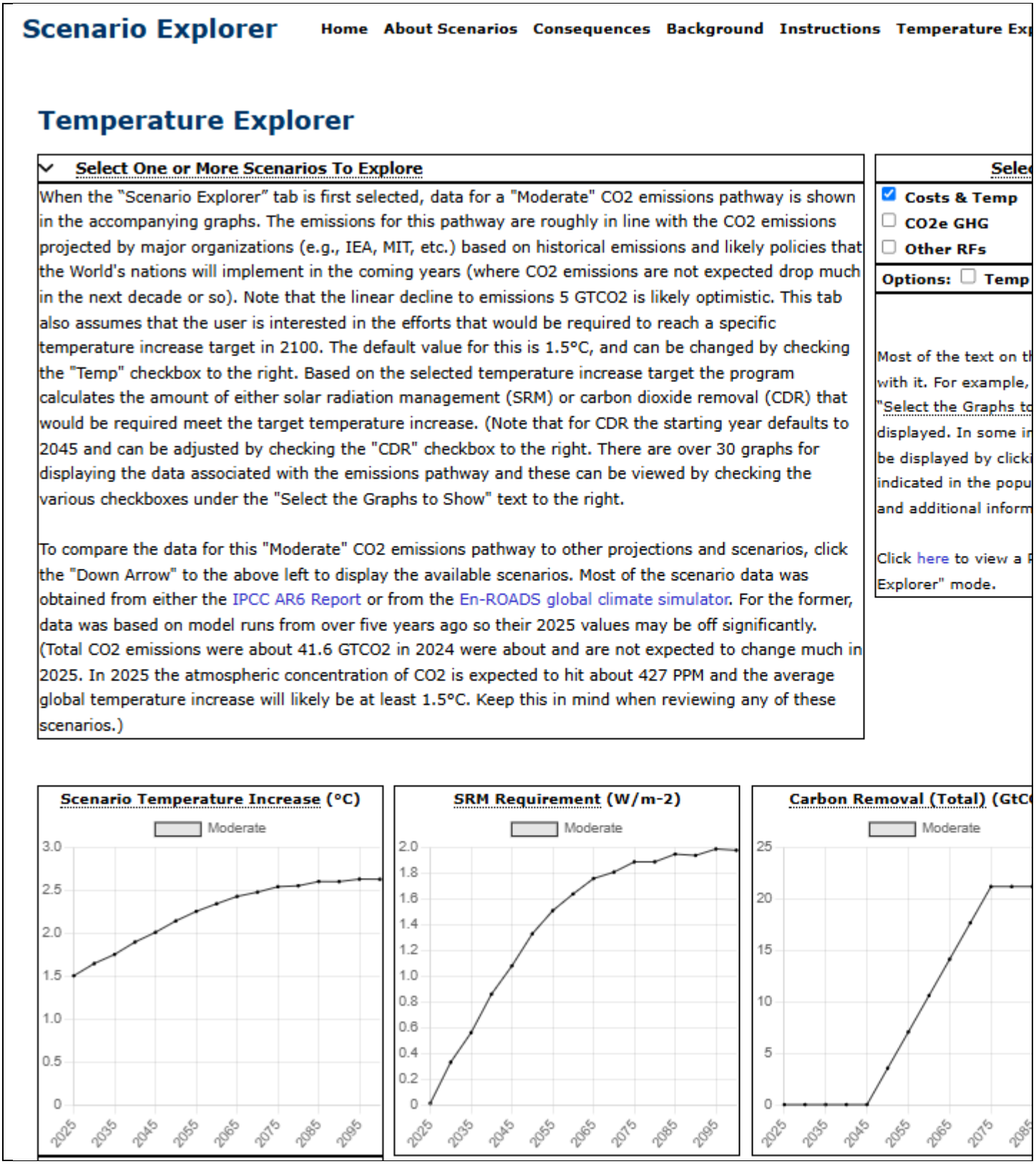
The "Scenario Explorer" has been designed to help people to understand the assumptions that underly the temperature increase projections made by climate scientists so that th make informed decisions about the climate policies that need to be implemented in order to avoid the likely serious consequences of global warming. It focuses is primarily on giv users the ability to discover the amount of sunlight that must be reflected or CO2 that must be removed from the atmosphere to reach a specific temperature goal: the "Tempera Explorer" allows a specific temperature increase goal (initially set to 1.5°C) and calculates the amount of both solar radiation management and carbon dioxide removes to meet th goal, while the "Scenario Explorer" allows for the changing of many of the assumptions that are used to calculate the corresponding temperature increase.

This Website makes extensive use of "tooltips", which are available whenever the there is a "dotted underline" under the text.

There are nine menu options:

Home	This page
About Scenarios	Define a climate scenario, discuss the data item from a scenario which the model uses, shows several of the data items for 18 scenarios, and has graphs showing the temperature increase projections for 51 scenarios that had 2025 data relatively close to expected 2025 values for CO2 emissions, CO2 PPM, and temperature increase. Please review the charts and graphs in this section as they demonstrate why a temperature increase of over 2.0°C is expected in a "mitigation only" scenario.
Consequences	This page will discuss the consequences of exceeding the 1.5°C temperature increase target for significant period of time
Background	Discusses some of the rational for the Scenario Explorer
Instructions	Instructions on using this Web site
Temperature Explorer	Allows a specific temperature increase goal (initially set to 1.5°C) and calculates the amount of both solar radiation management and carbon dioxide removes to meet that goal

To get to the "Temperature Explorer", click the "Temperature Explorer" menu option.



The Web page initially provides some instructions on using the “Temperature Explorer”. Click the “Down Arrow” (on the upper left of the page) to hide the instructions.

Scenario Explorer Home About Scenarios Consequences Background Instructions Temperature Exp

Temperature Explorer

Select One or More Scenarios To Explore

Shared Socioeconomic Pathways (SSPs)

- ☐ SSP1-19 ☐ SSP1-26 ☐ SSP2-45 ☐ SSP3-Baseline
- ☐ SSP4-34 ☐ SSP4-60 ☐ SSP5-34 ☐ SSP5-Baseline

Other Scenarios

- ☐ 1.5° C (En-ROADS) ☐ AR6 1.5°C ☐ AR6 2.0°C
- ☐ AR6 2.5°C ☐ AR6 3.0°C ☐ AR6 3.5°C
- ☐ AR6 4.0°C ☐ AR6 4.5°C ☐ AR6 5.0°C
- ☐ BAU (En-ROADS) ☐ Mod CDR 1.5 ☐ Mod SRM 1.5
- ☐ Mod Tmp Acc 1.5 ☑ Moderate

Simplified Net-Zero Emission Scenarios

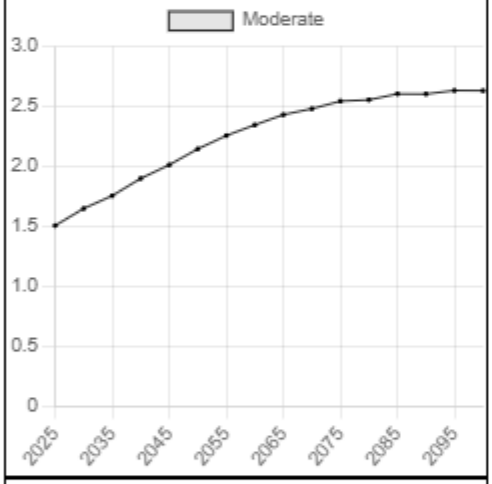
	Peak Year of CO2 Emissions					
# Years	2025	2030	2035	2040	2045	2050
25	☐	☐	☐	☐	☐	☐
30	☐	☐	☐	☐	☐	☐
35	☐	☐	☐	☐	☐	☐
40	☐	☐	☐	☐	☐	☐

Selec

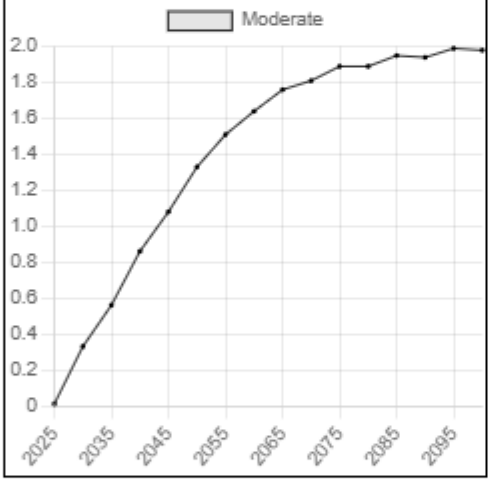
- ☑ Costs & Temp
- ☐ CO2e GHG
- ☐ Other RFs

Options: ☐ Temp

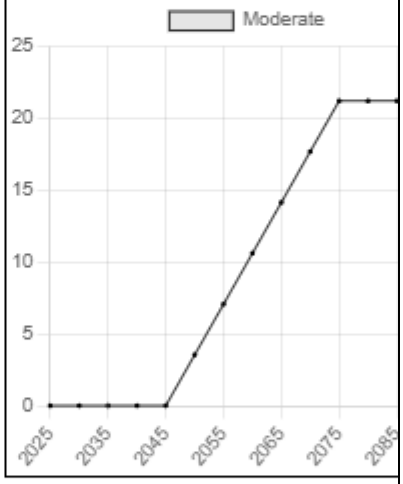
Scenario Temperature Increase (°C)



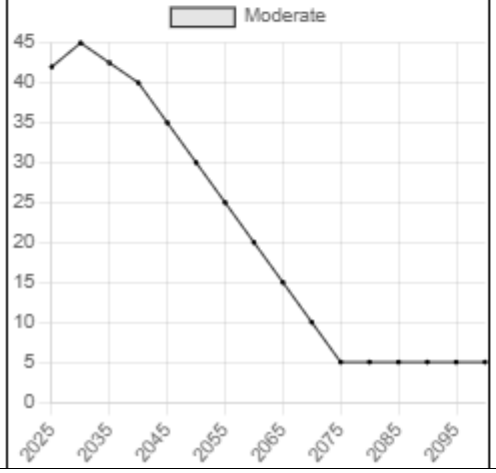
SRM Requirement (W/m-2)



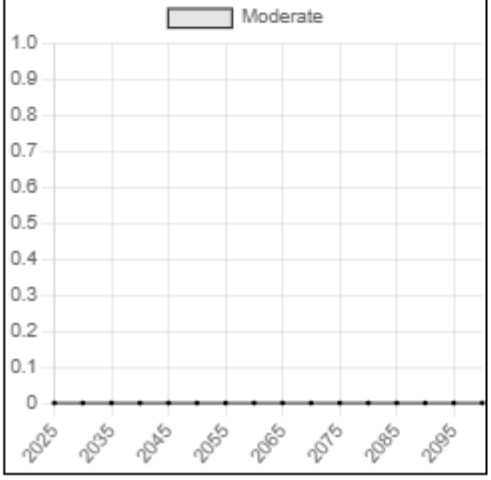
Carbon Removal (Total) (GtC



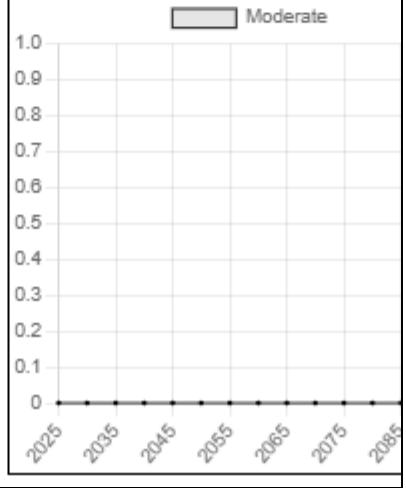
Net Anthropogenic CO2 Emssions (GTCO2)



CCS,BECCS, Etc. (GtCO2)

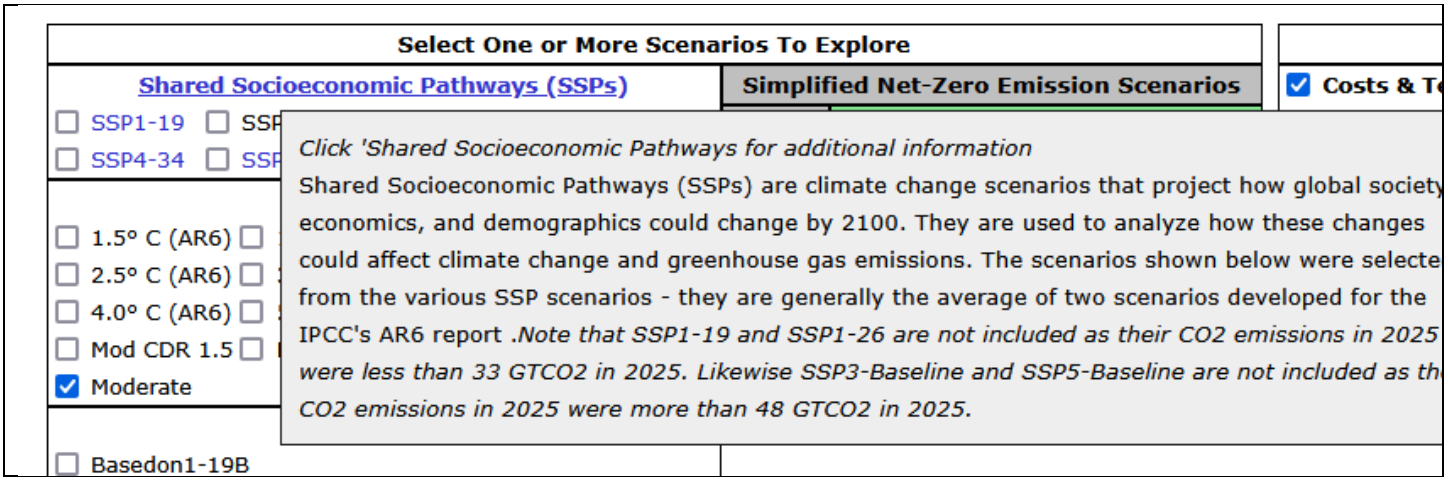


Carbon Removal (Scenario) (Gt



The upper left part of the webpage displays the scenarios that can be explored. Note that in future versions there will be more scenarios to explore.

Most of the text on the Web page has popup text associated with it. For example, if you hover your mouse over the text "Shared Socioeconomic Pathways (SSPs)", a popup window will be displayed.



In some instances additional information can also be displayed by clicking on the text, and this will always be indicated in the popup. Note that additional popup windows and additional information will be added in future releases.

Scenario Explorer - Additional Information

Shared Socioeconomic Pathways (SSPs)

Shared Socioeconomic Pathways (SSPs) are climate change scenarios that project how global society, economics demographics could change by 2100. They are used to analyze how these changes could affect climate change an greenhouse gas emissions.

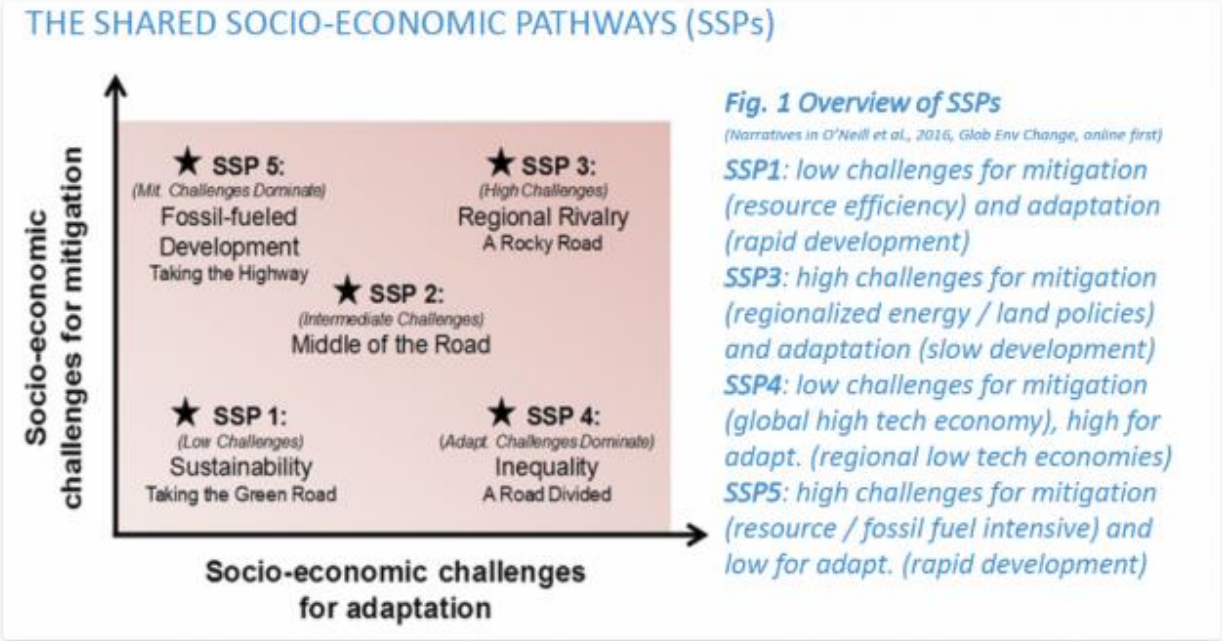
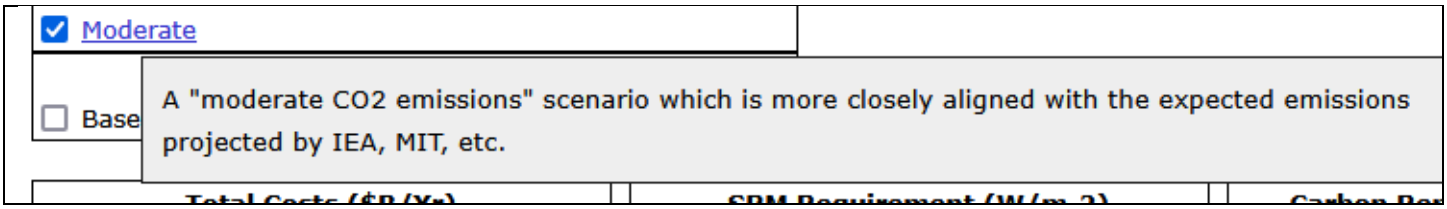


Diagram summarizing and locating the relationship of the five SSPs to challenges for mitigation and adaptation.

Source: Riahi et al poster

(For a more complete description see Shared Socioeconomic Pathways from the IPCC Sixth Assessment and thei Implications for the Future of Places)

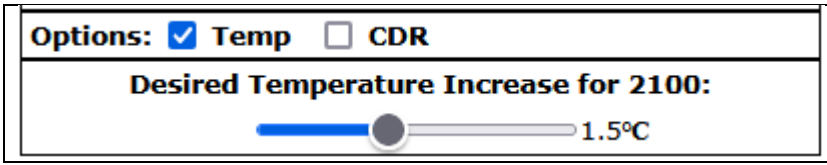
When the web page is first displayed, the data for the "Moderate" scenario is displayed. Hovering a mouse over the scenario name will display information about the scenario.



The “Simplified Net-Zero Emission Scenarios” provide an easy way to examine pathways where net CO2 emissions peak before 2050 and then decline to zero within 25-40 years

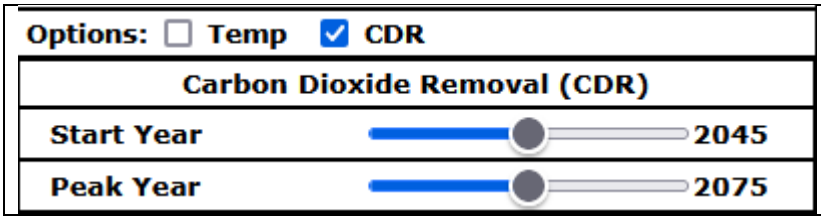
Simplified Net-Zero Emission Scenarios						
	Peak Year of CO2 Emissions					
# Years	2025	2030	2035	2040	2045	2050
25	☐	☐	☐	☐	☐	☐
30	☐	☐	☐	☐	☐	☐
35	☐	☐	☐	☐	☐	☐
40	☐	☐	☐	☐	☐	☐

In addition to being able to visualize the scenario’s many data elements, the “Overview mode” was also designed to display the requirements for meeting a specific temperature increase for both solar radiation management and carbon dioxide removal. The initial temperature increase goal is set to 1.5℃, and this can be change by clicking the “Temp” checkbox on the upper right side of the web page.



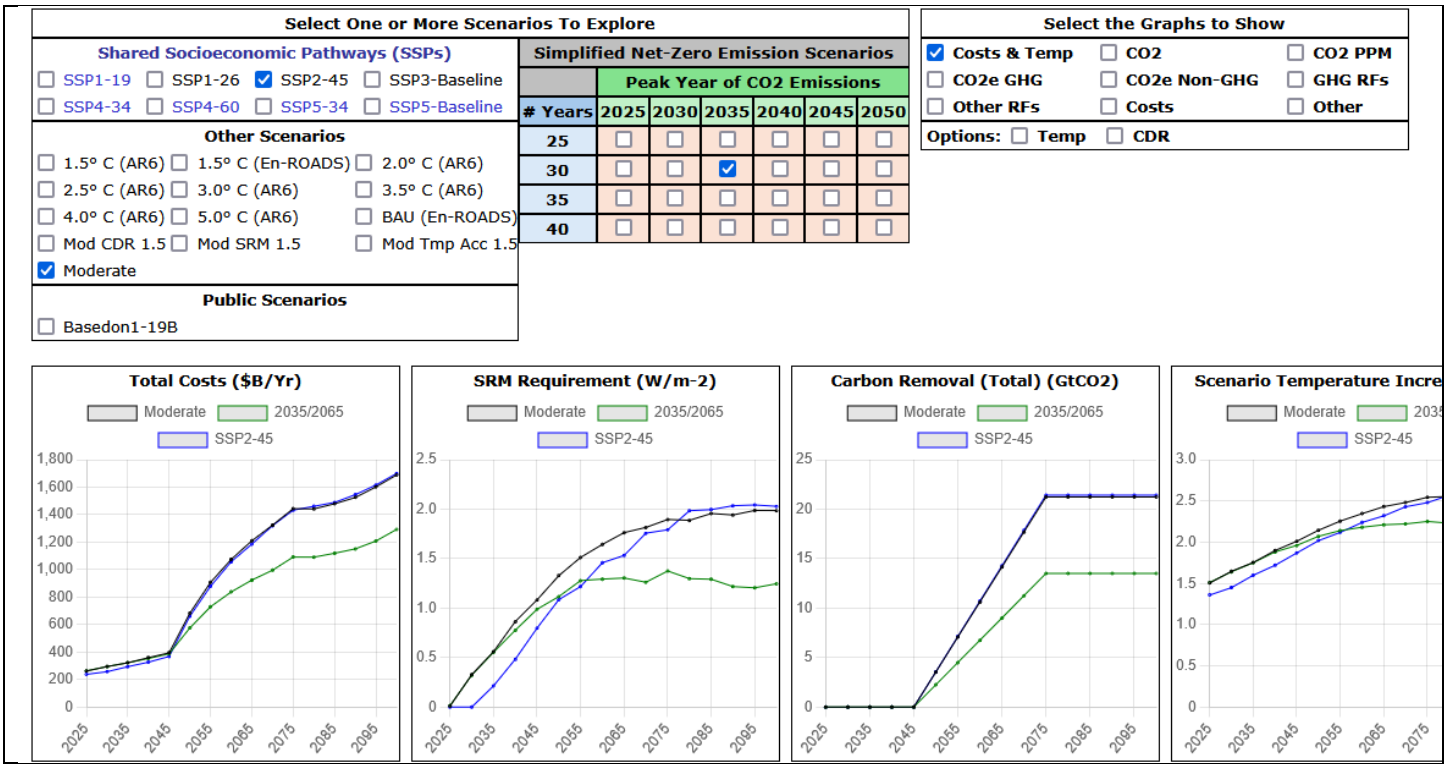
As this value is changed the “Total Costs”, “SRM Requirement”, and “Carbon Removal (Total)” graphs will be updated.

The model also defaults to having significant carbon dioxide removed from the atmosphere starting in 2045 and peaking in 2075. These values can be adjusted by clicking the “Temp” checkbox on the upper right side of the web page.

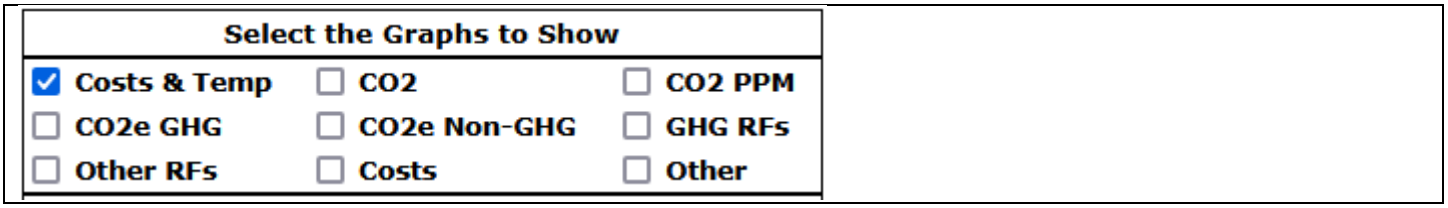


As these values are changed the “Total Costs” and “Carbon Removal (Total)” graphs will be updated.

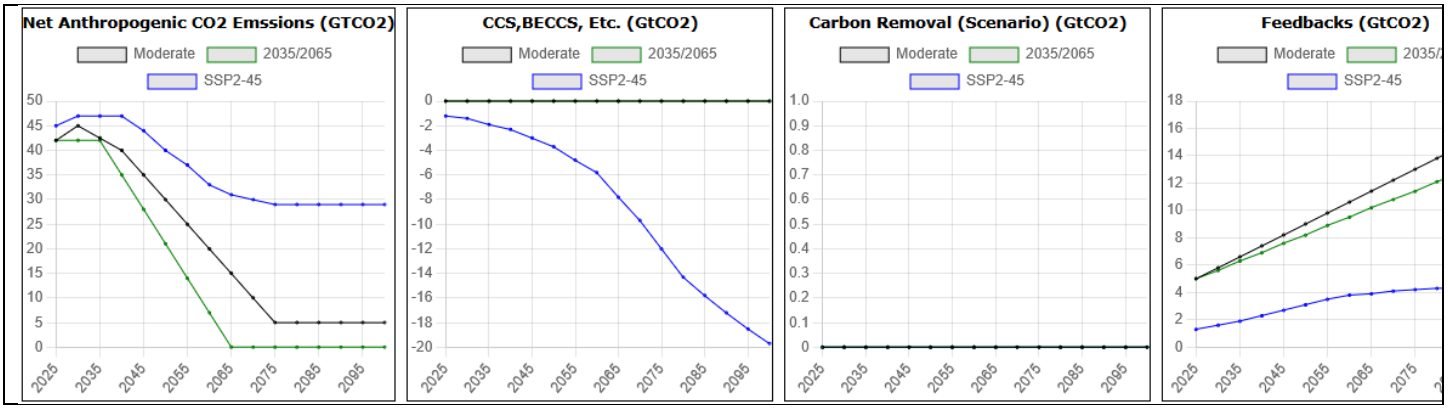
To view the data for other scenarios simply check the box to the left of the scenario name (or one of the check boxes in the “Simplified Net-Zero Emission Scenarios” table



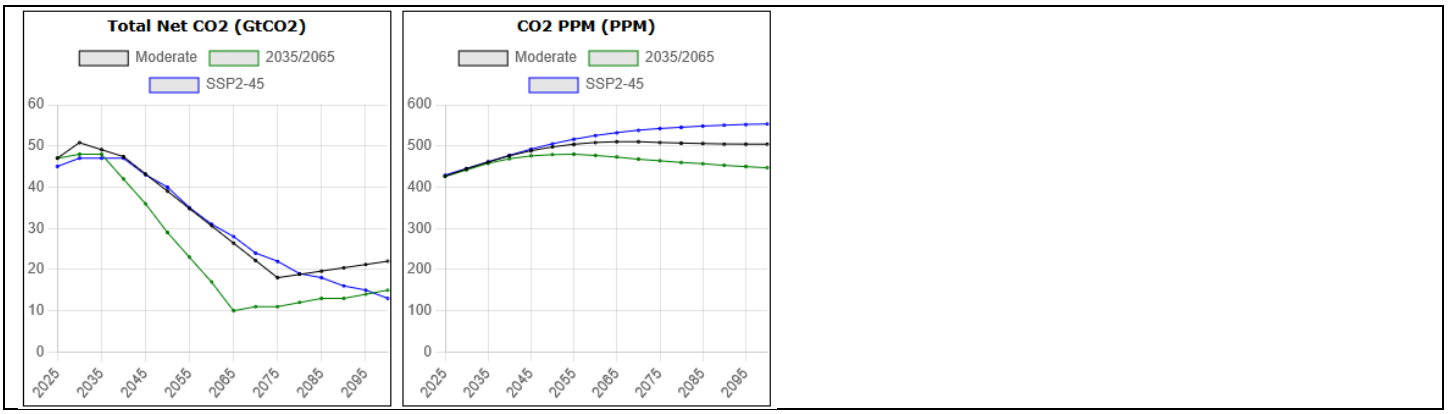
The “Overview” mode provides over 30 graphs for displaying the data for the “checked” scenarios. To display additional graphs simple check the appropriate checkbox under “Select the Graphs to Show”.



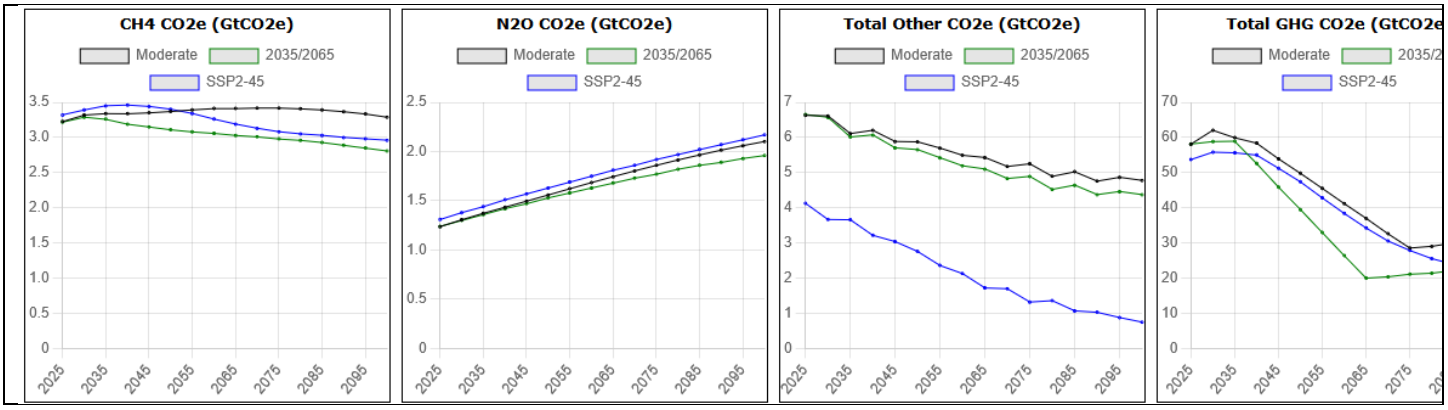
CO2



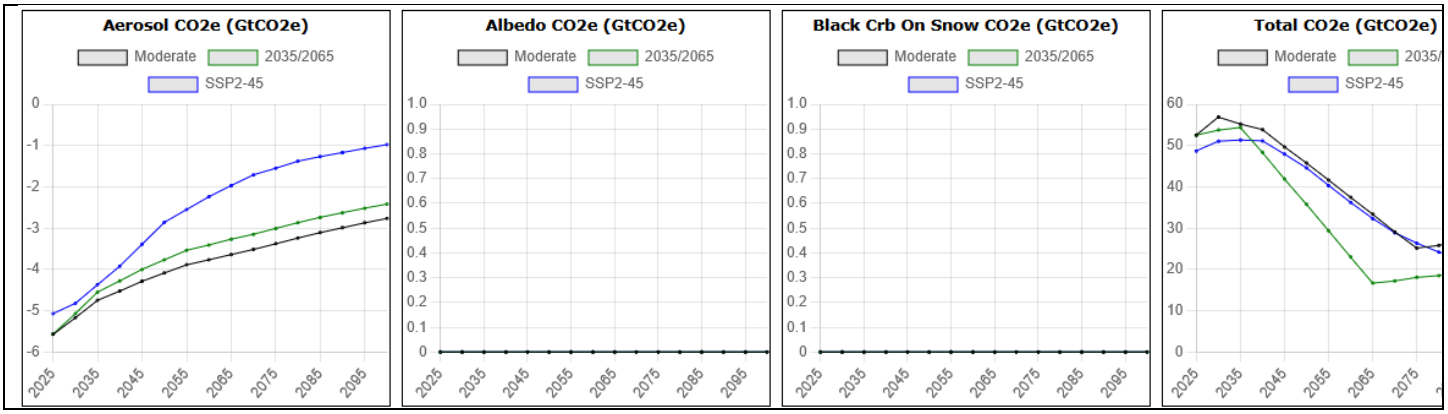
CO2 PPM



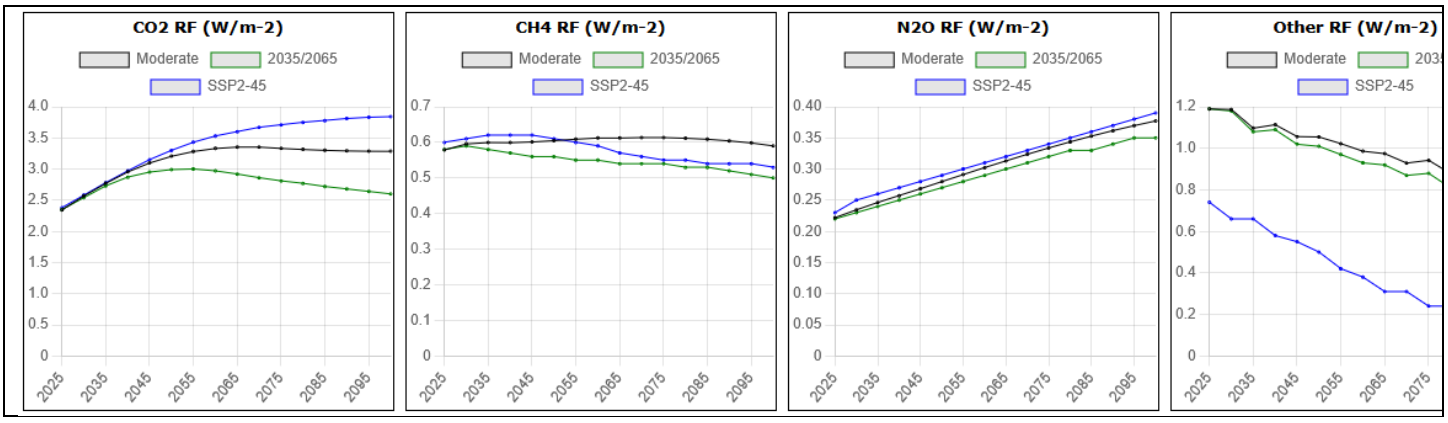
CO2e GHG



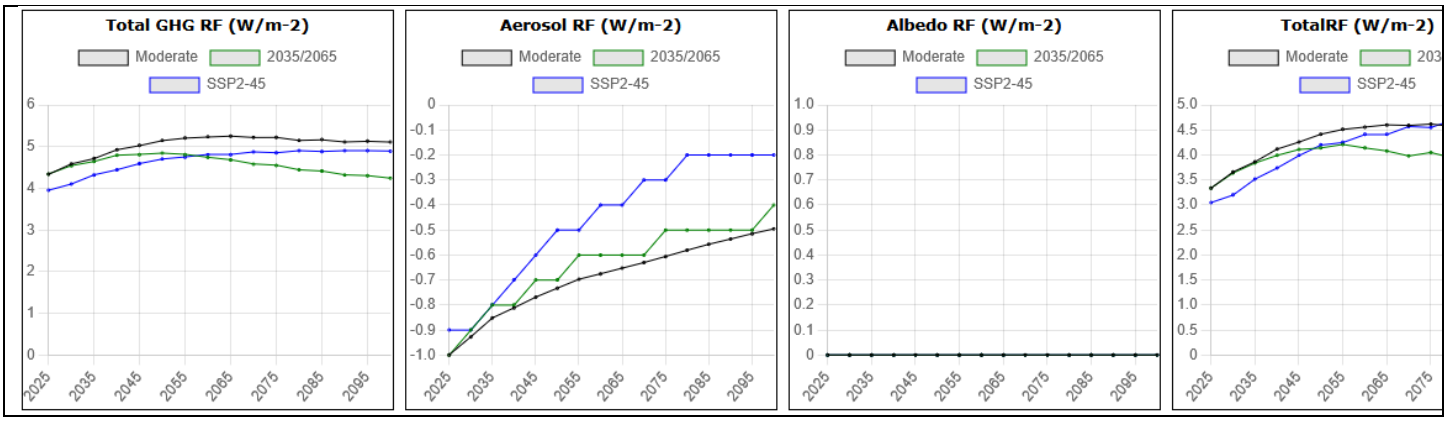
CO2e Non-GHG



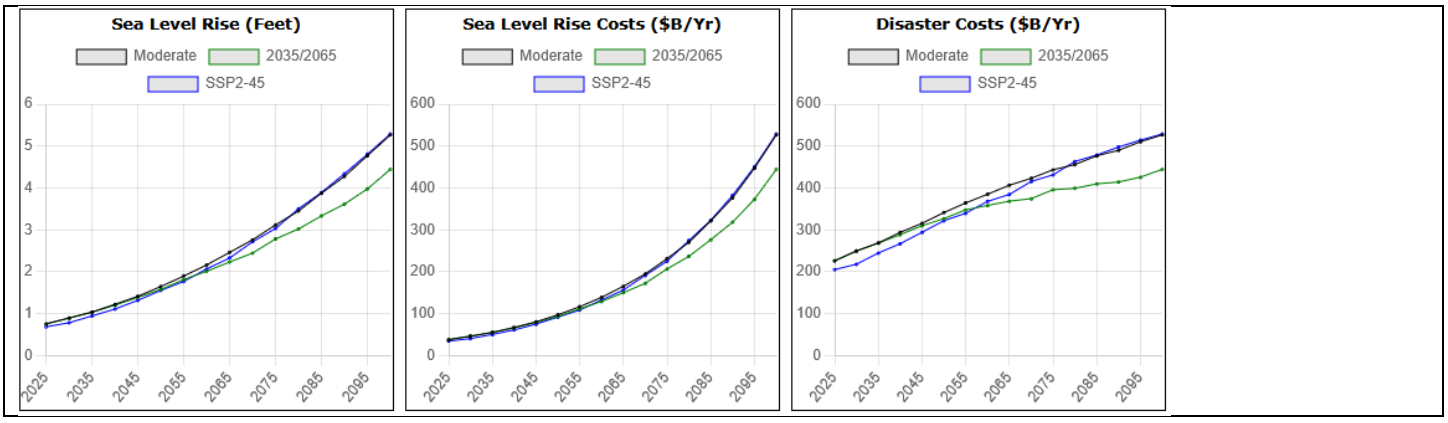
GHG RFs



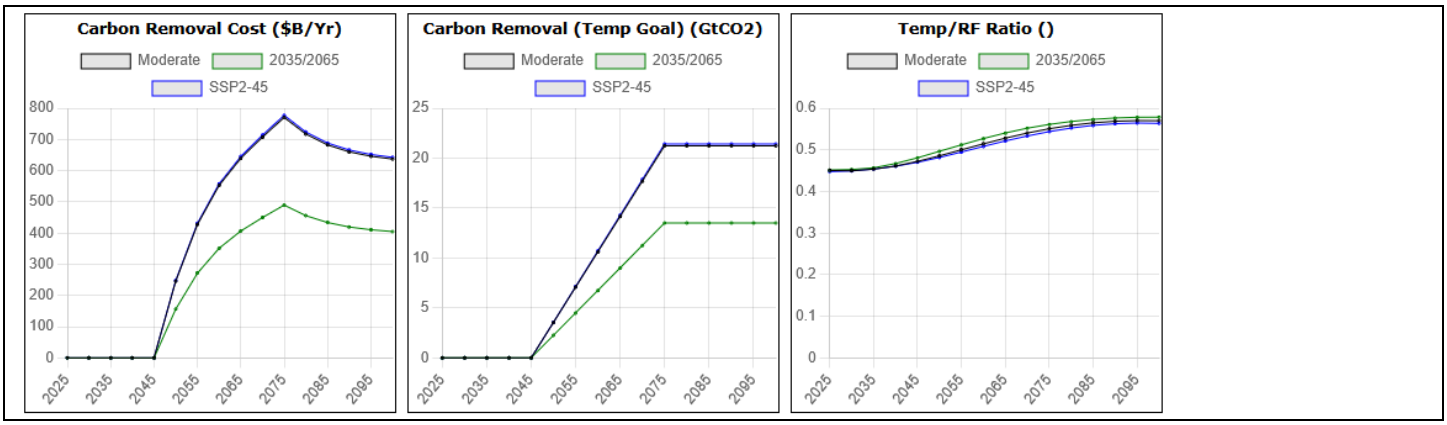
Other RFs



Costs



Other


Carbon Removal Cost ($B/Yr)
Moderate
2035/2065
SSP2-45
800
700
600
500
400
300
200
100
0
2025
2035
2045
2055
2065
2075
2085
2095
Carbon Removal (Temp Goal) (GtCO2)
Moderate
2035/2065
SSP2-45
25
20
15
10
5
0
2025
2035
2045
2055
2065
2075
2085
2095
Temp/RF Ratio ()
Moderate
2035/2065
SSP2-45
0.6
0.5
0.4
0.3
0.2
0.1
0
2025
2035
2045
2055
2065
2075
2085
2095