

*BSUoS wider system
modelling with updated
Carbon Appraisal
Values for Ofgem*

November 2021



Updated carbon appraisal value BSUoS analysis

Overview of this analysis

This analysis provides updated system cost impacts based on BEIS's updated carbon appraisal values

- In Spring 2021, Ofgem commissioned LCP and Frontier Economics to assess the impacts of potential reforms to remove BSUoS charges from generators and move them completely to suppliers.
- LCP lead on the wider system impacts analysis, which assessed the system cost impacts of the reforms under two background scenarios (National Grid ESO's Consumer Transformation and Steady Progression scenarios).
- One input to this analysis was the **carbon appraisal value**, which provides an assumption from BEIS on the value of carbon required to meet the UK's carbon targets.
- BEIS has since published an updated set of carbon appraisal values, which are materially higher than the values used in LCP's analysis.
- As a result Ofgem has asked LCP to update the analysis to reflect these higher carbon appraisal values, for the central, high and low values published by BEIS.
- This pack presents this updated analysis. Note that the carbon appraisal value assumption only affects the system cost calculation, and the other impacts (including the changes to the capacity and generation mix) are not affected, as they rely on the market carbon price assumption.



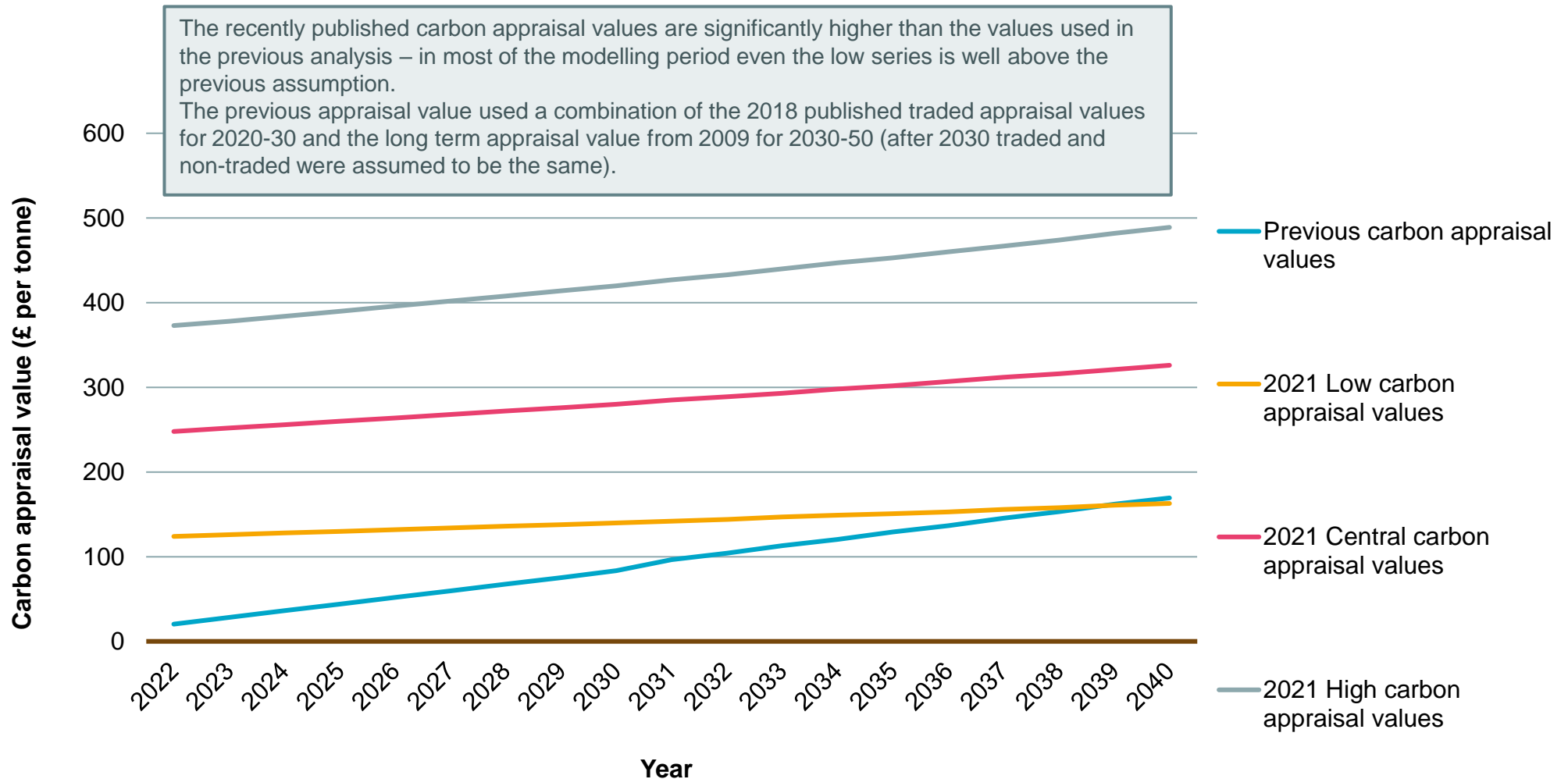
Assumptions



Carbon appraisal values

The new BEIS carbon appraisal values for 2021

Updated carbon appraisal values are significantly higher than those previously used.



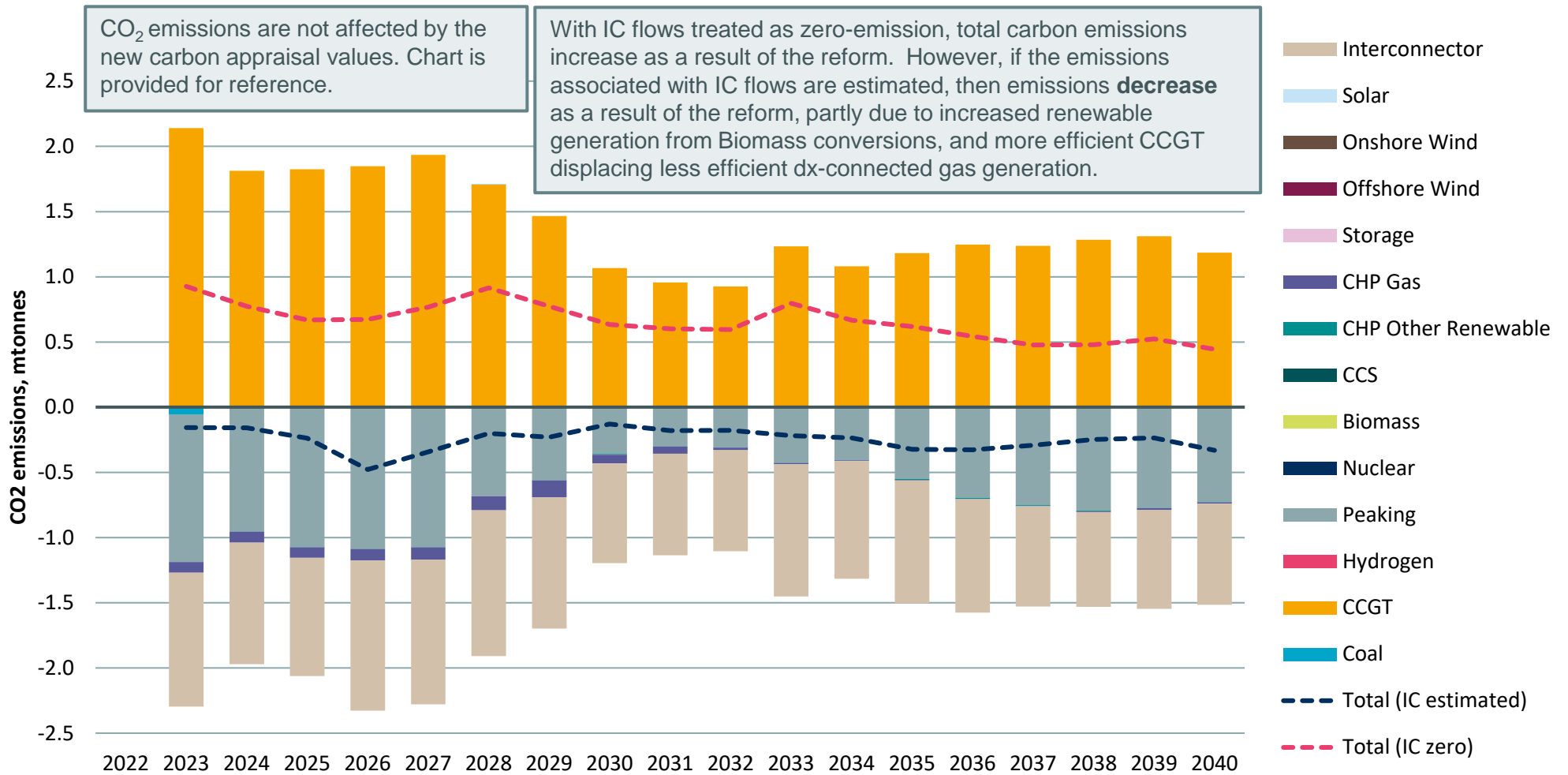
*Wider system impacts:
Modelling results*



Wider System Impacts

Steady Progression: Emissions changes

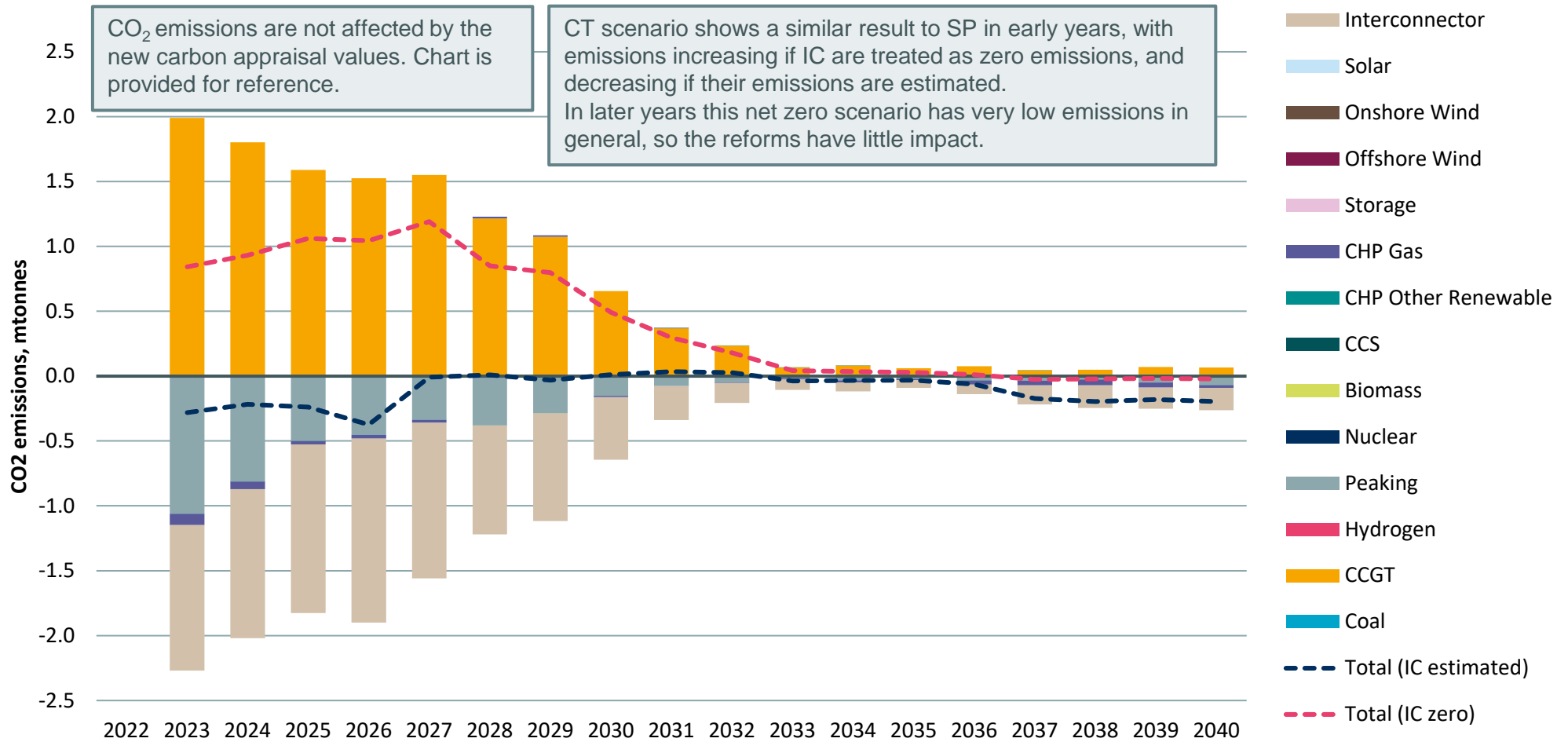
Steady Progression: CO₂ Emissions (Factual – Counterfactual), mtonnes CO₂e



Wider System Impacts

Consumer Transformation: Emissions changes

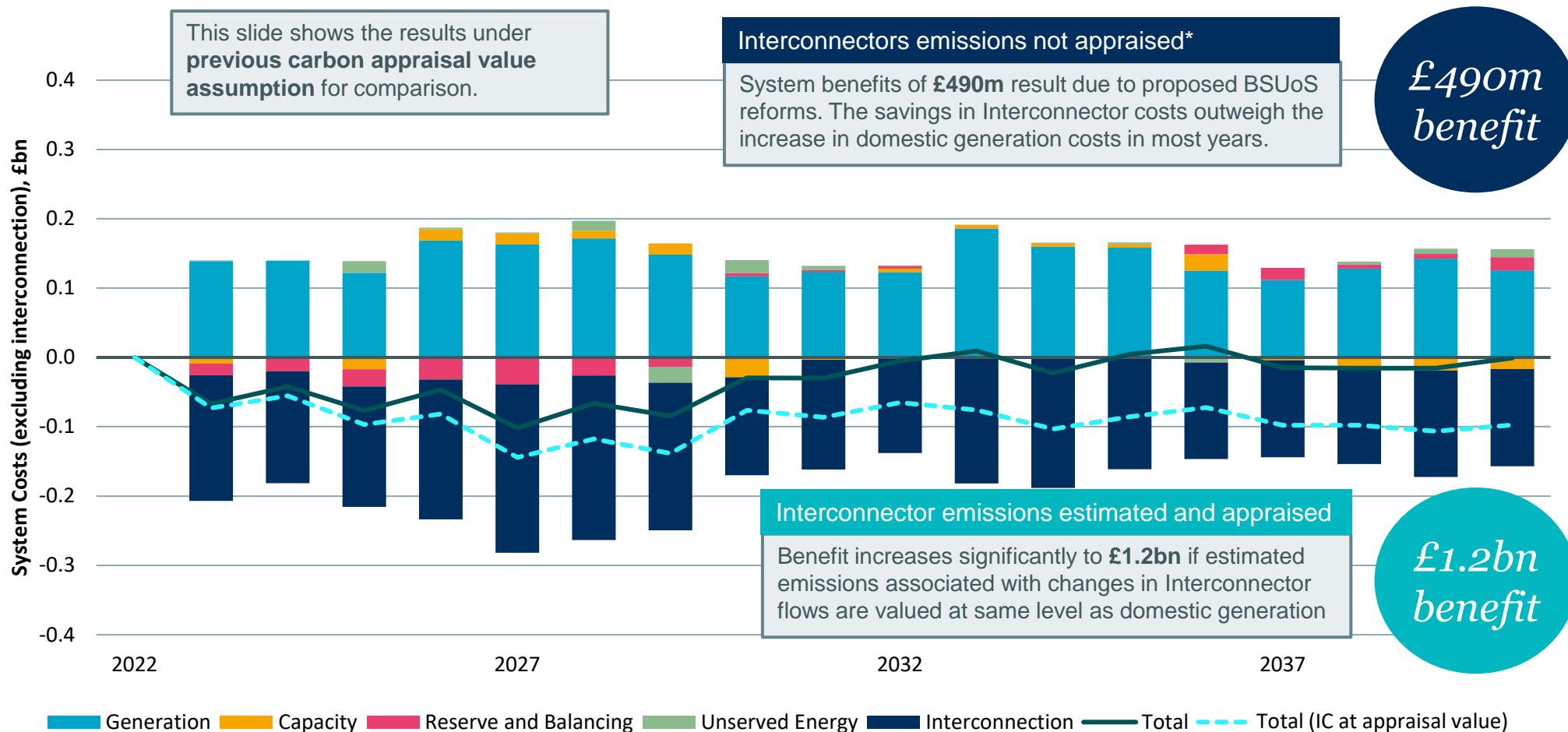
Consumer Transformation: CO₂ Emissions (Factual – Counterfactual), mtonnes CO₂e



Wider System Impacts – previous assumptions

Steady Progression: System cost changes

Steady Progression: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

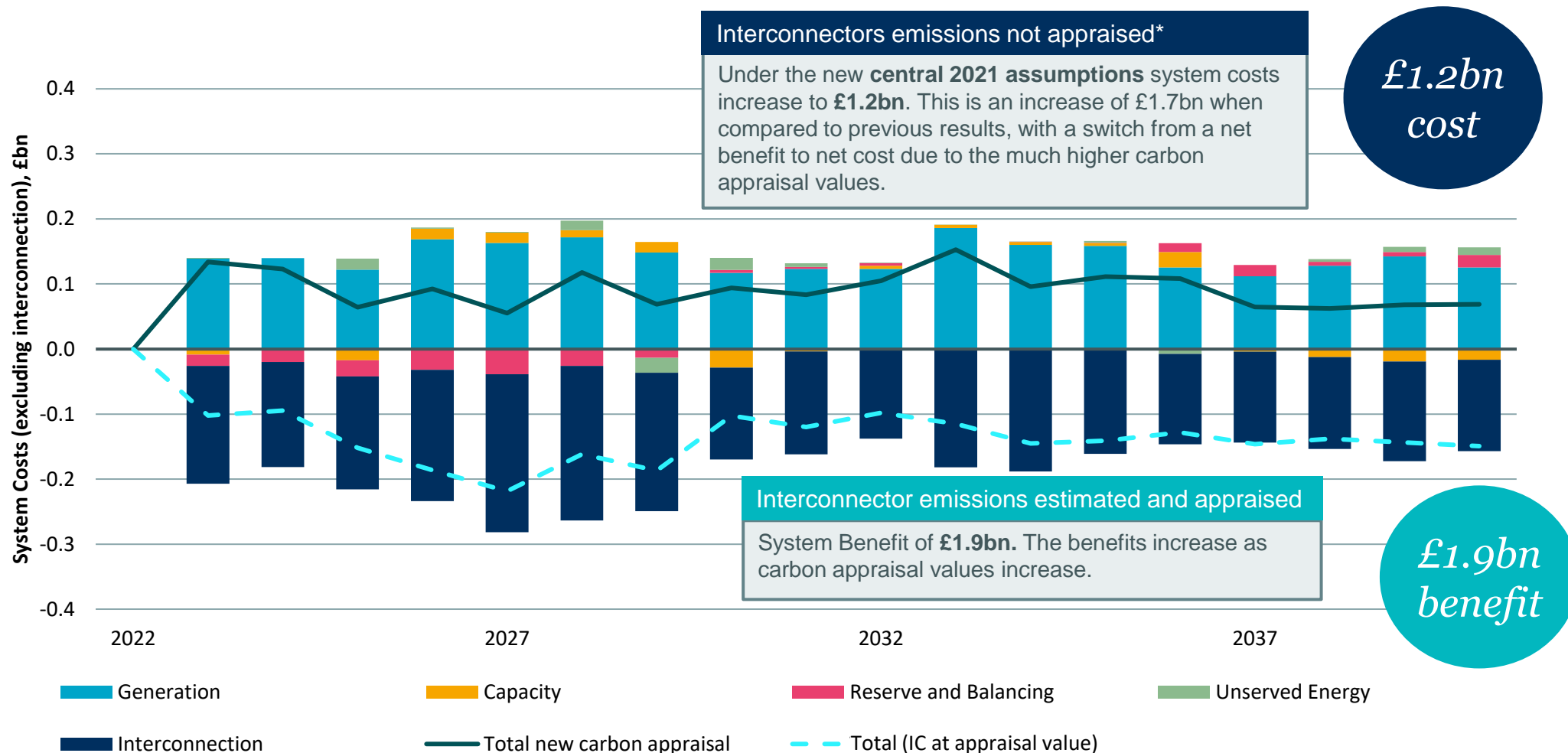


* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – Central 2021 series

Steady Progression: System cost changes

Steady Progression: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

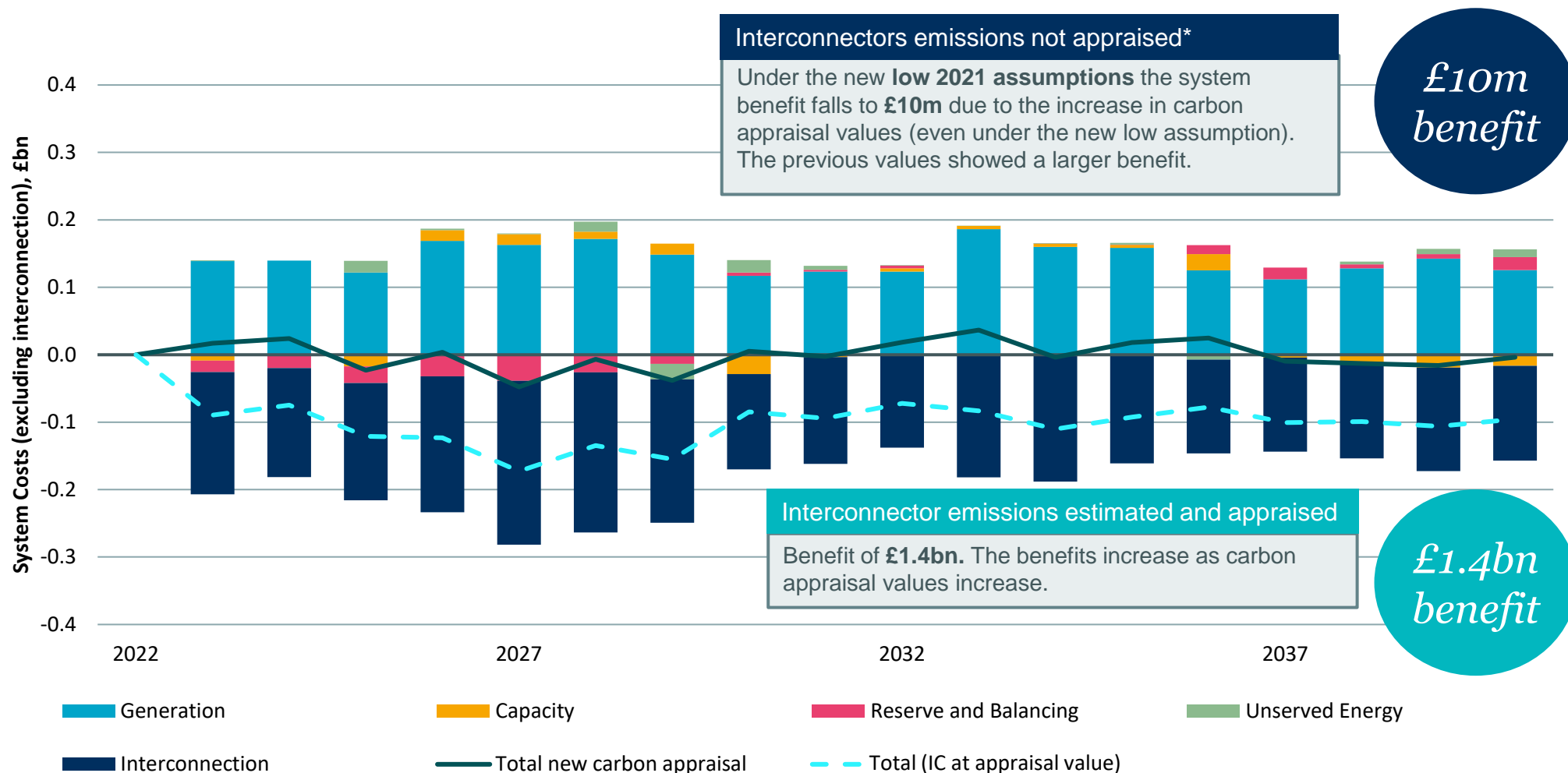


* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – Low 2021 series

Steady Progression: System cost changes

Steady Progression: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

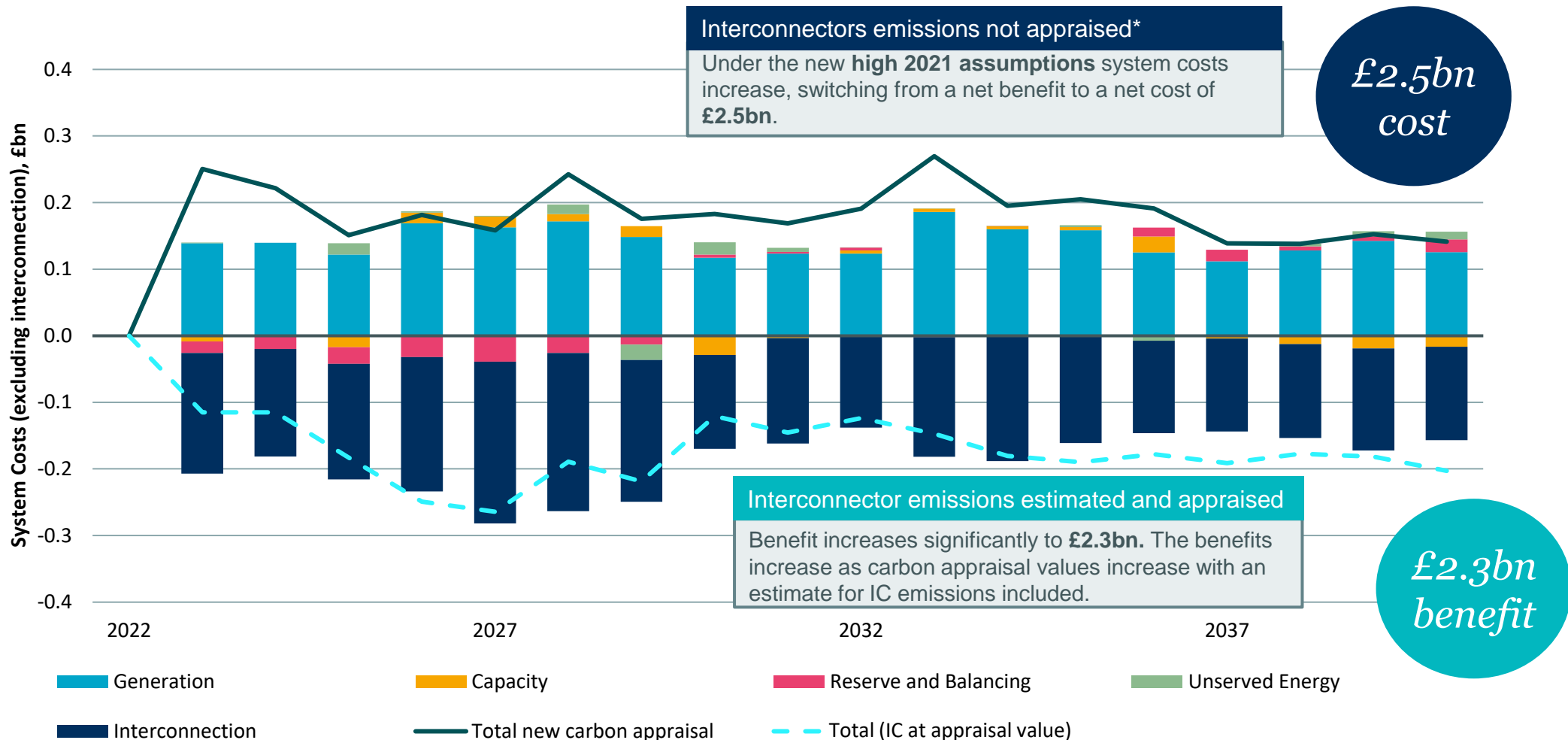


* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – High 2021 series

Steady Progression: System cost changes

Steady Progression: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

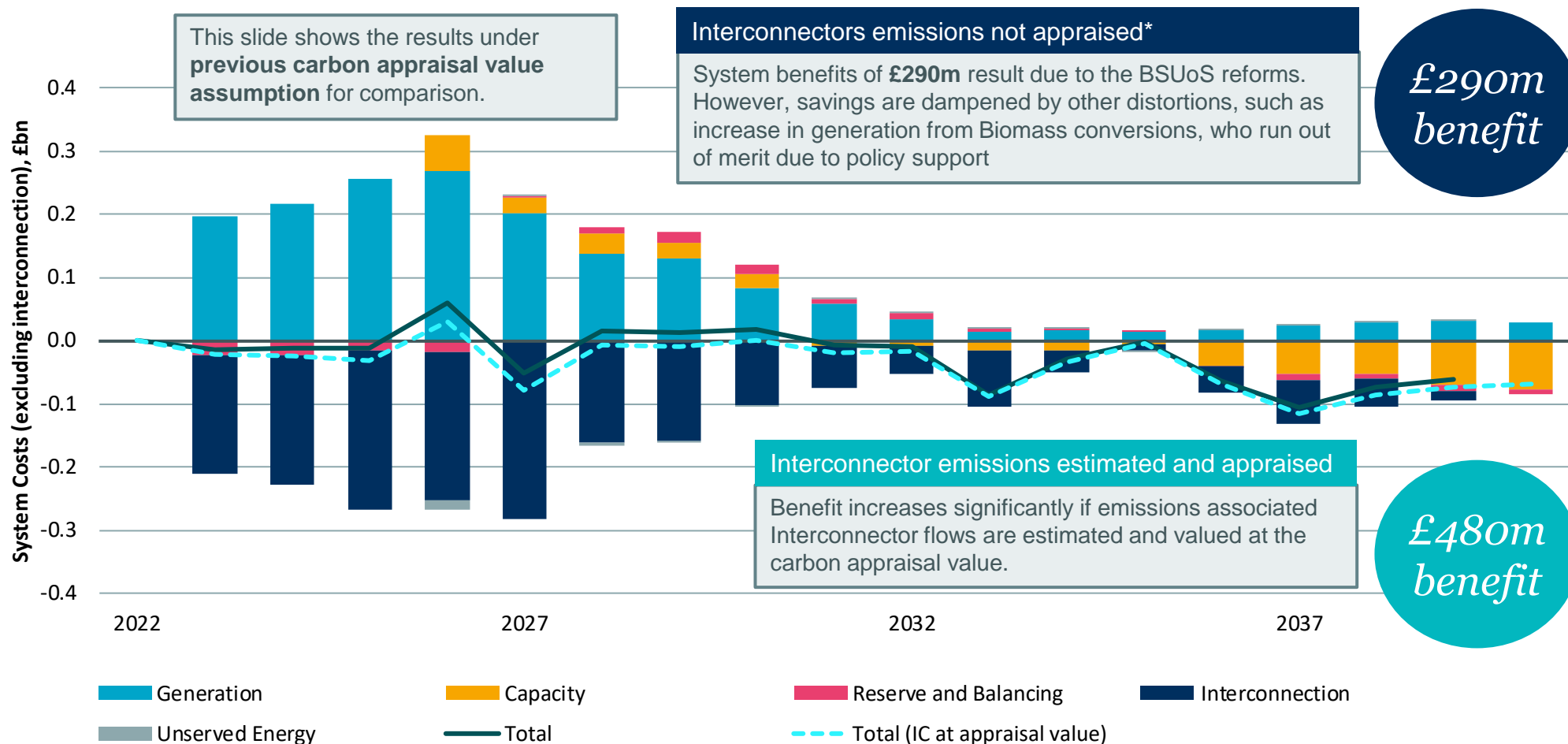


* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – previous assumptions

Consumer Transformation: System cost changes

Consumer Transformation: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

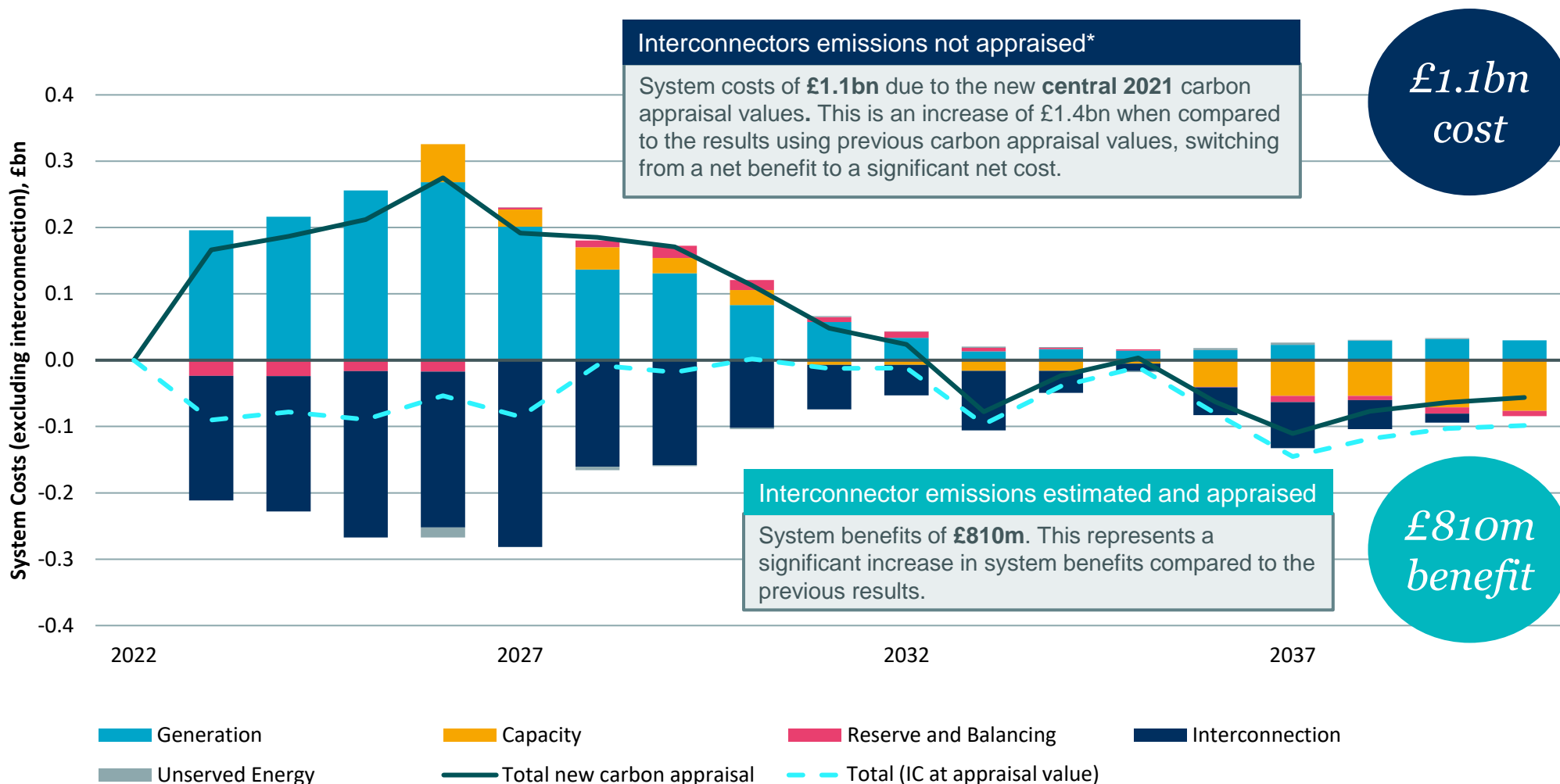


* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – Central 2021 series

Consumer Transformation: System cost changes

Consumer Transformation: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

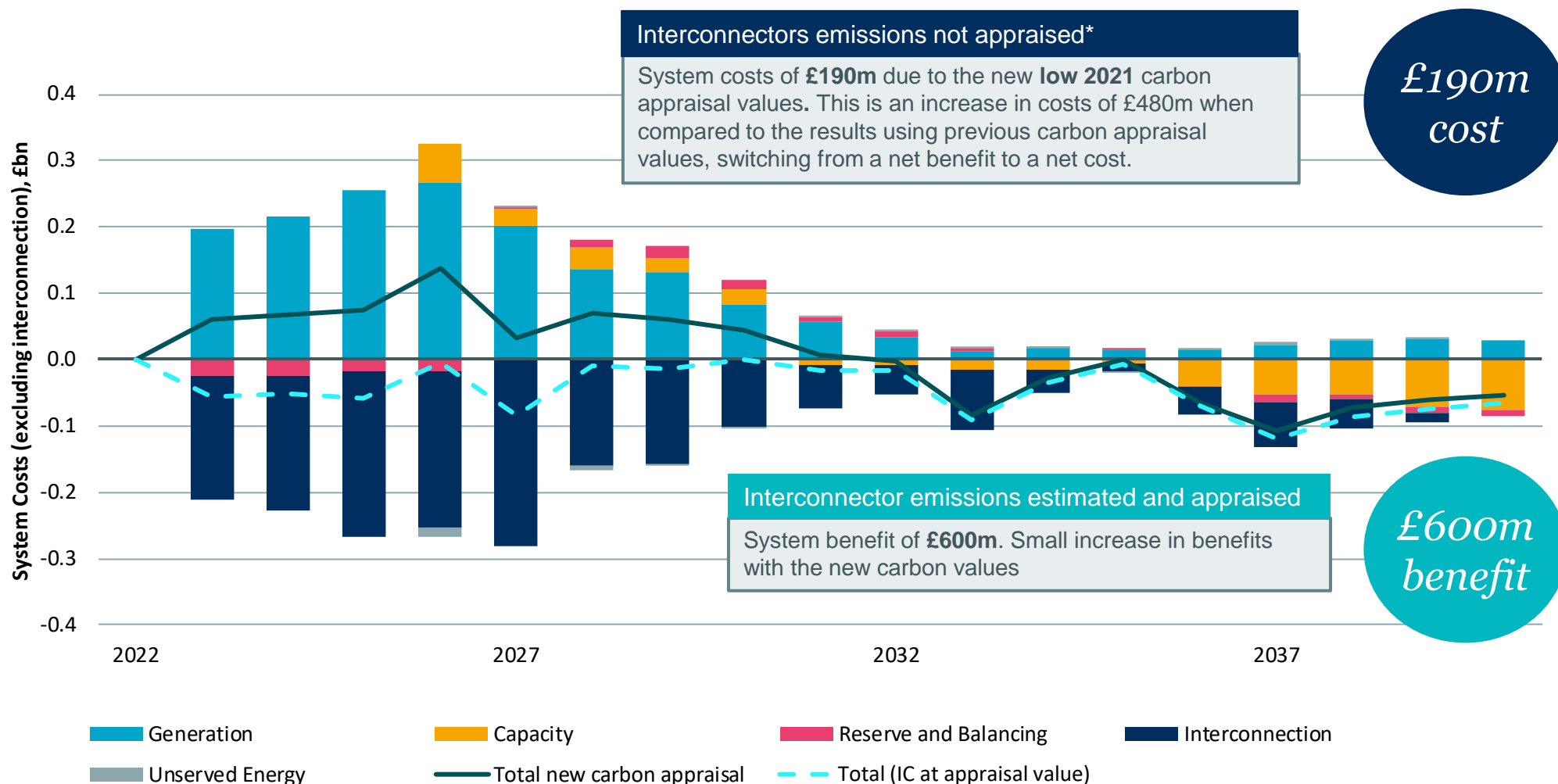


* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – Low 2021 series

Consumer Transformation: System cost changes

Consumer Transformation: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

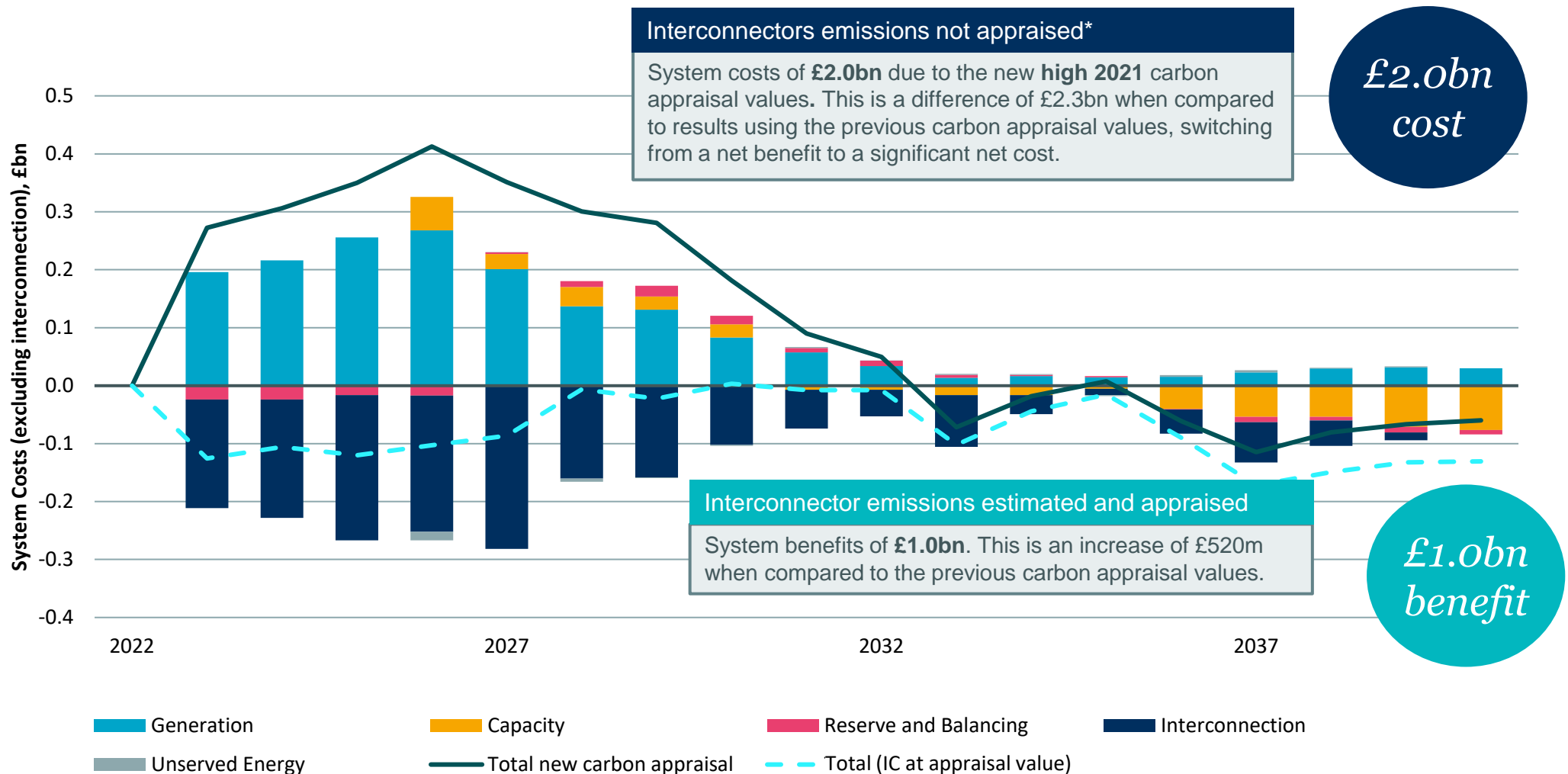


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Wider System Impacts – High 2021 series

Consumer Transformation: System cost changes

Consumer Transformation: System Cost (Factual – Counterfactual), NPV £(real 2020)bn



* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

Wider System Impacts – Summary

Consumer Transformation and Steady Progression: System cost changes

System Cost (Factual – Counterfactual), NPV £(real 2020)bn

The table below shows the changes in **system cost** as result of the BSUoS reform under different carbon appraisal value assumptions.

Note: Negative values represent a system benefit due to the reforms (a decrease in system cost).

- The new values provide a larger system benefit when carbon costs associated with an estimate of the emissions associated with Interconnection are included.
- However if Interconnection imports are considered to have zero emissions, the system costs increase with higher carbon appraisal values. This is because the BSUoS reforms result in an increase in domestic generation and decrease in imports.

Scenario	Carbon appraisal values	Interconnectors emissions not appraised* (£bn)	Estimated interconnector emissions at carbon appraisal value (£bn)
Steady Progression	Previous values	-0.49	-1.22
	2021 Low series values	-0.01	-1.40
	2021 Central series values	+1.24	-1.86
	2021 High series values	+2.50	-2.31
Consumer Transformation	Previous values	-0.29	-0.48
	2021 Low series values	+0.19	-0.60
	2021 Central series values	+1.07	-0.81
	2021 High series values	+1.95	-1.02

* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied

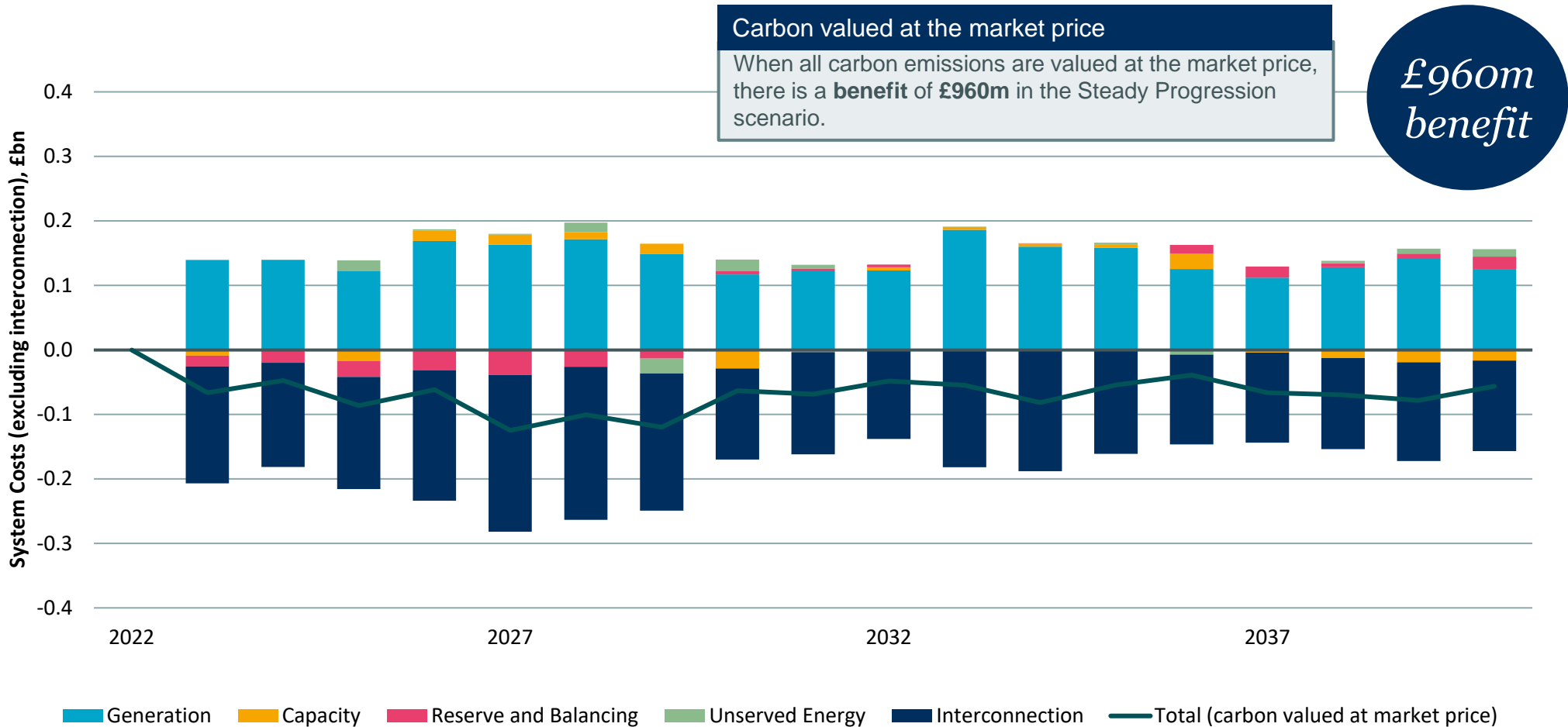
*Wider system impacts:
Carbon valued at market price*



Wider System Impacts – Carbon valued at market price

Steady Progression: System cost changes

Steady Progression: System Cost (Factual – Counterfactual), NPV £(real 2020)bn



Wider System Impacts – Carbon valued at market price

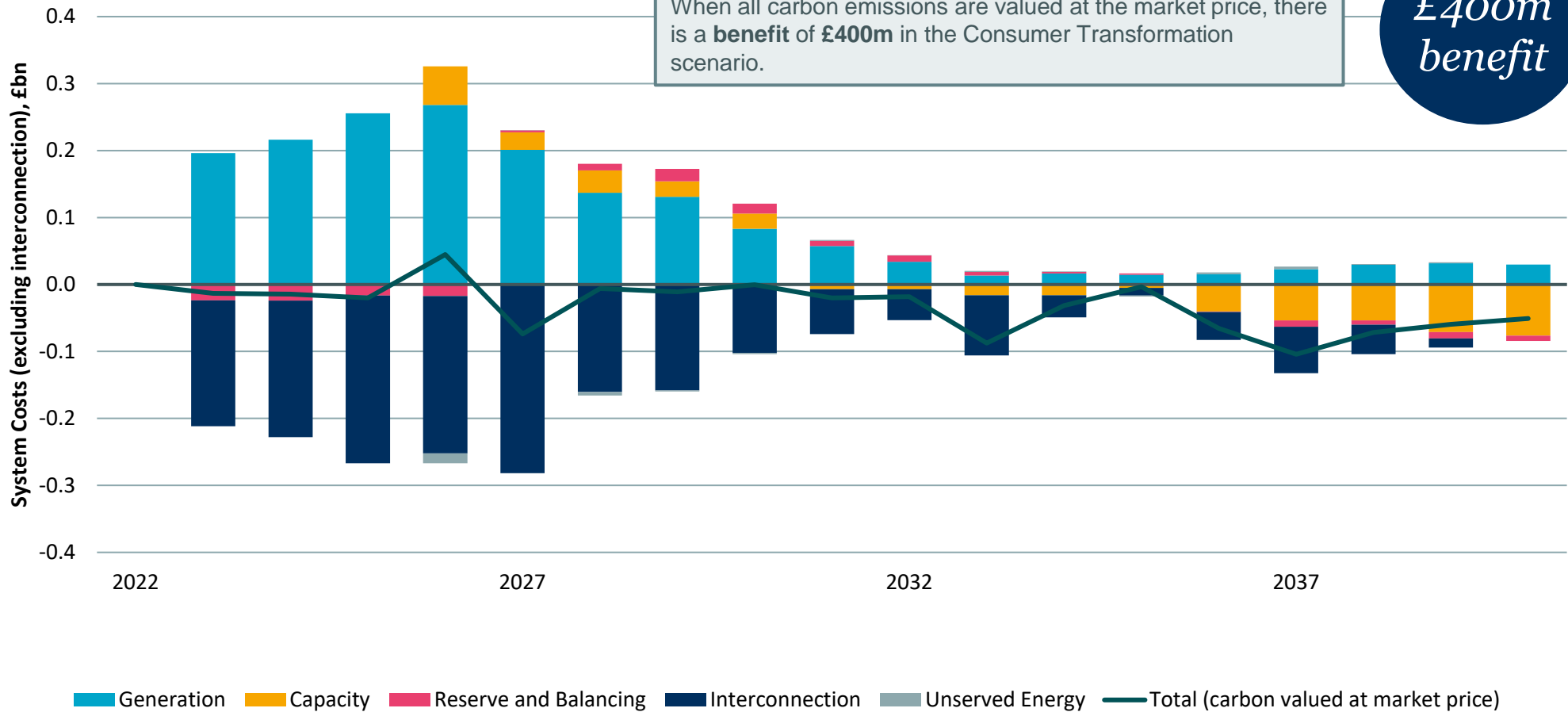
Consumer Transformation: System cost changes

Consumer Transformation: System Cost (Factual – Counterfactual), NPV £(real 2020)bn

Carbon valued at the market price

When all carbon emissions are valued at the market price, there is a **benefit of £400m** in the Consumer Transformation scenario.

*£400m
benefit*



Wider System Impacts – Summary

Consumer Transformation and Steady Progression: System cost changes

System Cost (Factual – Counterfactual), NPV £(real 2020)bn

The table below shows the changes in **system cost** as result of the BSUoS reform under different carbon appraisal value assumptions.

Note: Negative values represent a system benefit due to the reforms (a decrease in system cost).

The sensitivity showing the results with carbon emissions appraised at the market price is now included.

Scenario	Carbon appraisal values	Interconnectors emissions not appraised* (£bn)	Estimated interconnector emissions at carbon appraisal value (£bn)
Steady Progression	Previous values	-0.49	-1.22
	2021 Low series values	-0.01	-1.40
	2021 Central series values	+1.24	-1.86
	2021 High series values	+2.50	-2.31
	Market prices	-0.96	-0.96
Consumer Transformation	Previous values	-0.29	-0.48
	2021 Low series values	+0.19	-0.60
	2021 Central series values	+1.07	-0.81
	2021 High series values	+1.95	-1.02
	Market prices	-0.40	-0.40

* The Interconnection costs include the EU ETS paid in the connected market, but no additional appraisal cost is applied



At LCP we combine in-depth knowledge of the energy sector with modelling expertise to help our clients make informed decisions.

Our products and consultancy services have developed over many years of close engagement with government and industry, and are used by policy makers, strategists, investors, operators and traders in the UK and Ireland