



Adaptation Catalyst Tool

Quick Start Guide

This guide is designed to help you use the Adaptation Catalyst tool including:

[Data Needed](#)

[Basic Functionality](#)

[Outputs and Uses](#)



Quick Start Guide

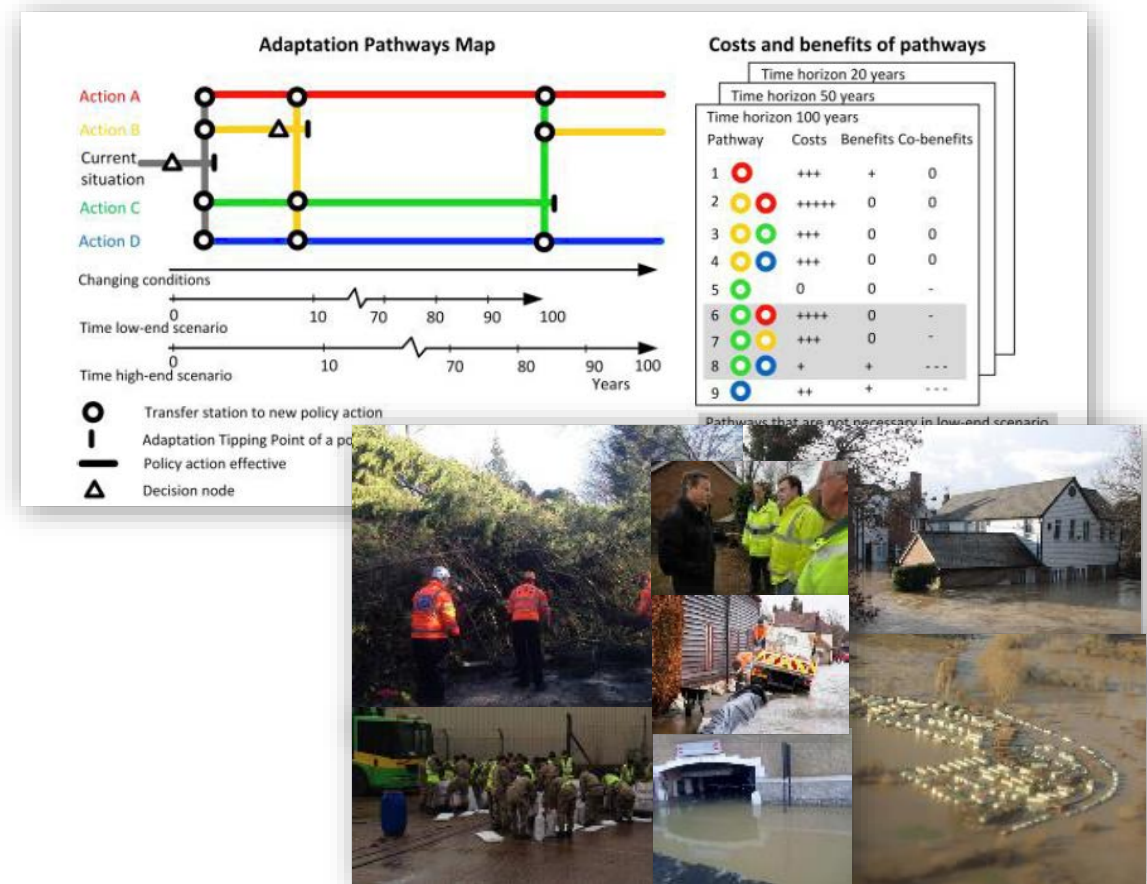
Before You Start

What is the Adaptation Catalyst?



A decision-support tool designed to aid professionals in delivering local action to adapt to climate change

- **Supports** use of **adaptation planning and pathways** method in **complex** decision-making.
- Provides **insight** on how adaptation measures can be delivered **optimally** through **incremental, integrated** actions in **uncertain environments**.
- Encourages **stakeholder participation** in 'future-proofed' decision-making through **flexibility, comparison** and **visualisation**.



What does the Adaptation Catalyst do?



- Allows users to **visualize and test** the effectiveness of different adaptation options **through time, under different future scenarios** and can be used to demonstrate:
 - **how/if adaptation can be combined with regular asset management**
 - choices between **different types/packages of adaptation measures**
 - **actions** that have to be made **now**
 - **drawbacks of restoration without adaptation** to climate change
- Shows **effectiveness of measures**; shows tipping points (when no longer effective); shows relative to norm or other threshold
- Can be **applied** to a **wide-range** of **contexts**:
 - Climate change effect
 - Sector
 - Adaptation type
 - Geographic or spatial scale
 - Data precision (exact figures or relative scale)

Key Definitions



System	The set of conditions you want to test in the adaptation catalyst
Pressure	The climactic change or hazard impacting the system (e.g. sea-level rise, change in temperature, change in rainfall volume)
Coping capacity	The amount of pressure the system can cope with before failing.
Measures	Solutions that can be put in place to adapt to the pressure being placed on a system
Alternatives	Different combinations of measures that can be enacted to counteract the pressure on the system
Excess pressure	The amount of pressure above the coping capacity of the system (and any measures in place)

Gather Your System Data



The data can be as accurate and precise as you want at the scale (e.g. single site, city, catchment) that's most appropriate for your analysis. **If you don't have exact figures you can use scales or ratios.** There will be opportunities to modify these figures within the Adaptation Catalyst.

Data Type	Explanation and Source	Examples
System	What do you want to analyse in the adaptation catalyst?	A river defence system, sea-level, urban heat island effect, subsidence
Climate Pressure	What climatic change or hazard do you want to analyse?	Increased precipitation, Increased temperatures, Increased sea-level
First Year of Analysis	When do you want the analysis to start?	2000, 2019, 2050
Last Year of Analysis	When do you want the analysis to end?	2030, 2050, 2100
Starting Value for the Pressure	What is the current or starting value of your climate pressure? <i>You could use risk assessments or meteorological data for this.</i>	Annual rainfall: 160mm Sea-level: 1m Hottest summer day: 35°C
End Value for the Pressure	What is the future value of your climate pressure? <i>You could use climate modeling such as UKCP18 for this.</i>	Annual rainfall: 280mm Sea-level: 2m Hottest summer day: 43°C

Gather Your Measures Data



These data can be as accurate and precise as you want at the scale (e.g. single site, city, catchment) that's most appropriate for your analysis. **If you don't have exact figures you can use scales or ratios.** There will be opportunities to modify these figures within the Adaptation Catalyst.

Data Type	Explanation and Source	Examples
Type of Measures	What type of measure do you want to analyse in your system?	Higher dike, beach nourishment, NFM, emergency planning, AC systems
Start and End Year of Measures	What are the first and last years the measure could be applied? <i>This could be based on the lifespan of an piece of infrastructure, availability of budget, time to implement, etc.</i>	2019 – 2050 2037 – 2081
Impact on the System	What impact will the measure have on the system? Coping capacity measures: solutions that increase the ability of the system to cope with the pressure Reduction of sensitivity measures: solutions that decrease the risk of the pressure through reducing the impact of the pressure on people and assets Decrease of pressure measures: solutions that reduce the impact of the pressure	Coping capacity measures (e.g. 2m increase in the height of sea walls) Reduction of sensitivity measures (e.g. raising 20% of at risk buildings from ground level) Decrease of pressure measures (e.g. dredging to reduce water levels 2m)
Investment and Operational Costs	Investment: What will the initial cost be to implement the measure Operational: What are the on-going costs of implementing the measure	Investment Costs: £100,000 Operational Costs: £10,000
Co-benefits	What are additional benefits or disadvantages of the measure?	These can be set from -5 to +5.



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The Adaptation Catalyst

<https://publicwiki.deltares.nl/display/AP/Adaptation+Catalyst>

Supporting documents for the Adaptation Catalyst

Basic user guide

Technical user guide

Theoretical background

The Adaptation Pathways Generator

<https://publicwiki.deltares.nl/display/AP/Pathways+Generator>



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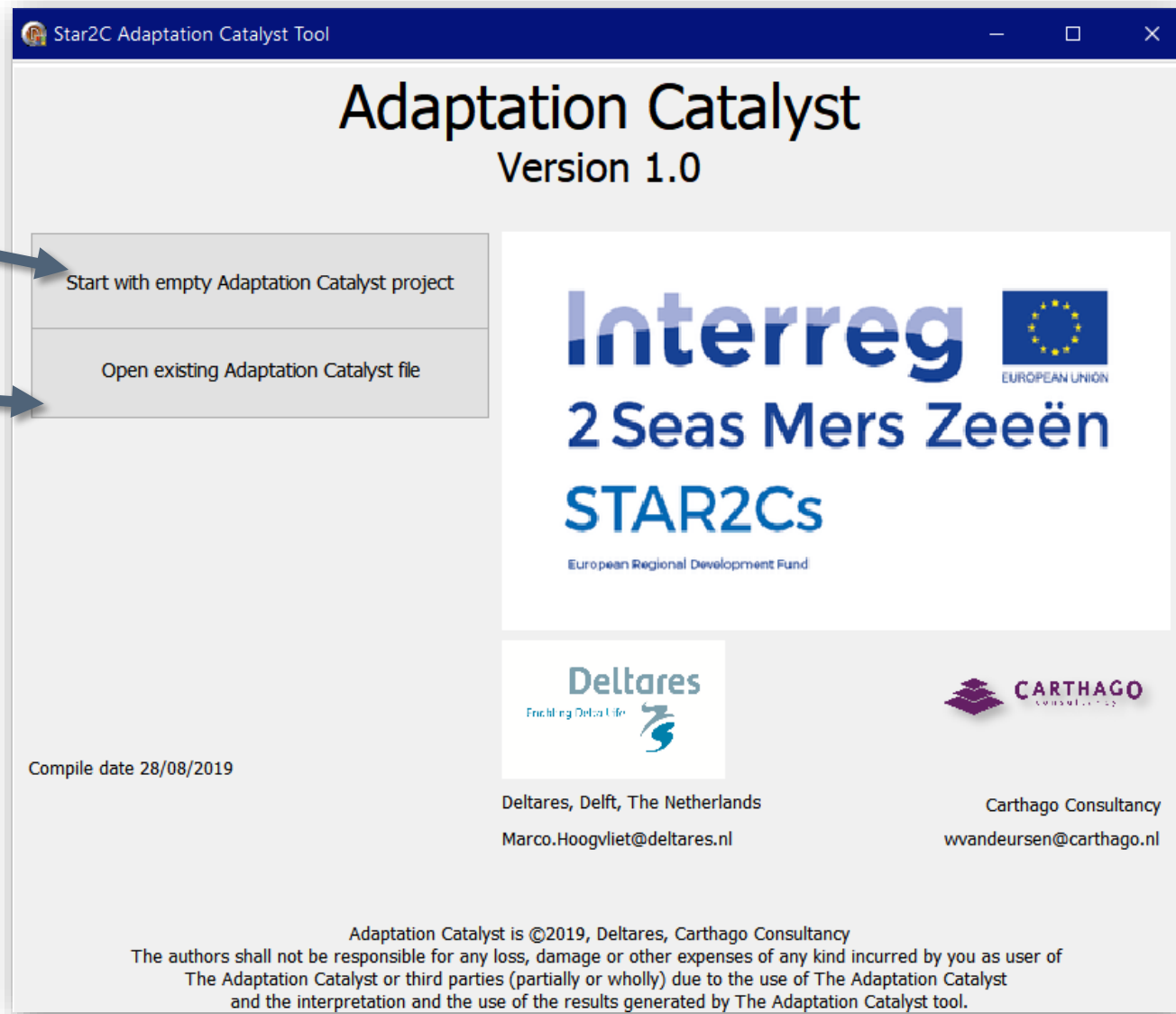
Get Started

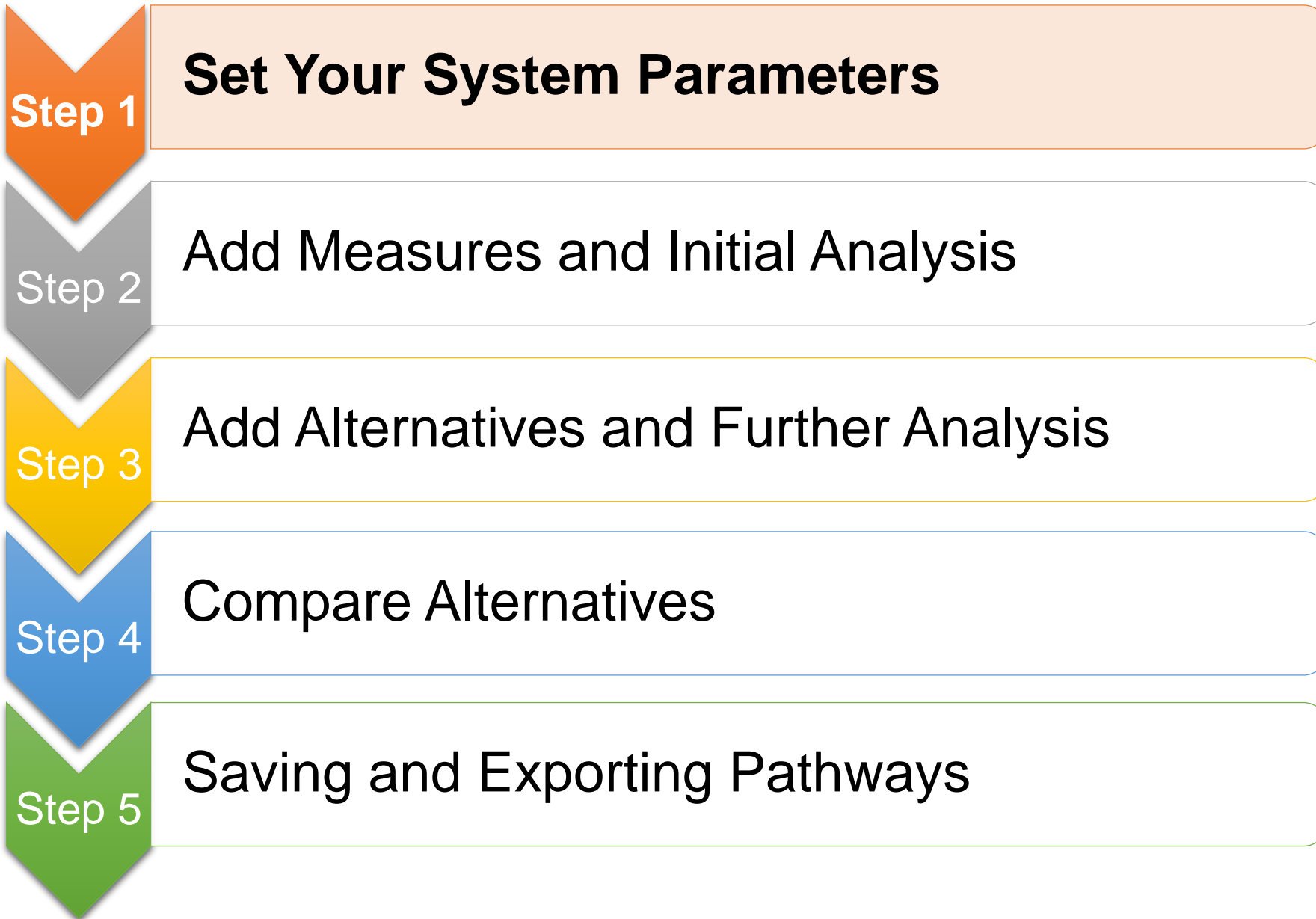
Launch the Adaptation Catalyst Tool



The Adaptation Catalyst is available here: <https://publicwiki.deltares.nl/display/AP/Adaptation+Catalyst>

- 1 Start a new system analysis
- 2 Open an existing system analysis





Step 1: Set Your System Parameters

To start using the **Adaptation Catalyst**, you must set initial parameters for your system.

Case Info

Give a label for the pressure
Avg Spring Tide @ Margate

Give the approximate value for the pressure
10.00 Units Meters

Give units for costs analysis £ (000)

First year of analysis 2019

Last year of analysis 2100

OK

1

Define your system and pressure

2

Enter your 'end value for pressure' and units.
Units must be the same as for the capacity of
your system

3

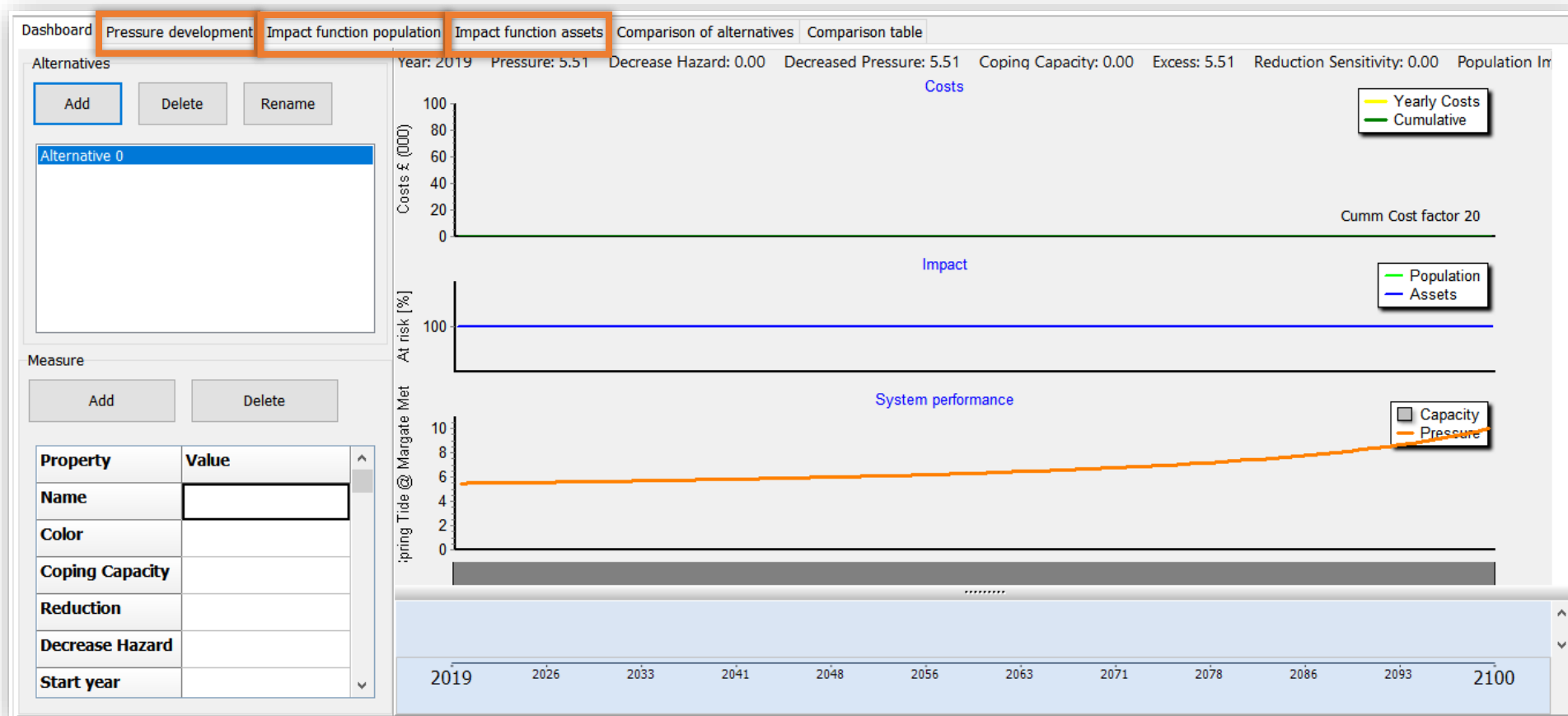
Enter the currency unit for financial assessment

4

Enter the first and last years that you want to
use to analyse your system

Step 1: Set Your System Parameters

You are now in the **Dashboard** of the Adaptation Catalyst. To continue to set your system parameters you need to use the tabs.



1

Pressure Development

2

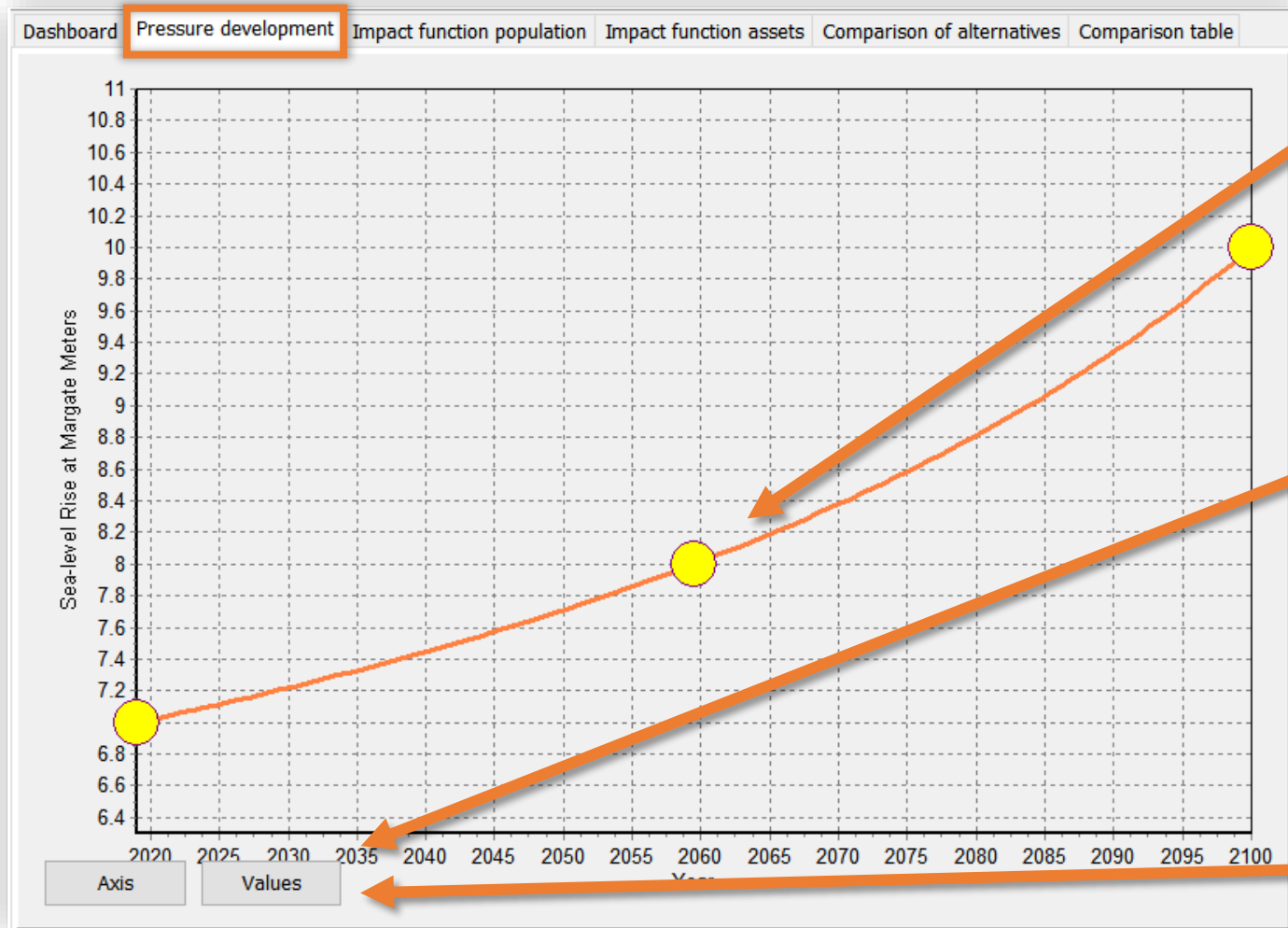
Impact Function Population

3

Impact Function Assets

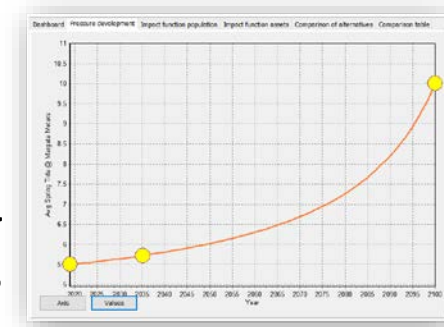
Step 1: Set Your System Parameters

In **Pressure Development**, you can adjust the values and rate of the climatic changes.



1

Change the rate and start/end values by clicking & dragging the **nodes**



2

Change the start/end values using the **Values** menu

Pressures Values

Enter value for 2019

Enter value for 2059

Enter value for 2100

Adjust Chart Y-Axis min-max

Cancel OK

3

Change axis values using the **Axis** menu

ScenarioLeftAxisDialog

AutoMinMax

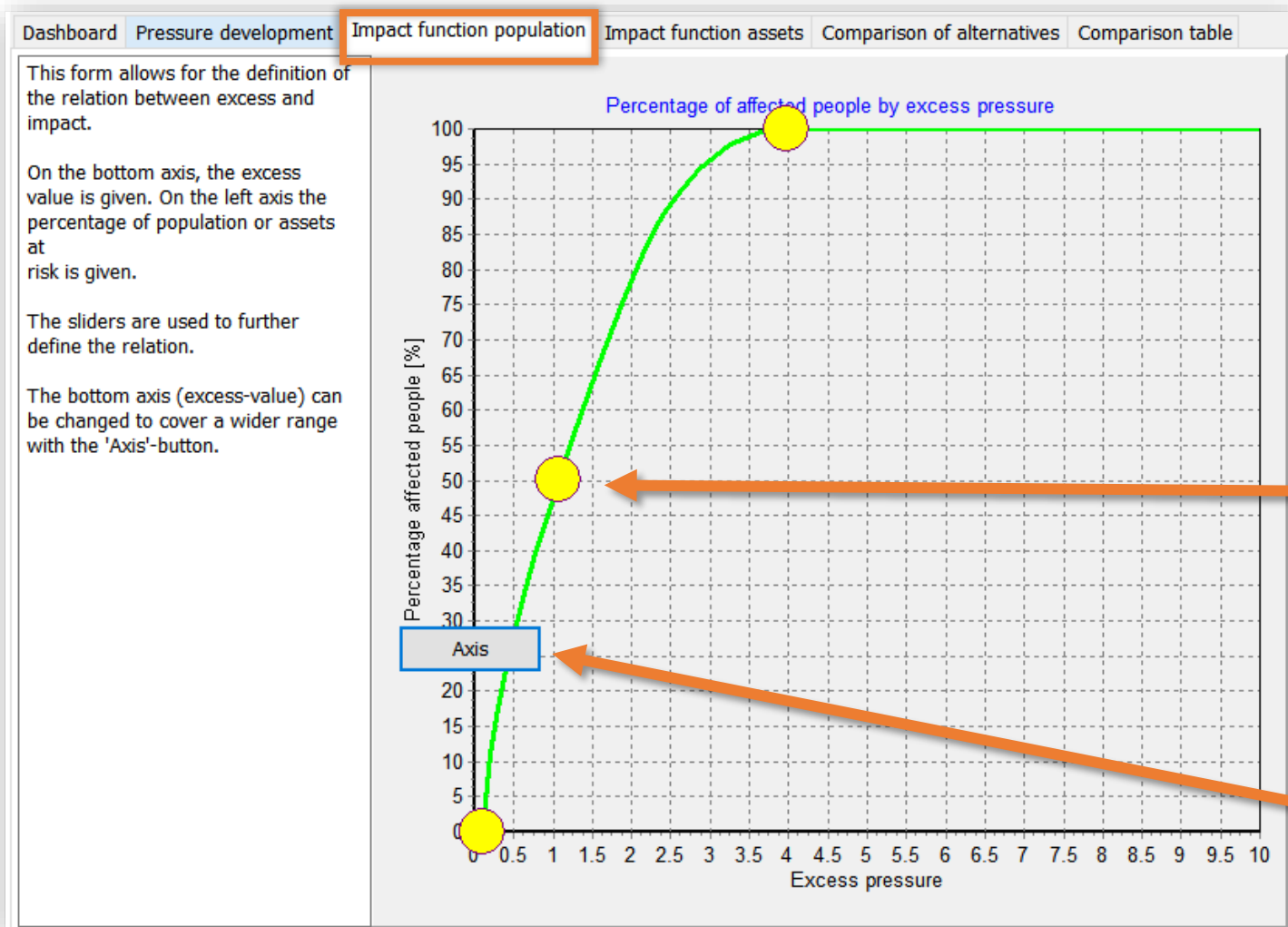
Minimum

Maximum

Cancel OK

Step 1: Set Your System Parameters

In **Impact Function Population**, you can adjust the percentage of people that are impacted at what value of excess pressure.



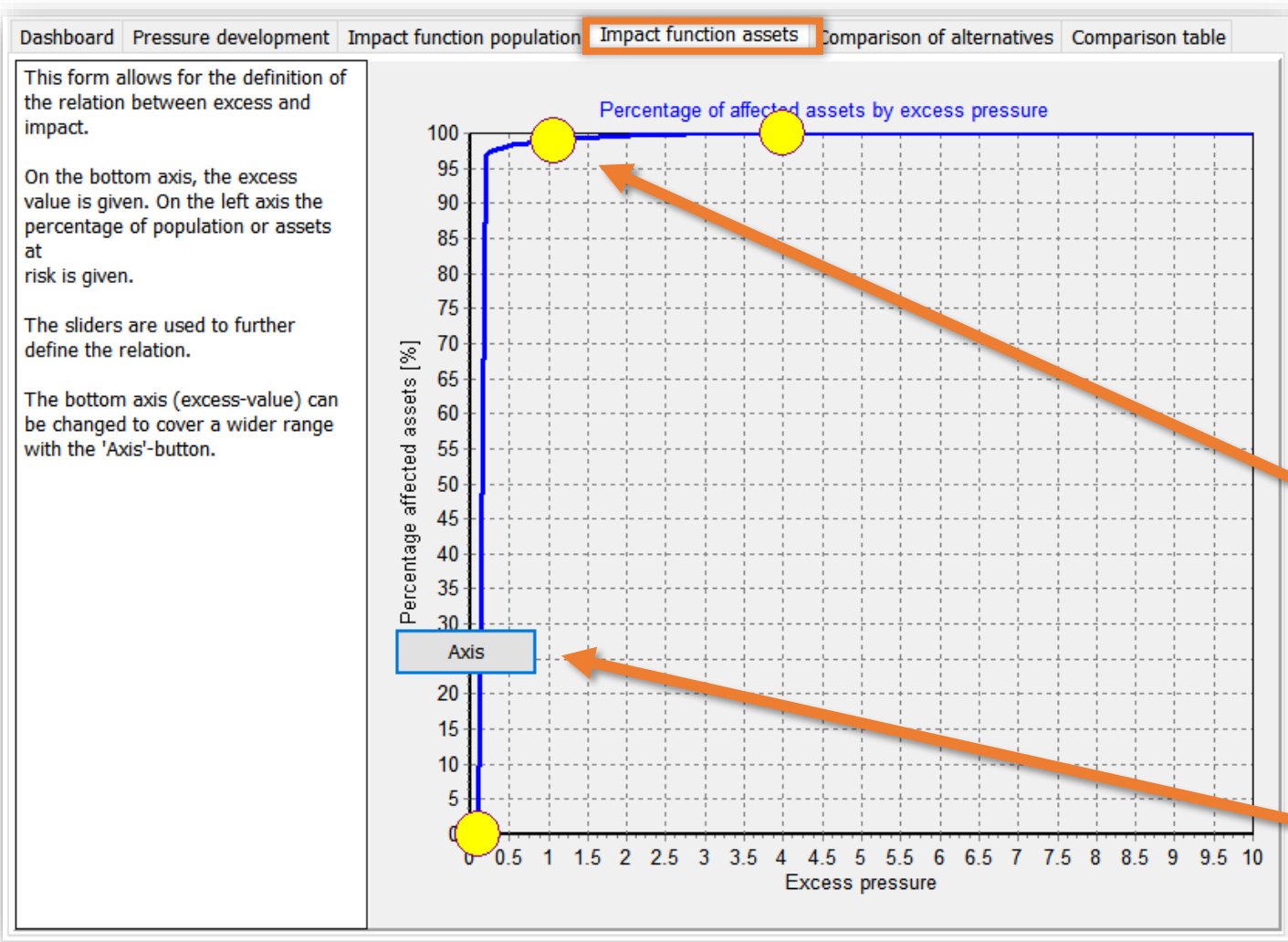
Excess pressure is the value above the pressure defined in your system. If the pressure exceeds this value, people will be in danger.

1 Change the shape of the curve and start/end values by clicking and dragging the **nodes**

2 Change axis values using the **Axis** menu

Step 1: Set Your System Parameters

In **Impact Function Assets**, you can adjust the percentage of assets that are impacted at what value of excess pressure.



Excess pressure is the value above the pressure defined in your system. If the pressure exceeds this value, damage will occur.

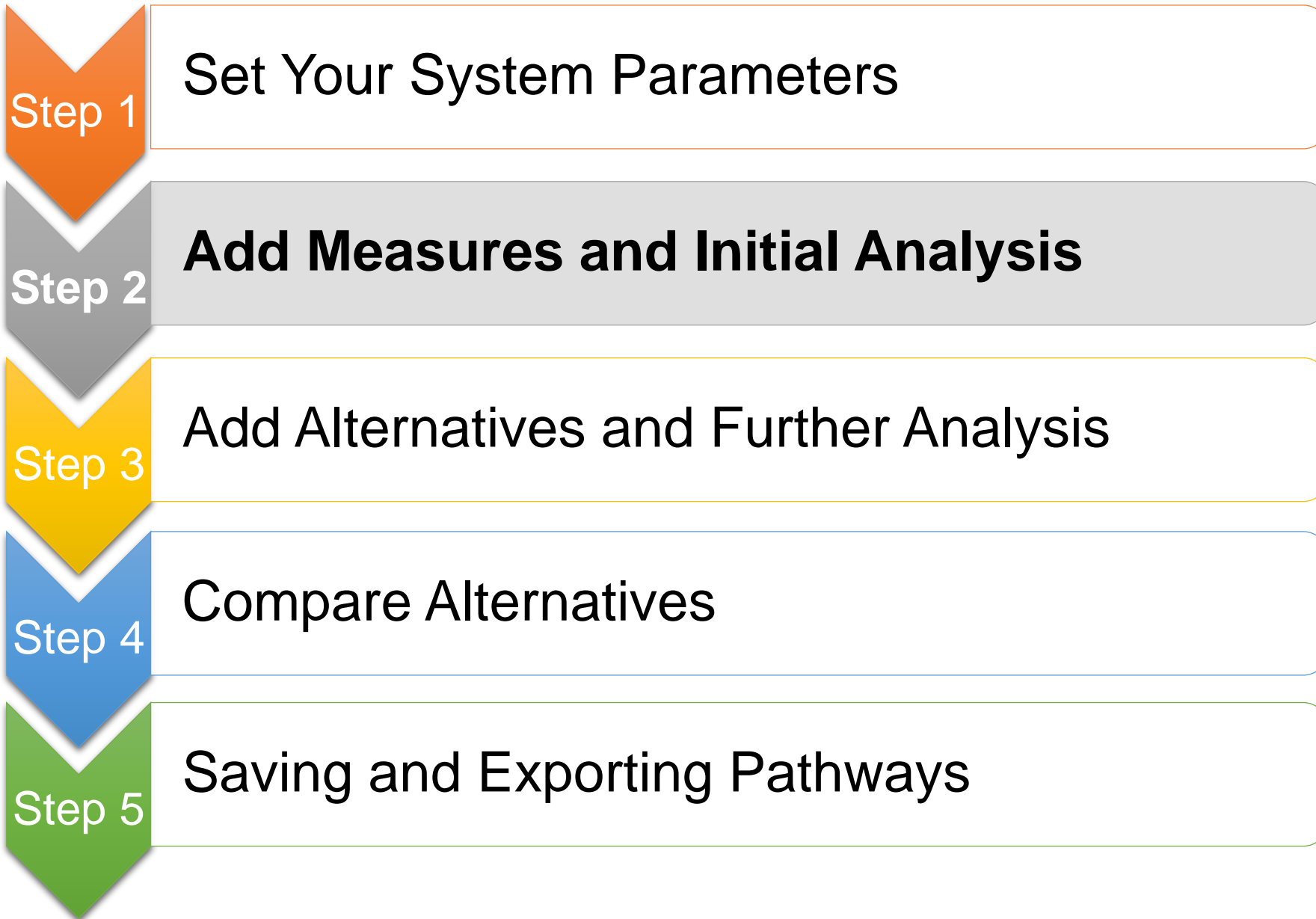
1

Change the shape of the curve and start/end values by clicking and dragging the **nodes**

2

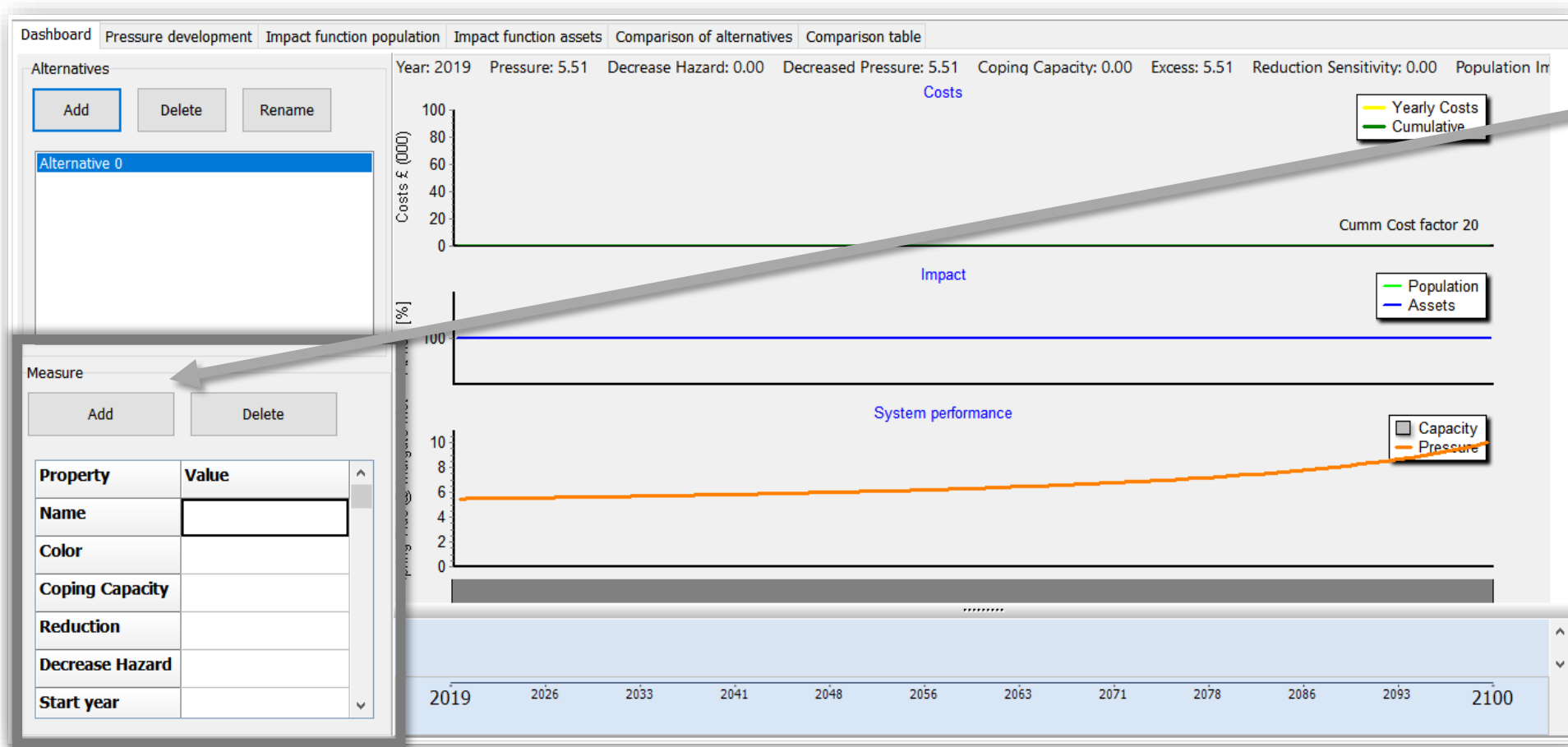
Change axis values using the **Axis** menu

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Step 2: Add Measures and Initial Analysis

Back in the **Dashboard**, your system is now ready to add measures. Click **Add** in the **Measure menu** to add measures to your system.



1

Click **Add** to open the add measure window

Step 2: Add Measures and Initial Analysis

In the **Add Measure** window, you can set initial parameters of each measure you want to analyse in your system.

Measures can impact the system in a combination of three ways:

- Increasing coping capacity
- Reducing sensitivity of vulnerable people and assets
- Decreasing the pressure itself

Co-benefits can be positive or negative on a scale (-5 to 5)

PRO TIP!

Adding the current system capacity as the first measure is quick way to see the resilience of the system without intervention

The screenshot shows the 'Add Measure' dialog box with the following fields and values:

- General**
 - Enter a name for the measure:
 - Set Color:
 - First year:
 - Last year:
 - Coping capacity Meters:
 - Reduction in sensitivity [%]:
 - Decrease hazard Meters:
- Cost structure**
 - Enter investment costs for the measure £ (000):
 - Enter operational (yearly) costs for the measure £ (000):
- Co-Benefits**
 - Co-benefits for measure:

Buttons:

1

Enter the name or description of the measure

2

Enter the estimated first and last year the measure is active

3

Enter the impact the measure will have on the system

4

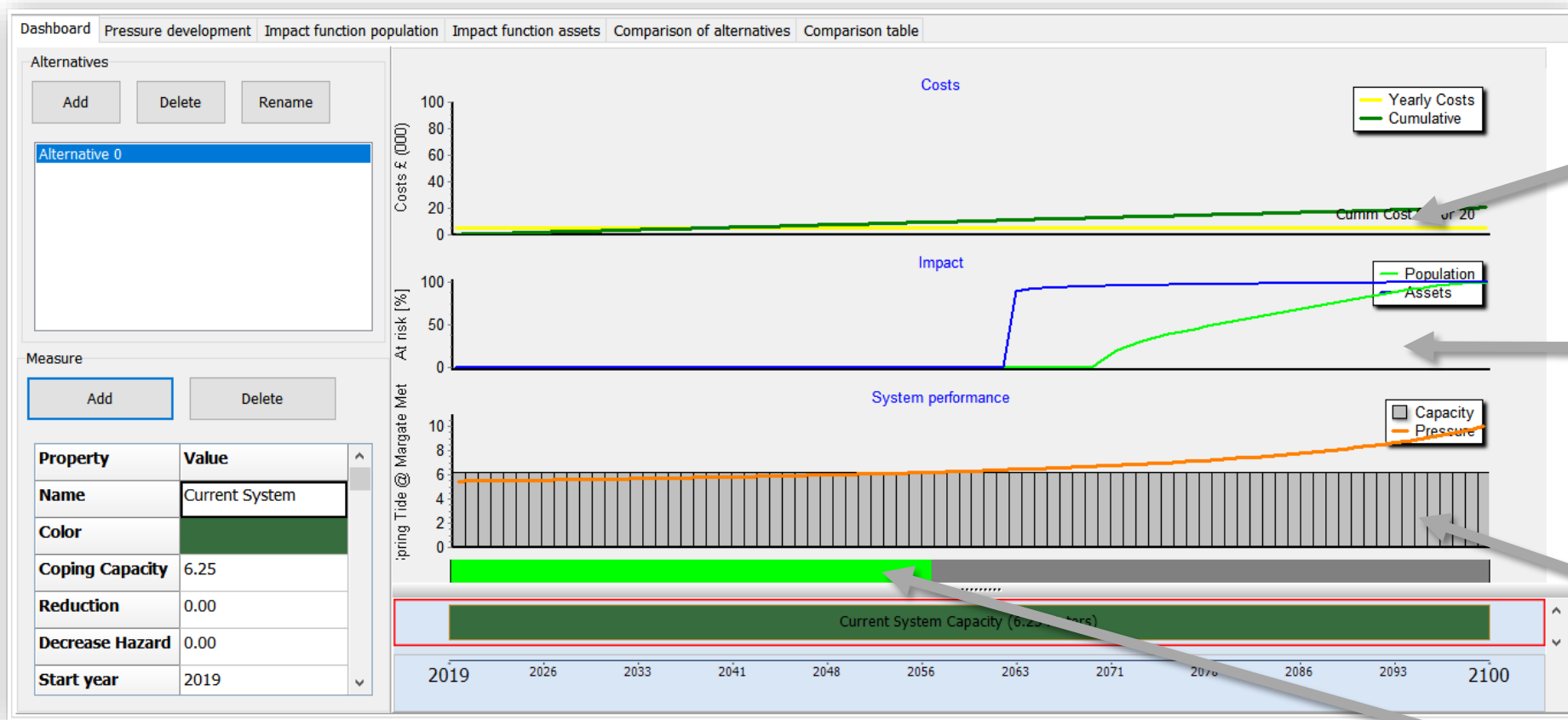
Enter the investment and operational costs of the measure

5

Enter the co-benefits of the measure

Step 2: Add Measures and Initial Analysis

Back in the **Dashboard**, you will see how your measure has impacted the system.



1 Impact on costs is displayed here

2 Impact on assets and population is displayed here

3 Coping capacity is displayed here. If coping capacity is above the pressure, the grey bar will show green

After adding the current situation, the tool shows the system can cope with increasing spring tides until 2056, after which flooding and damage to assets (immediately) and population (gradually from 2071) is likely to occur without further measures implemented.

Step 2: Add Measures and Initial Analysis

You can add more measures and see how they affect your system in the **Dashboard**.

PRO TIP! Measures will be shown in the dashboard in added order. You can use the scroll bars and section frames to adjust what you can see.

Add Measure

General

Enter a name for the measure
Increased Beach Nourishment

Set Color

First year: 2040 Last year: 2070

Coping capacity Meters: 1.00

Reduction in sensitivity [%]: 0.00

Decrease hazard Meters: 0.00

Cost structure

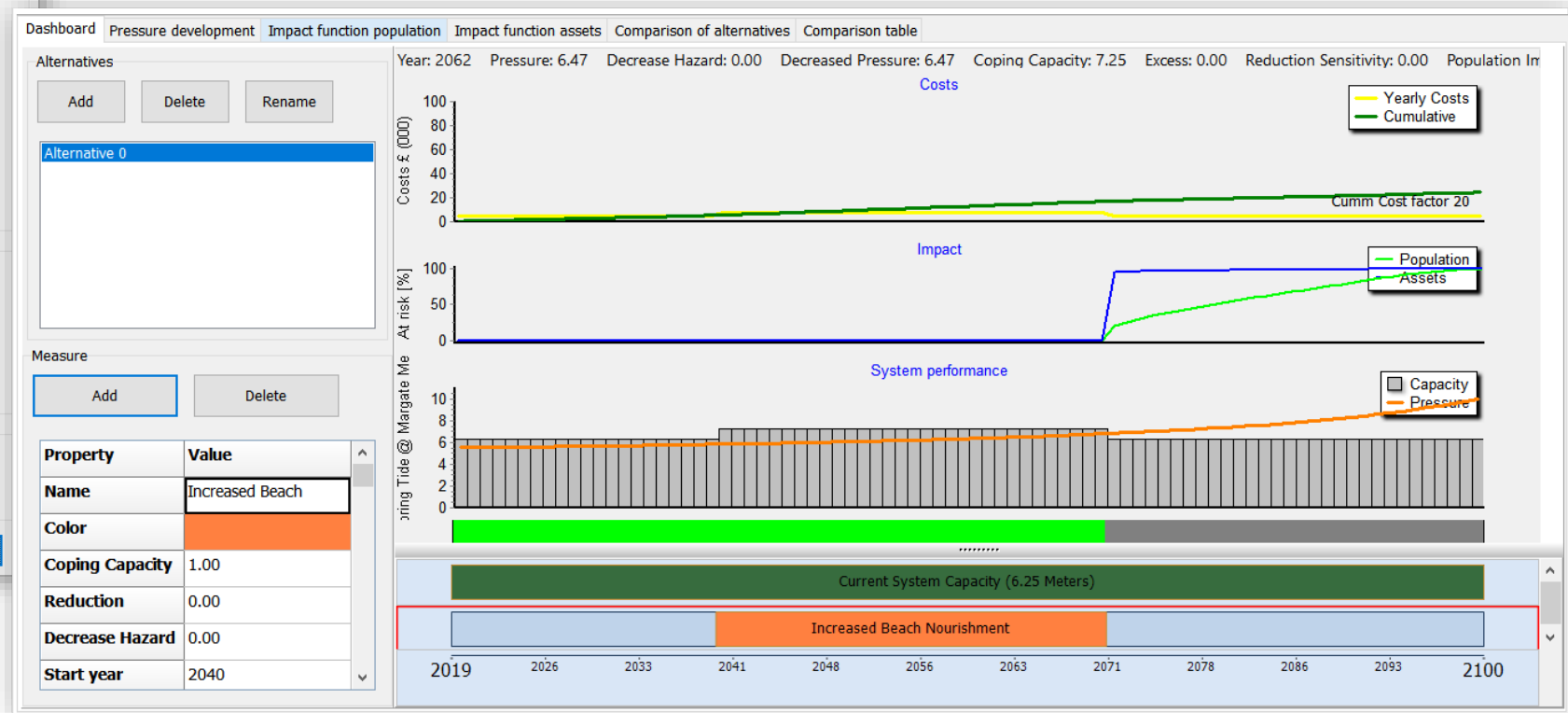
Enter investment costs for the measure £ (000): 0.00

Enter operational (yearly) costs for the measure £ (000): 2.50

Co-Benefits

Co-benefits for measure: 3

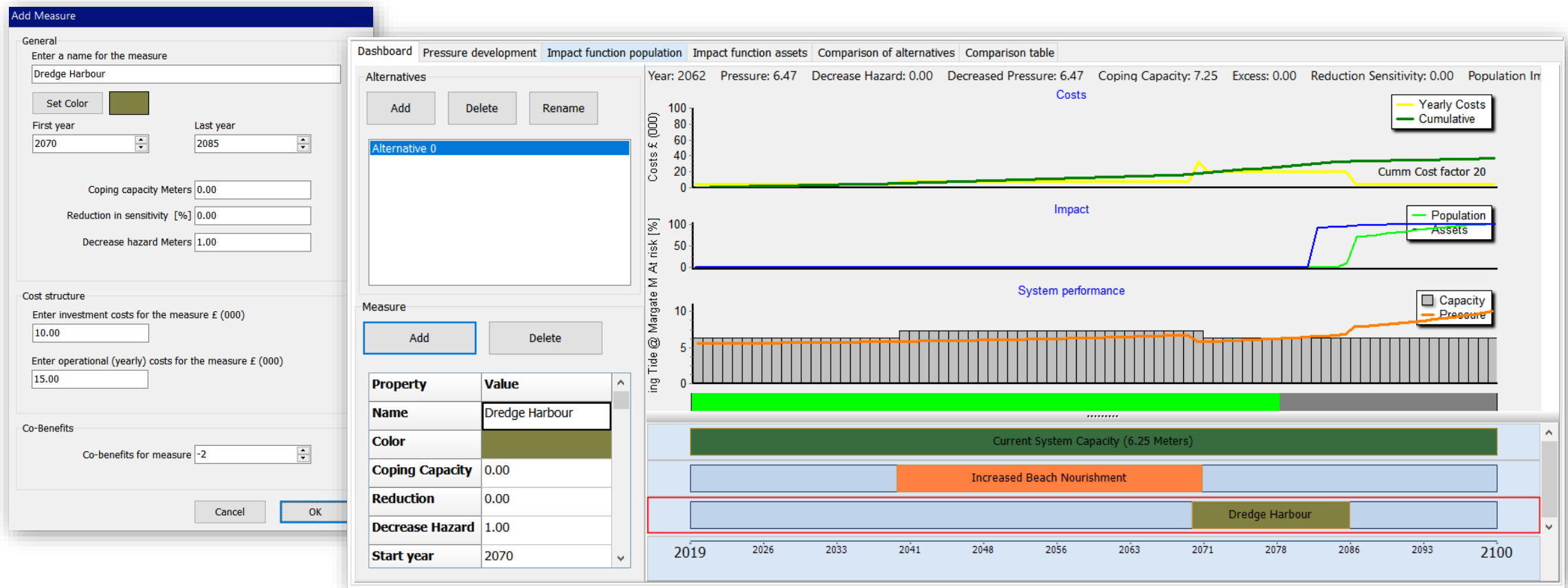
Cancel OK



The dashboard now shows the system can cope with increasing spring tides until 2071, after which flooding and damage is likely to occur without further measures implemented, impacting 100% of assets and population by 2095.

Step 2: Add Measures and Initial Analysis

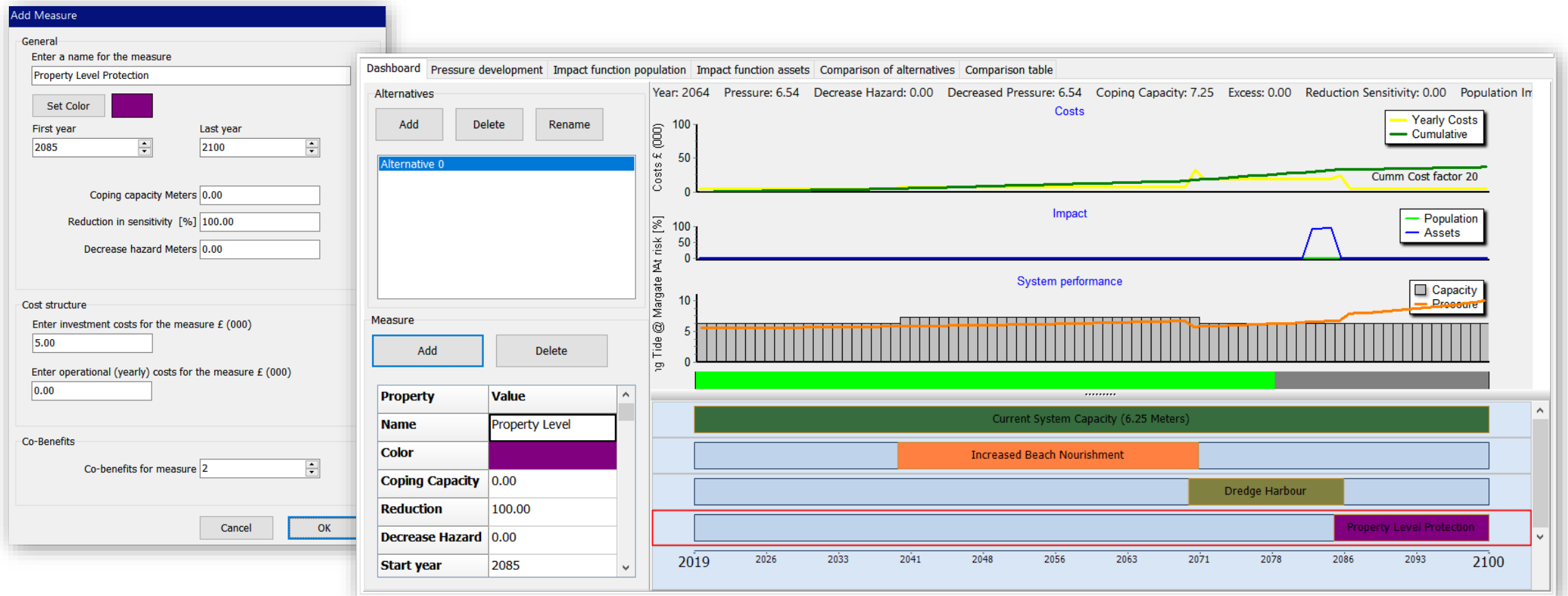
You can add more measures and see how they affect your system in the **Dashboard**.



The dashboard now shows the system can cope with increasing spring tides until 2078. It also shows that by adding dredging, it has reduced the amount of sea-level rise at the harbour between 2071 and 2086 and pushed backed when assets and population are impacted to 2082.

Step 2: Add Measures and Initial Analysis

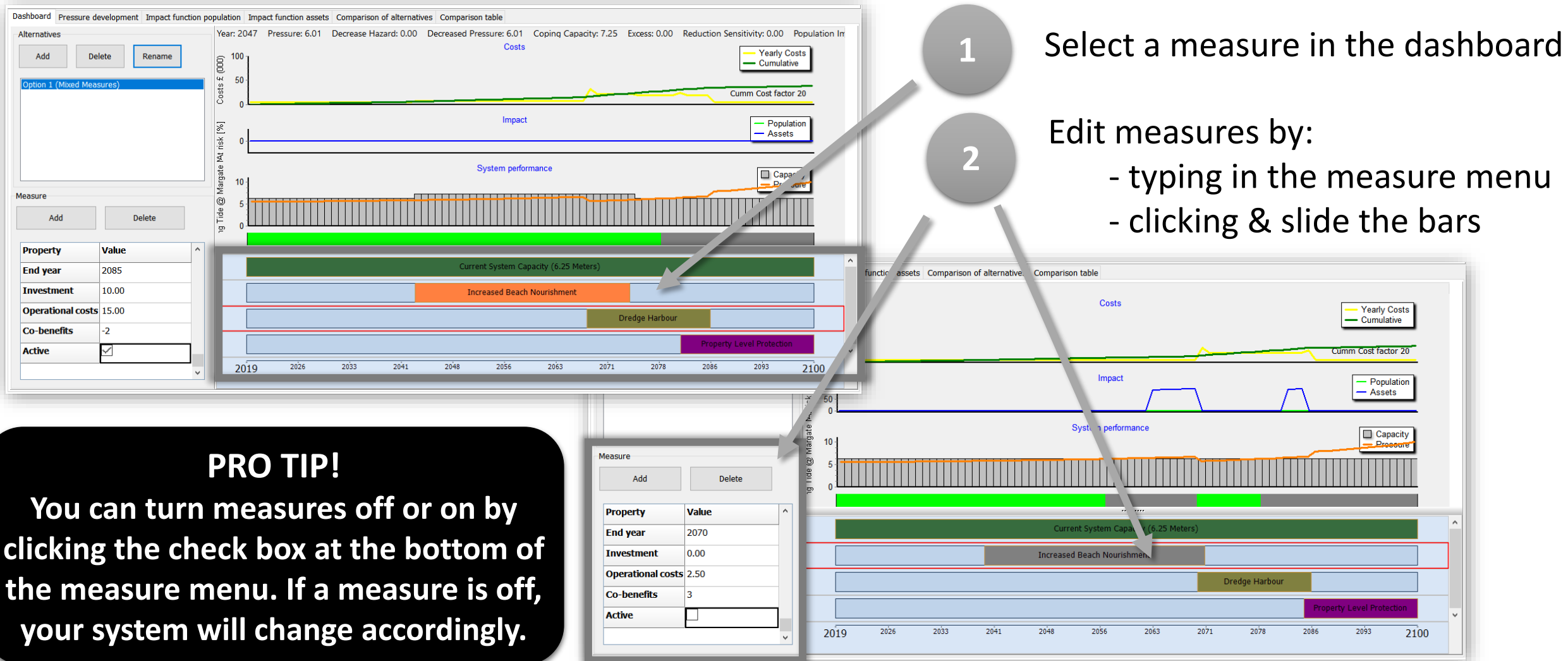
You can add more measures and see how they affect your system in the **Dashboard**.



The dashboard now shows the system can cope with increasing spring tides until 2078, after which flooding and damage is likely to occur. It also shows that by adding property level protection, 0% of assets will be impacted, even if flooding is more likely to occur.

Step 2: Add Measures and Initial Analysis

Once added, you can edit, delete or hide measures in the dashboard.



The dashboard displays a comparison of alternatives with the following data:

Year	Pressure	Decrease Hazard	Decreased Pressure	Coping Capacity	Excess	Reduction Sensitivity	Population In
2047	6.01	0.00	6.01	7.25	0.00	0.00	

The dashboard includes several charts:

- Costs:** Line chart showing Yearly Costs (yellow) and Cumulative Costs (green) over time. A legend indicates 'Cumm Cost factor 20'.
- Impact:** Line chart showing Population (green) and Assets (blue) over time.
- System performance:** Bar chart showing Capacity (grey) and Pressure (orange) over time.

The Measure menu is shown with the following properties:

Property	Value
End year	2085
Investment	10.00
Operational costs	15.00
Co-benefits	-2
Active	<input checked="" type="checkbox"/>

The dashboard also shows a timeline from 2019 to 2100 with various measures implemented:

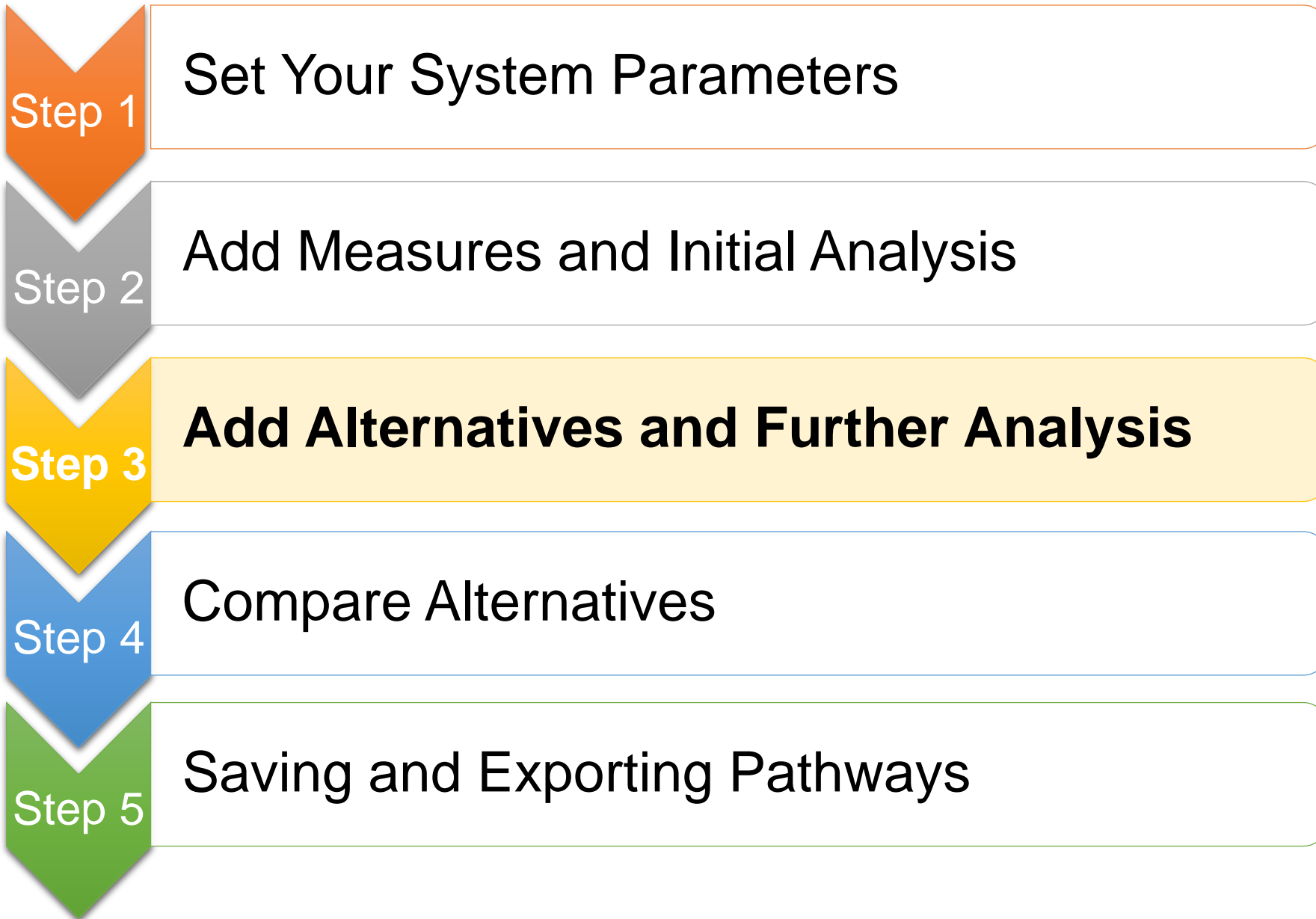
- Current System Capacity (6.25 Meters)
- Increased Beach Nourishment
- Dredge Harbour
- Property Level Protection

Two numbered callouts are present:

- 1 Select a measure in the dashboard
- 2 Edit measures by:
 - typing in the measure menu
 - clicking & slide the bars

PRO TIP!
You can turn measures off or on by clicking the check box at the bottom of the measure menu. If a measure is off, your system will change accordingly.

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Step 3: Add Alternatives

You can add alternative sets/combinations of measures to analyse and compare in the **Dashboard**.

1

Click **Add** in the alternatives menu

2

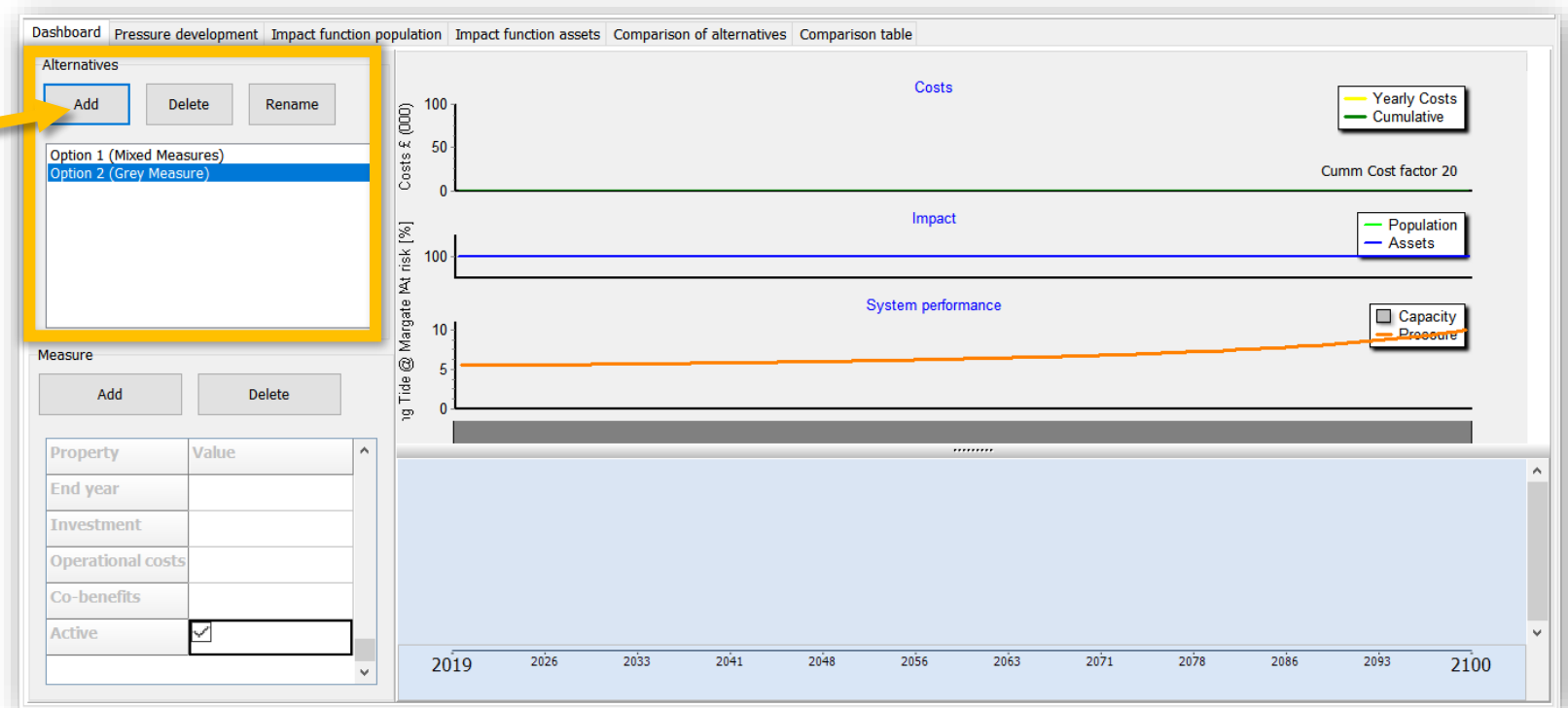
Enter alternative name

Enter a name for the alternative

Name

Option 2 (Grey Measure)

OK Cancel



PRO TIP!

Adding a new alternative will give you a blank system, ready for measures to be added. You can switch between alternatives by clicking the alternative named in the Alternatives menu.

Step 3: Add Alternatives

In your new alternative, add different measure and see how they impact your system.

Add Measure

General

Enter a name for the measure
Current System Capacity (6.25 Meters)

Set Color ■

First year: 2019 Last year: 2100

Coping capacity Meters: 6.25

Enter investment costs for the measure £ (000): 0.00

Enter operational (yearly) costs for the measure £ (000): 5.00

Coping capacity Meters: 5.00

Reduction in sensitivity [%]: 0.00

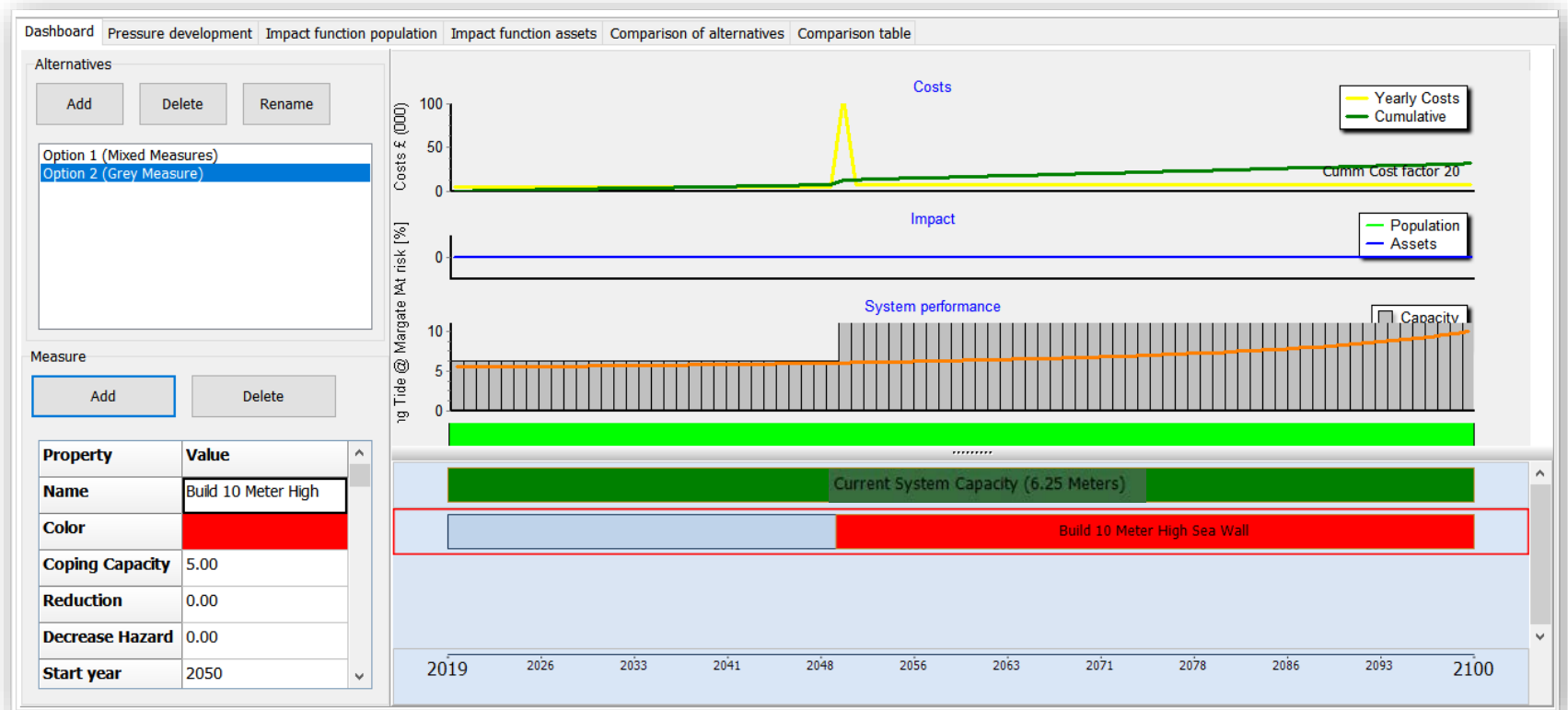
Decrease hazard Meters: 0.00

Enter investment costs for the measure £ (000): 100.00

Enter operational (yearly) costs for the measure £ (000): 2.50

Co-benefits for measure: 1

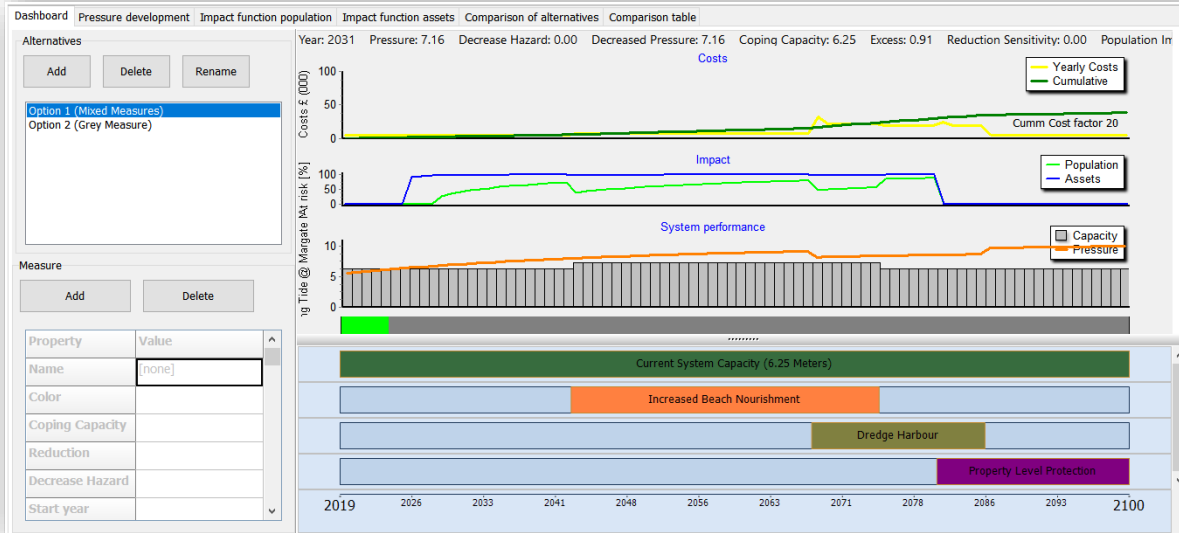
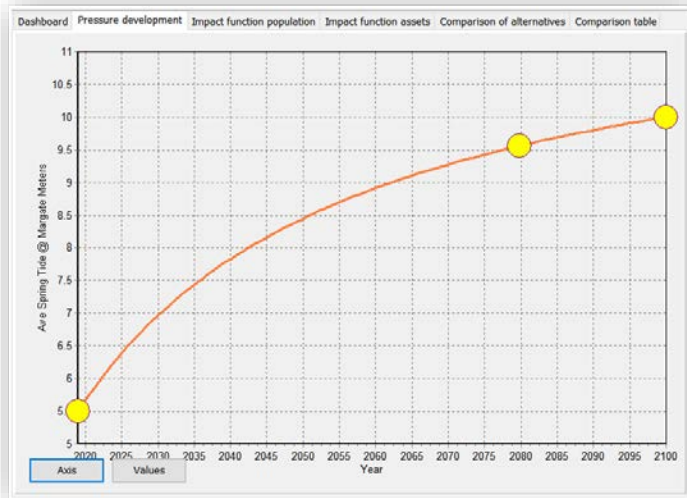
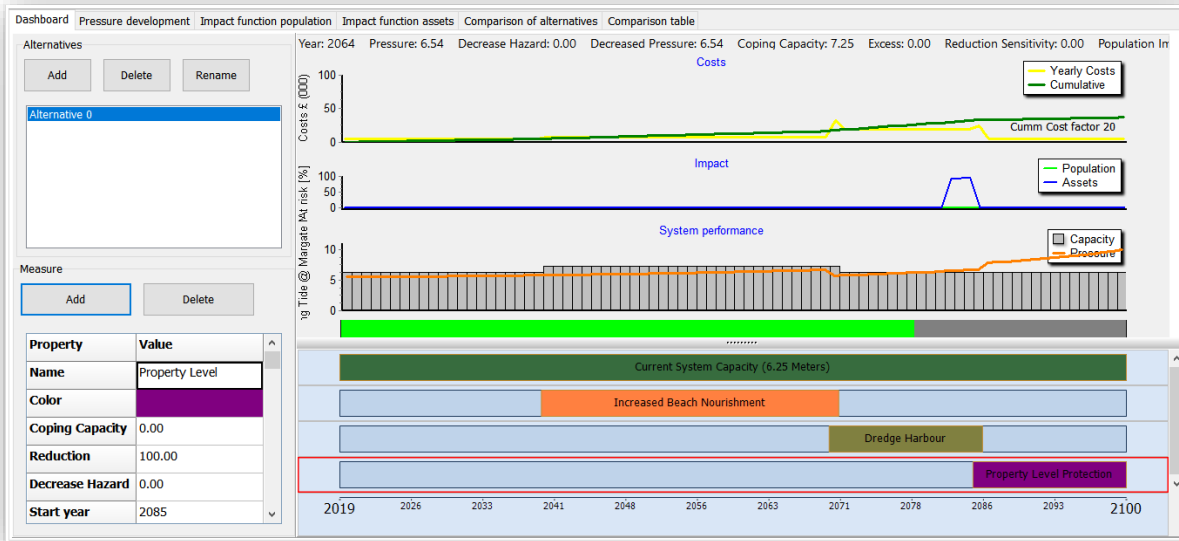
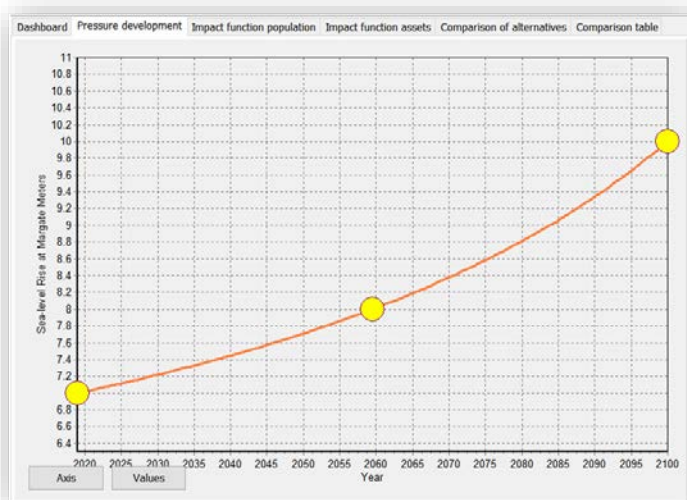
Cancel OK



PRO TIP! Start again by setting adding current scenario. Then add your new set of measures. Add more alternatives as you need.

Step 3: Further Analysis

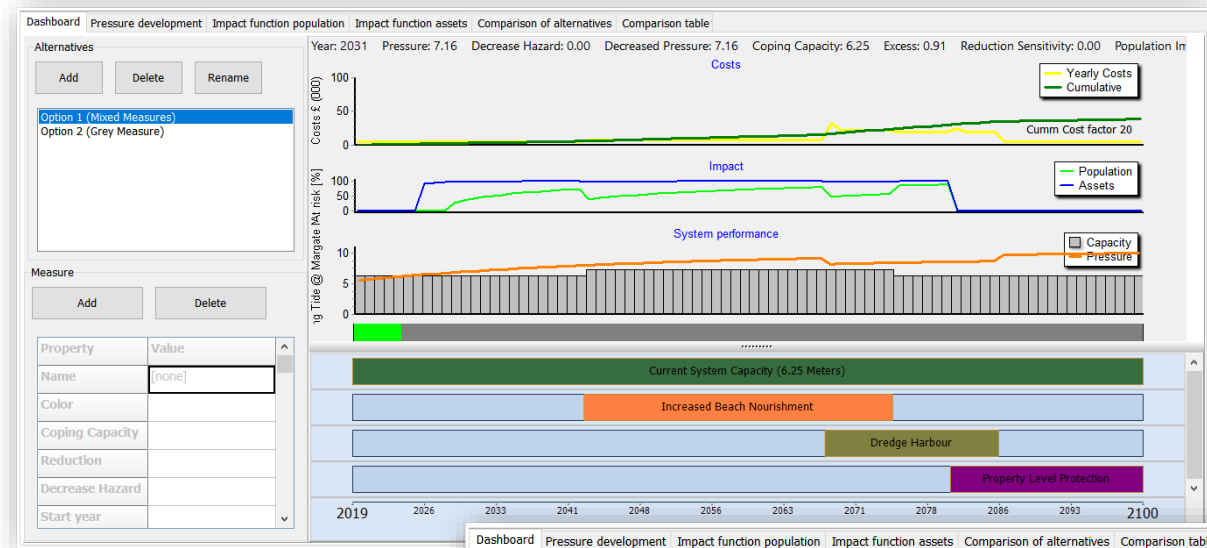
To further your analysis, you can change values and rate of the pressure and test how your system performs.



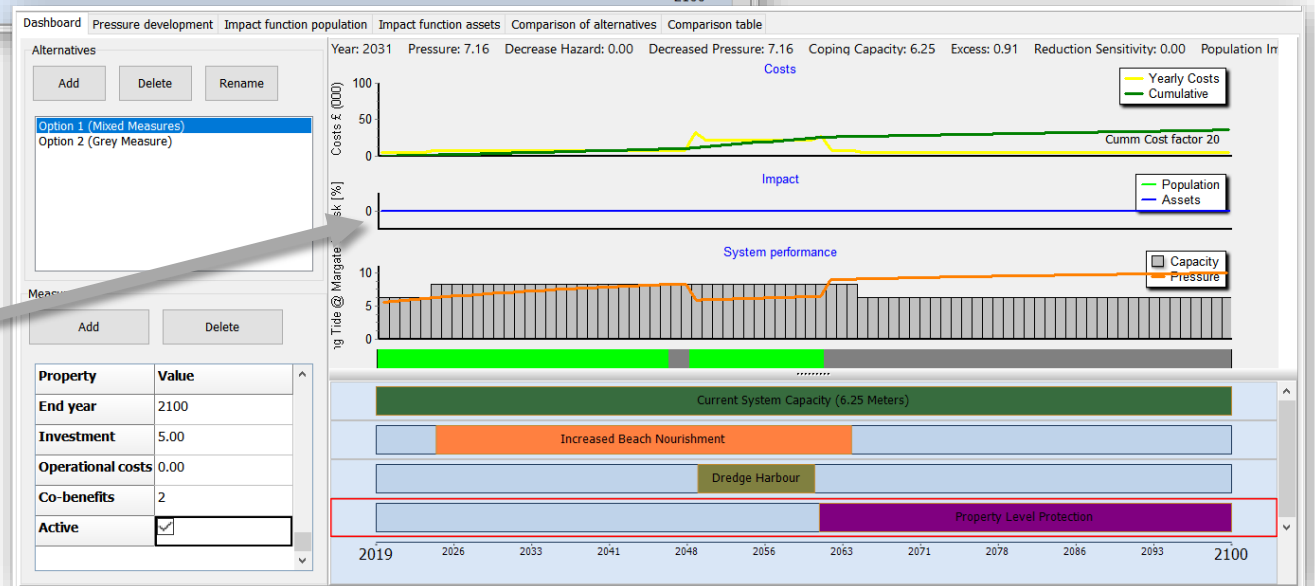
By changing the rate of increasing spring tides, the system has gone from functioning nearly to 2100 to failing throughout most of the time period of analysis.

Step 3: Further Analysis

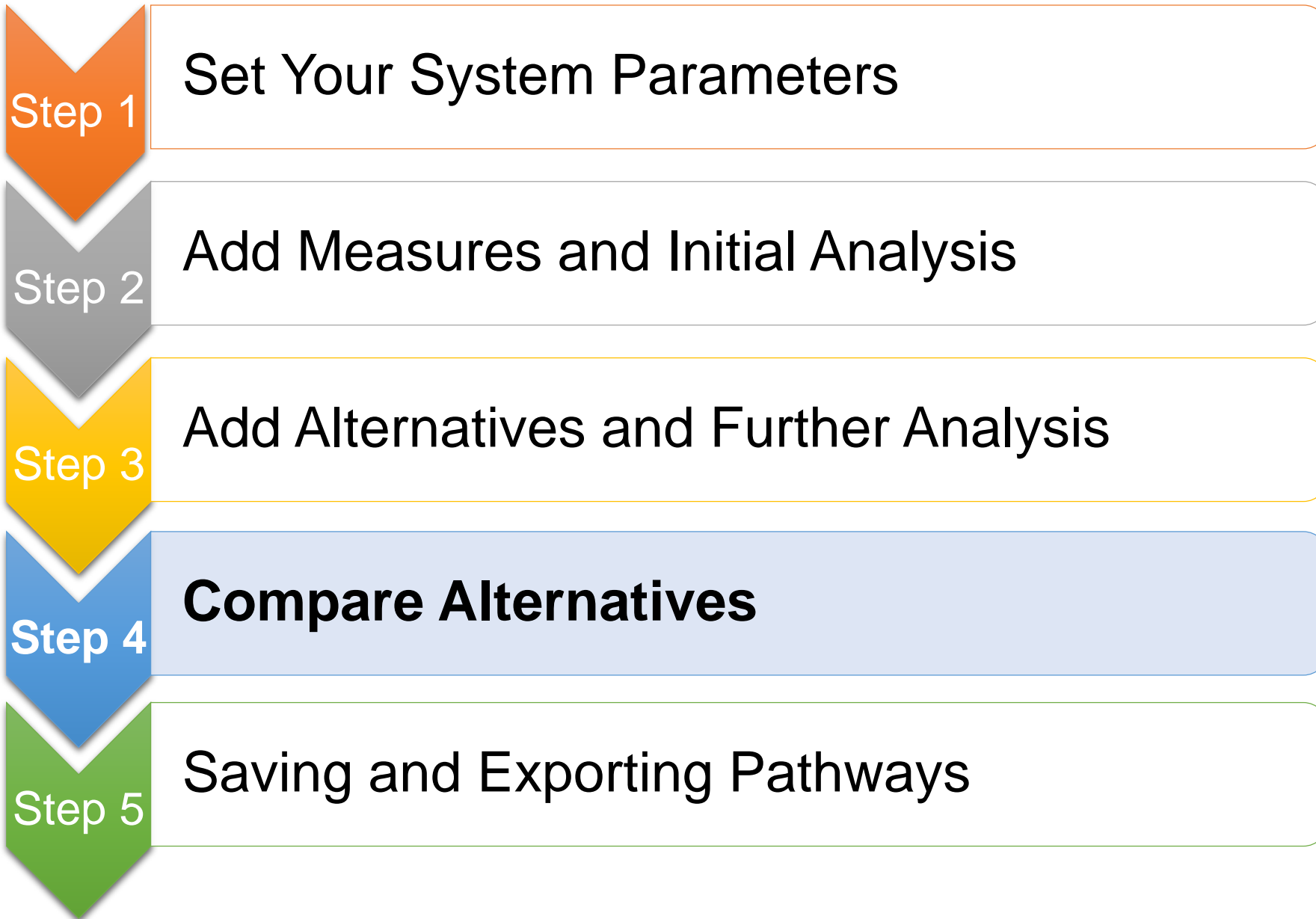
To further your analysis, you can change values your measures and test how your system performs.



In these two analysis, the start, end, and duration of measures have been adjusted to see how the system performs. Overall, the system in the lower analysis is performing better, indicated by the green bar in coping capacity window and 0% impacted in sensitivity window.

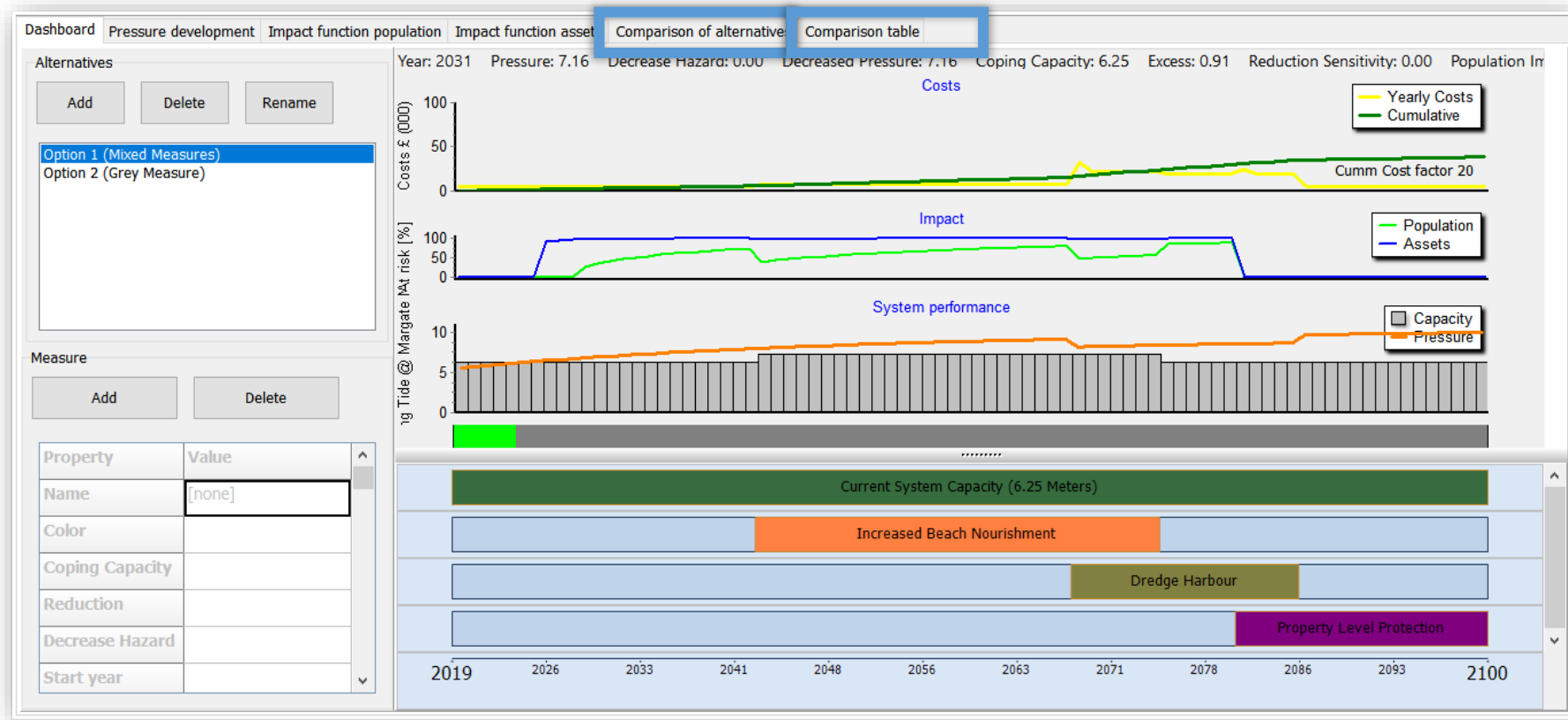


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Step 4: Compare Alternatives

You can compare alternative analyses of your system in the **Comparison of Alternatives Tab** and the **Comparison Table** tab.



1

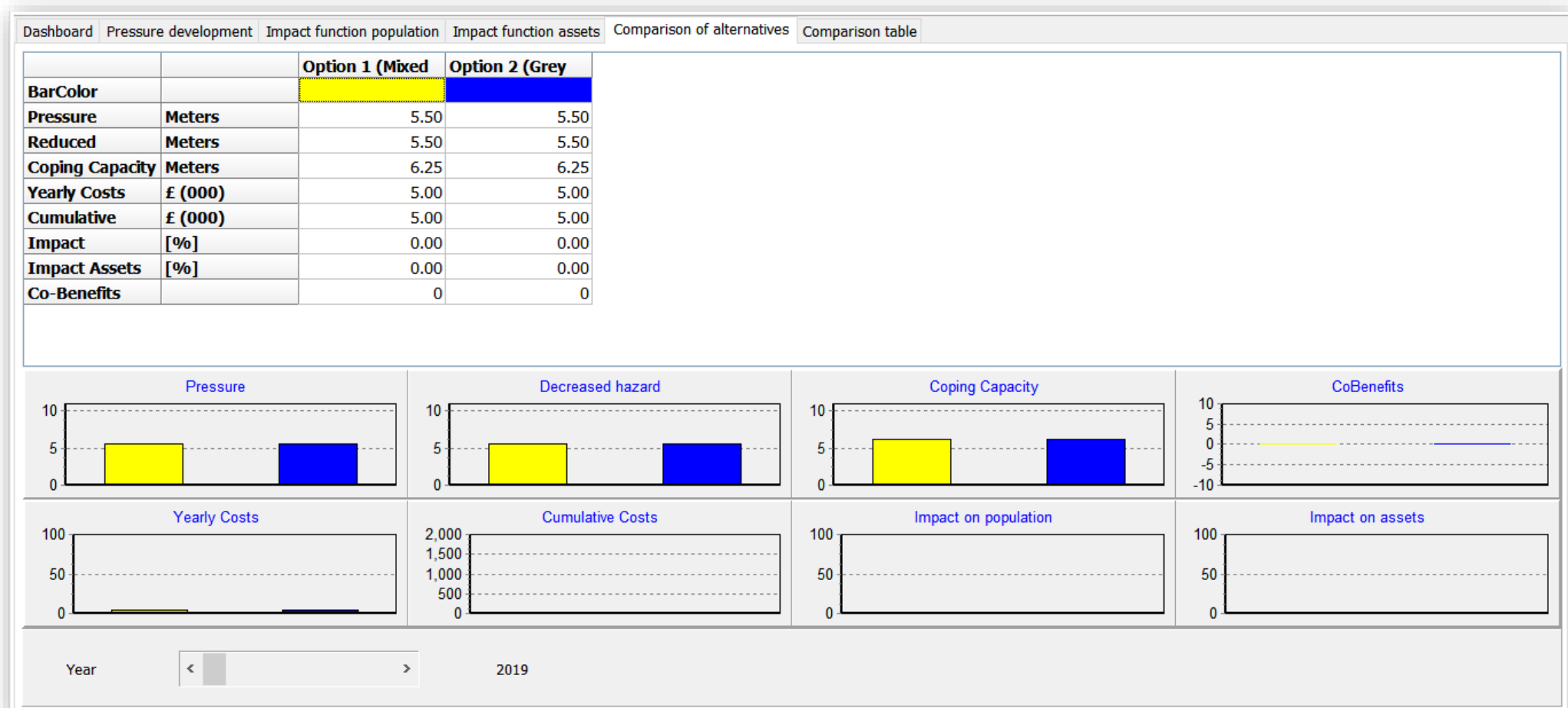
Comparison of Alternatives

2

Comparison Table

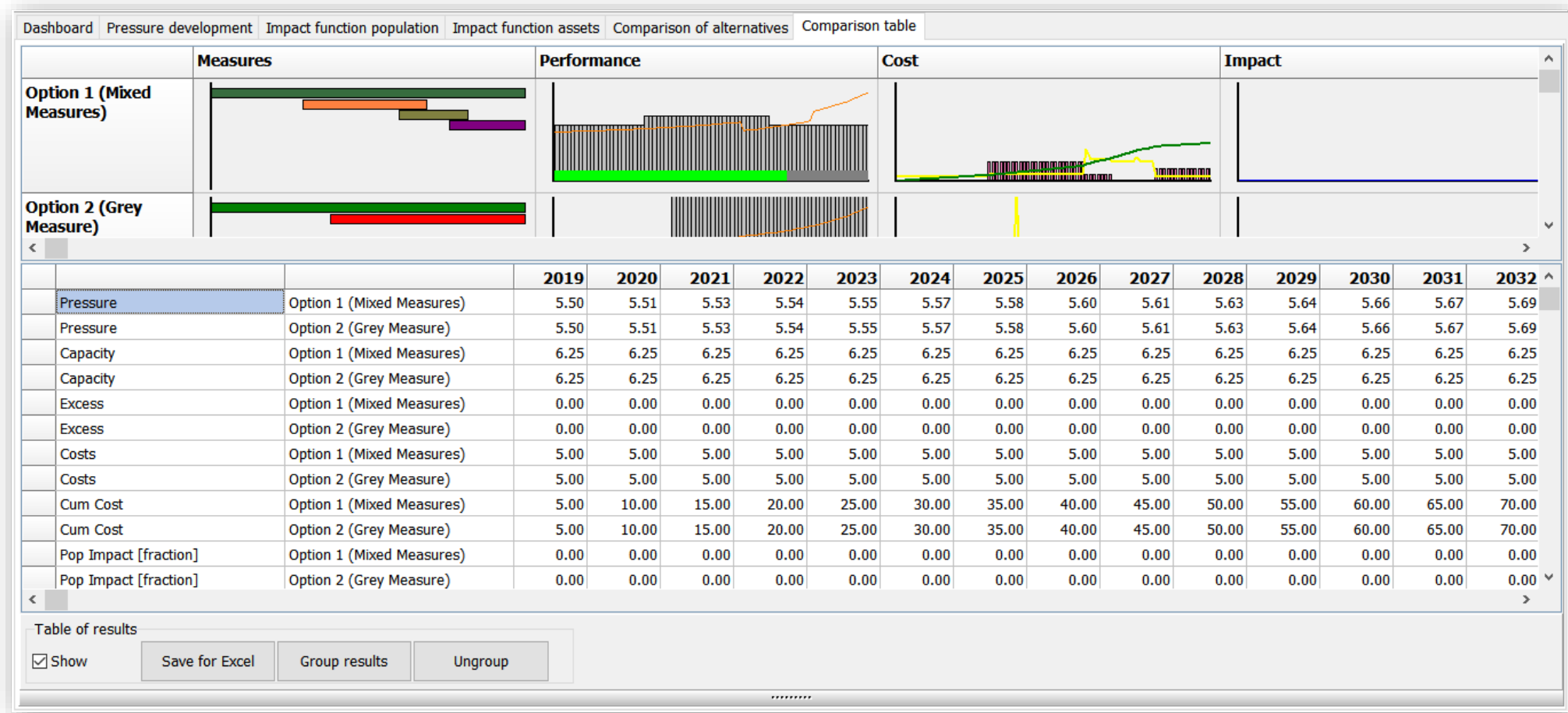
Step 4: Compare Alternatives

Comparison of alternatives allows you to view the differences between alternative analyses by **year** and **cumulatively** to assess which alternative is most cost effective and represents a balance between cost, protection, or adaptation capacity and co-benefit.

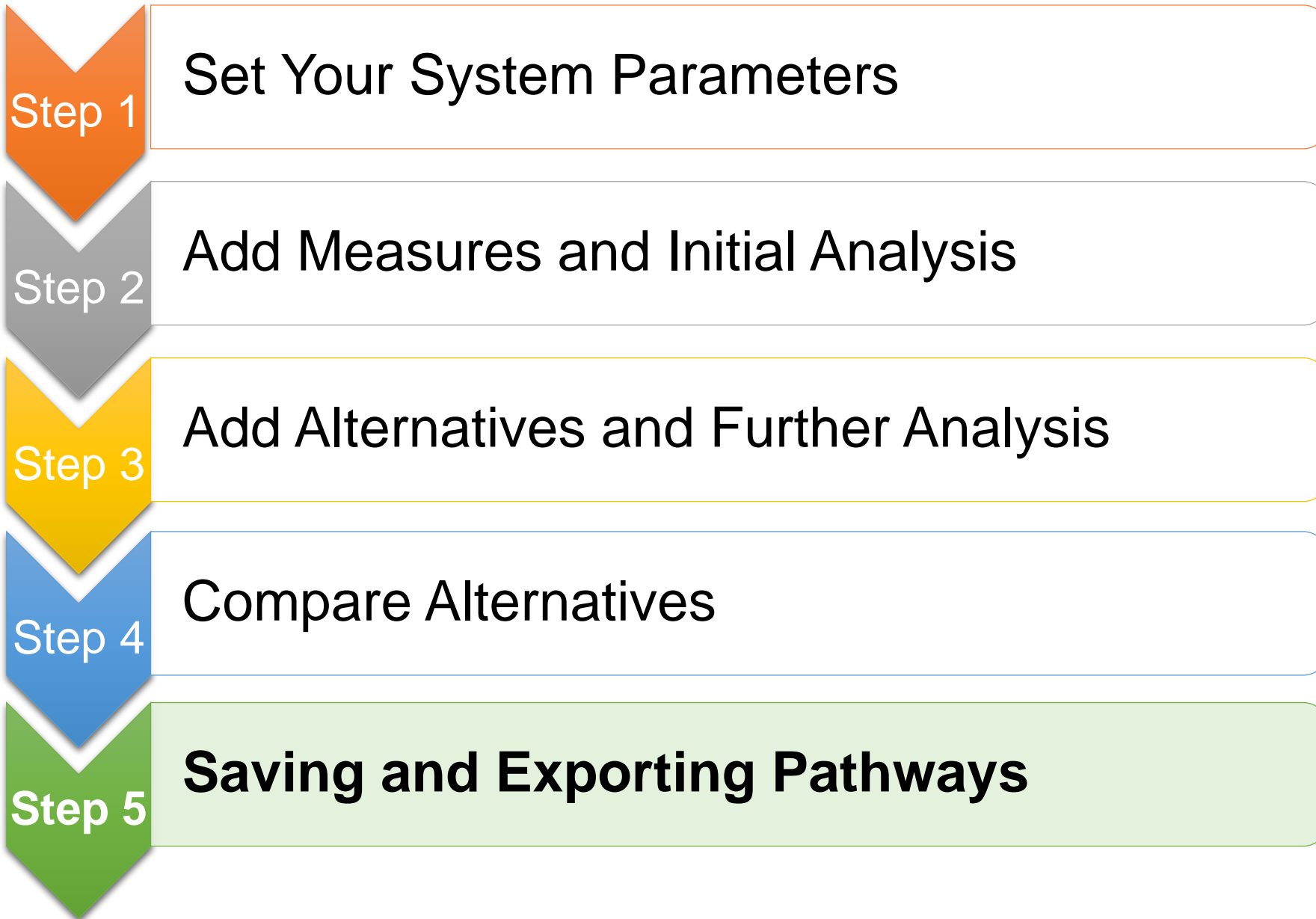


Step 4: Compare Alternatives

Comparison Table displays the **four dashboard graphics simultaneously** for all alternatives to see how **performance, cost and impact** differ. Data is also displayable in **table form**.

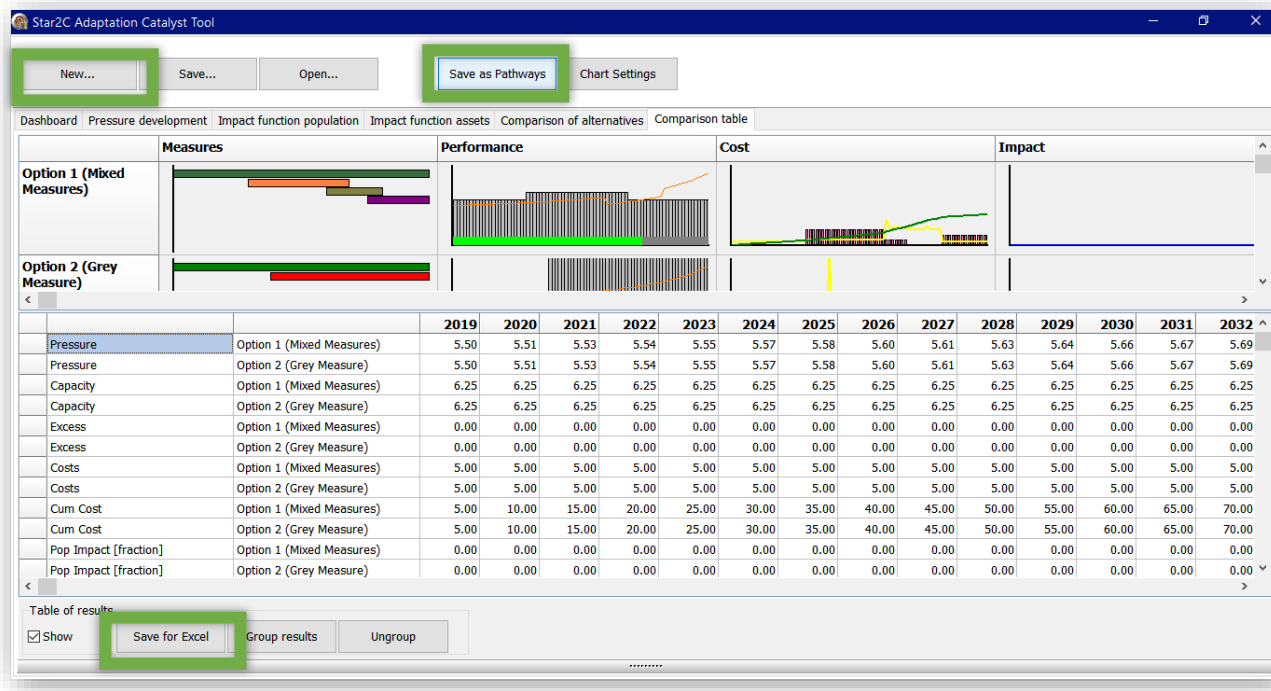


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Step 5: Saving and Exporting Pathways

Data from the Adaptation Catalyst analysis can be **saved** and **exported** in a number of ways, depending on how you want to use or display the data.



1

Save... will save your work as a .catalyst file to be opened and edited further in the Adaptation Catalyst Software at a future point

2

Save as Pathways will save your scenarios as an Adaptation Pathway. You will need the Pathway Generator programme to open and view the .pathway file

3

From the **comparison table** tab, data can be exported in the form of an Excel table (.csv file)



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