Committee on Climate Change

Review of UK Shipping Emissions

17th November 2011

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Key messages

- Current UK international shipping emissions are **highly uncertain**, but likely to be in the range 12-16 $MtCO_2$
- There is scope for **significant emissions reduction** in shipping, beyond that targeted by the EEDI - so need for new policies
- **By 2050** UK international shipping emissions could account for up to **11% of allowed emissions**
- International shipping emissions should ideally be **included** in the **2050 target**. We propose three options for inclusion in targets and budgets.

Presentation in four sections

We present the analysis underpinning our key messages in four sections:

1. International policy context
2. Shipping and the Climate Change Act
3. UK shipping emissions: current and projections to 2050
4. Inclusion of international shipping in 2050 target and carbon budgets

Globally, shipping emissions are projected to grow strongly...

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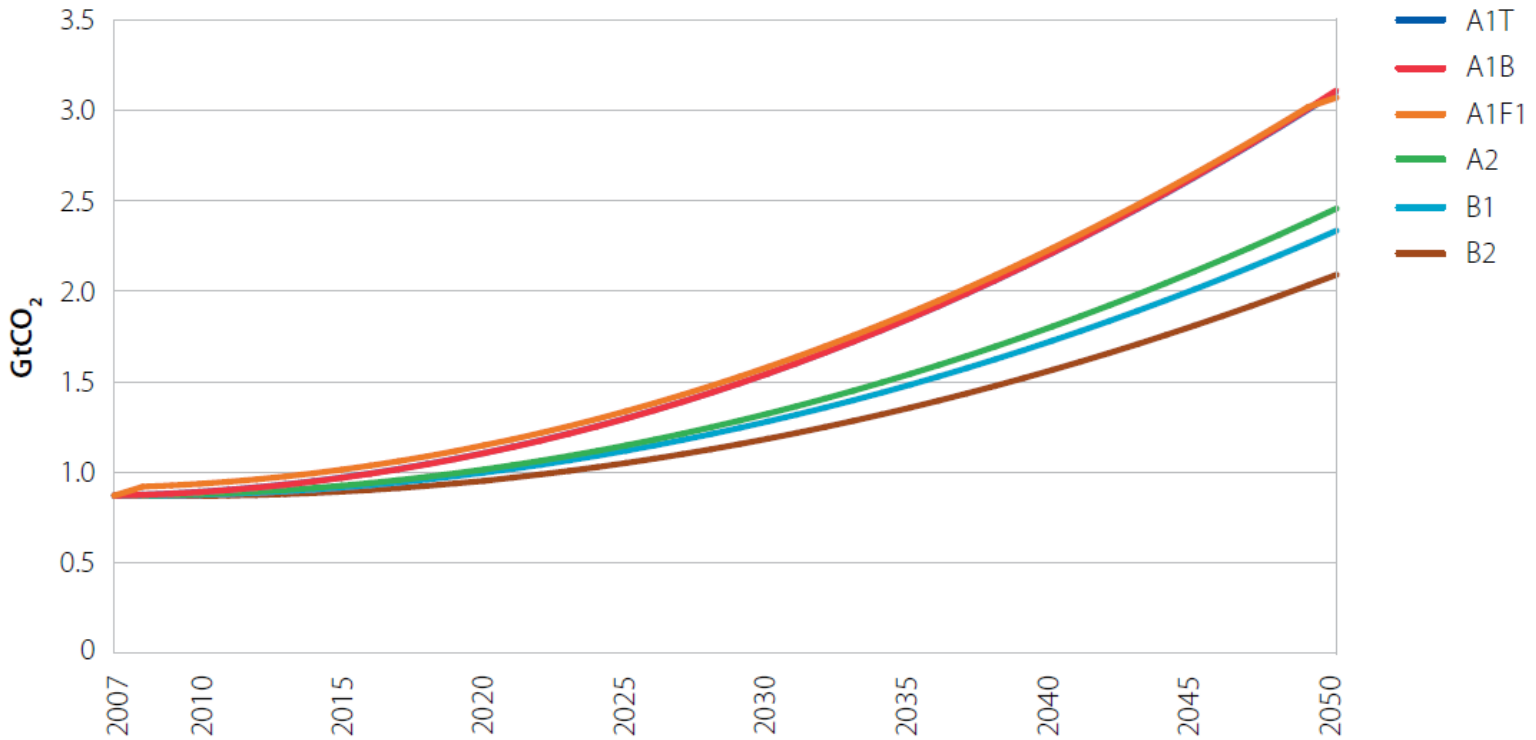
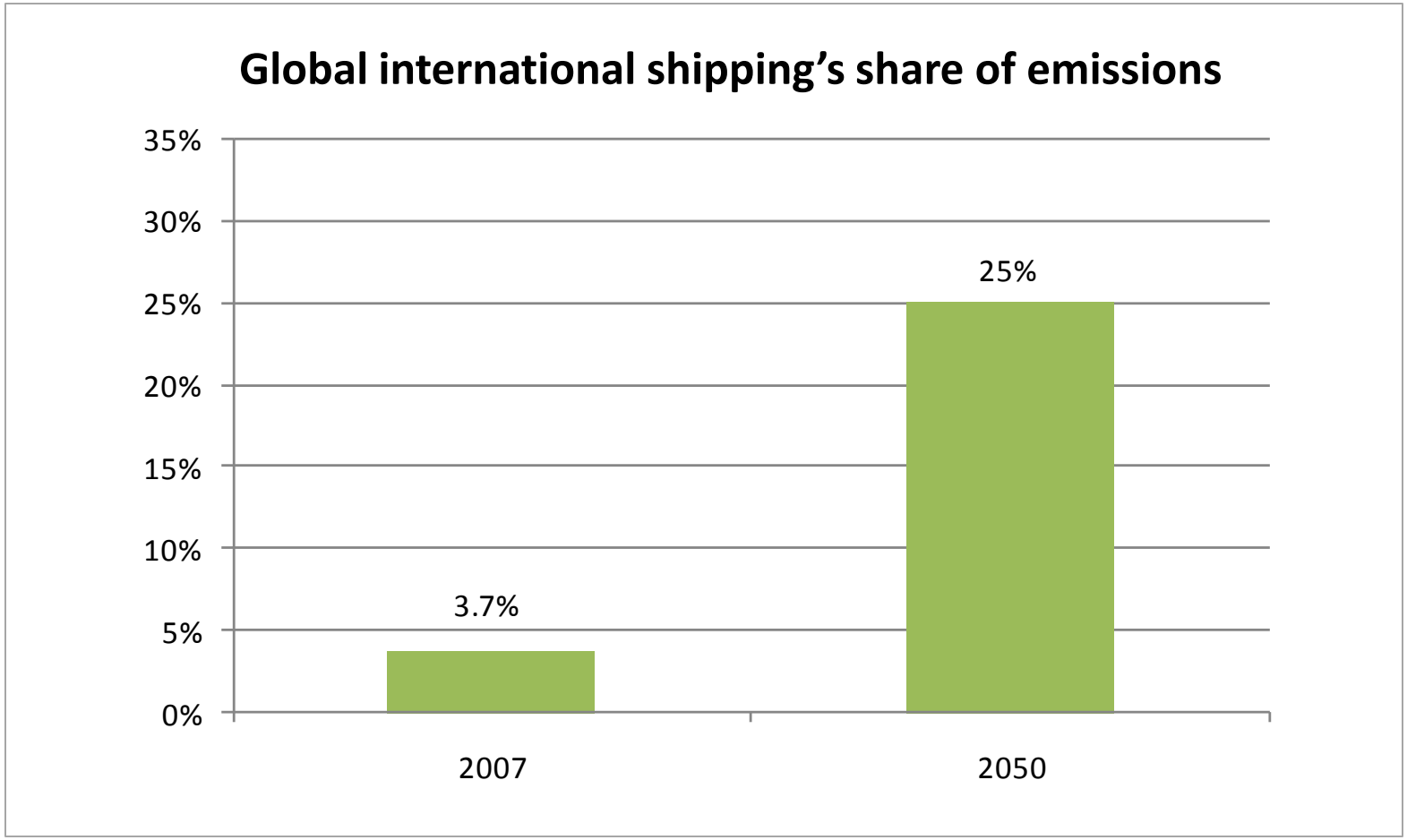
Global international shipping emissions (2007-2050)

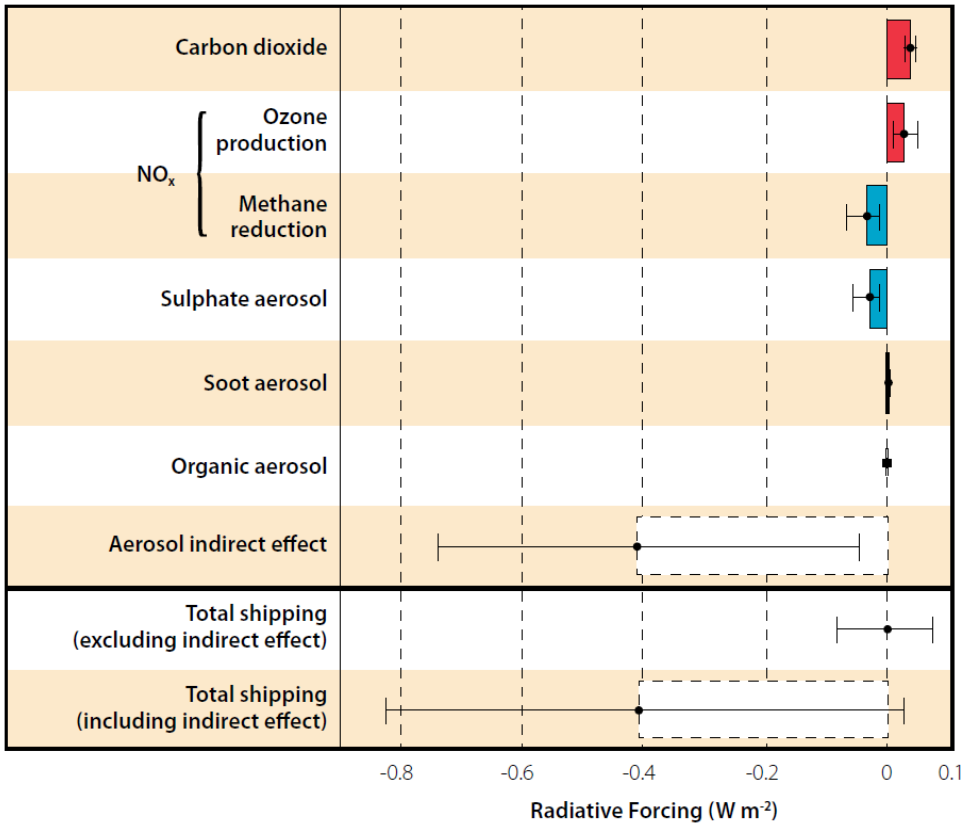


...taking up an increasing share of global CO_2 emissions



These emissions will have a long-term warming effect

Global shipping radiative forcing (2005)



Emissions from shipping will lead to long-term warming

- Warming effect of CO_2 lasts centuries and builds over time
- Currently cooling effect of sulphur emissions probably dominates **BUT**
- CO_2 effect will dominate further in future as sulphur content of ship fuel falls

Internationally, there has been some progress on policies to control emissions

The Kyoto Protocol, signed in 1997, assigned responsibility for developing a framework to reduce international shipping emissions to the IMO

At the global level

- IMO has agreed to mandate minimum efficiency levels for new ships (EEDI)…
- …but has not been able to gain agreement on measures with stronger incentives (e.g. emission trading or carbon levy)

At the EU level

- The EU has indicated it will implement its own policies if IMO progress is deemed insufficient

UK international shipping emissions are not covered by the Climate Change Act

International Shipping emissions are currently **excluded** from carbon budgets and the 2050 target under the Climate Change Act

By the end of 2012 the Government must:

- decide whether to **include** International Shipping in carbon budgets
- or lay a report to Parliament **explaining why not**

This review is preparatory work to our advice on inclusion in carbon budgets

In Spring 2012 we will advise Government on whether or not to include international shipping in carbon budgets

In this report we:

- Estimate **current UK shipping emissions** using different methodologies
- **Project emissions to 2050**, with different scenarios for demand growth and emissions abatement potential
- Set out **options for inclusion** in carbon budgets

What are we trying to measure?

There a different ways of measuring international shipping emissions

Where a ship picks up fuel

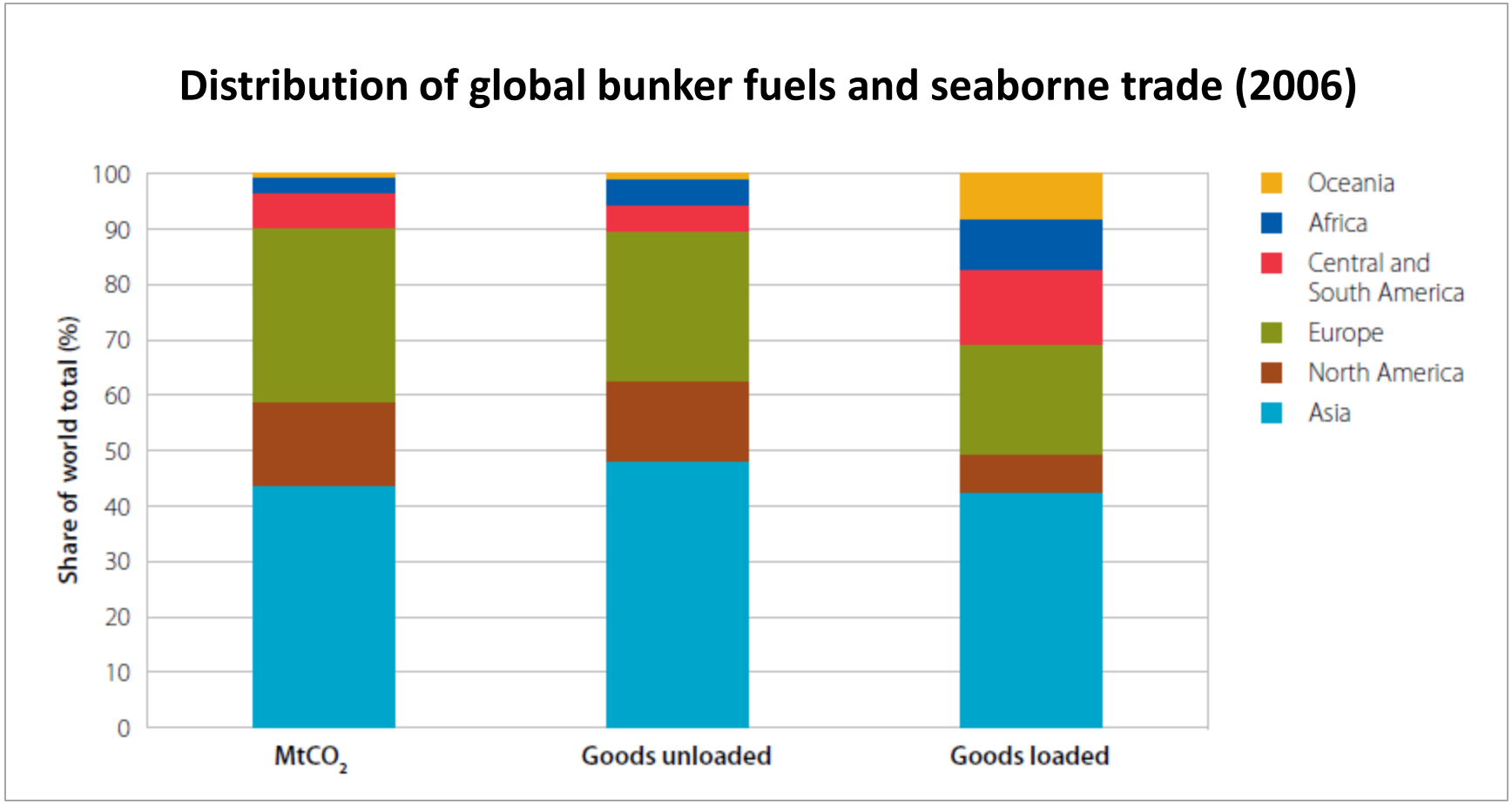
"bunker fuels"

On the fuel used to get a ship to a port

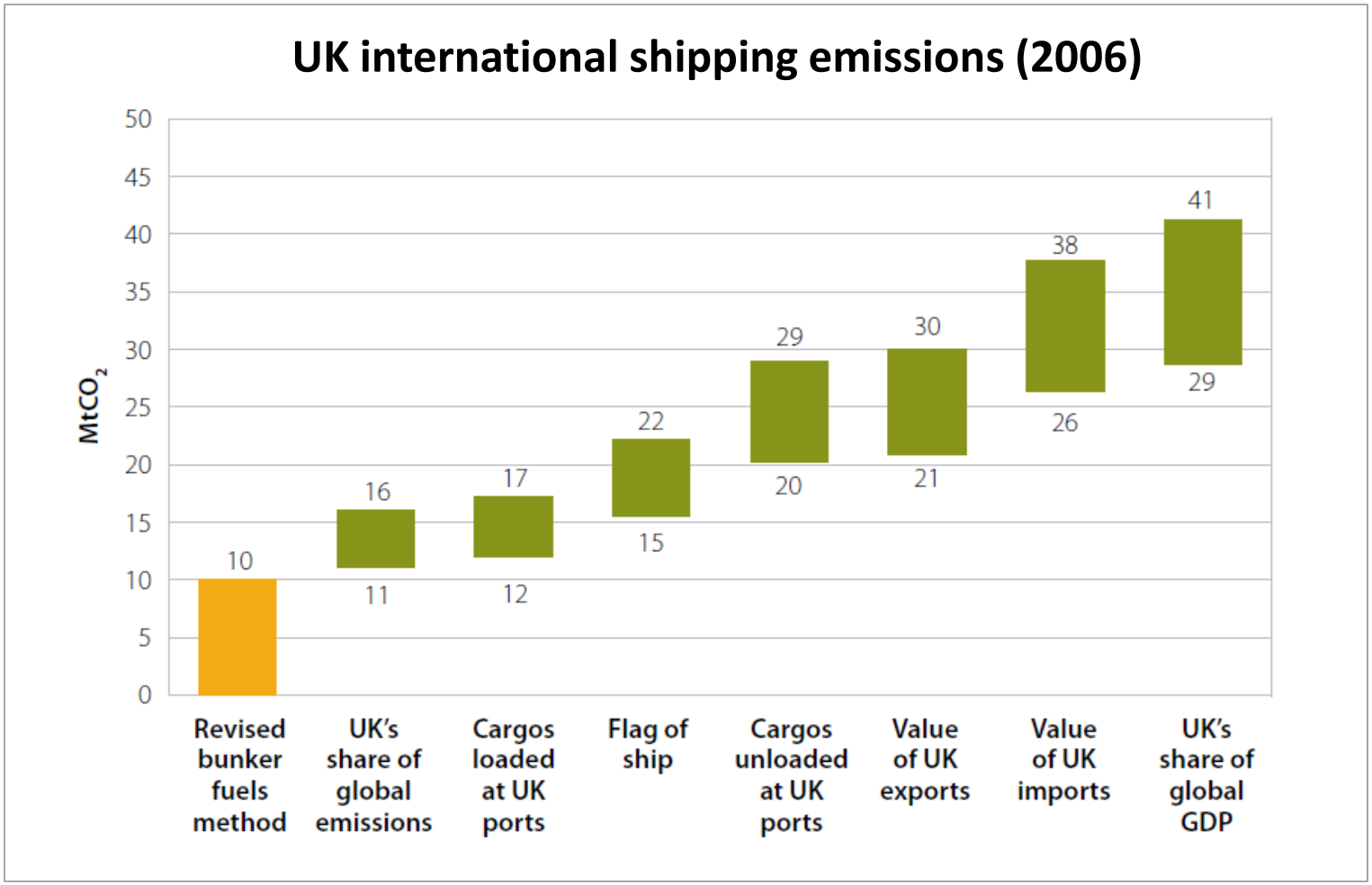
The fuel associated with moving a cargo

Methods can also be classified as top-down and bottom-up depending upon data source used.

Current emissions: Bunker fuels could be reasonable at regional levels

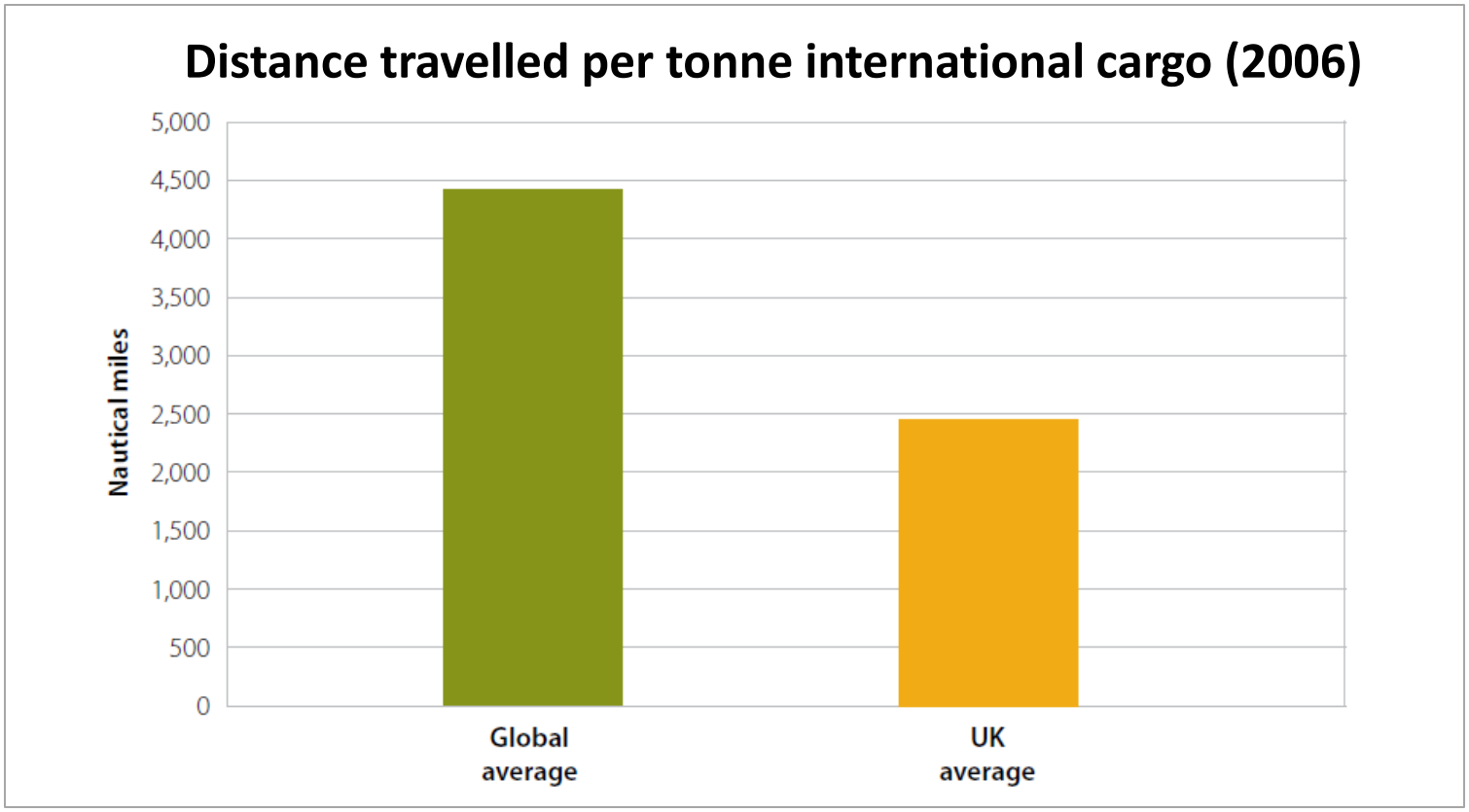


At UK level, top-down estimates are higher than bunker fuels...



...but over-estimate emissions

Top-down methods assume all countries have the same average journey length - but UK journey lengths significantly shorter.



Our approach to projecting UK shipping emissions

We take into account a wide range of factors that could affect future shipping emissions...

Current emissions

Future demand

Abatement potential

...and bring these together into scenarios for 2050

Uncertainties over current emissions

Estimates of current international shipping emissions are uncertain

Ship movements	• Use Lloyds ship movement data, but this undercounts ship movements.
Fuel use	• Data on fuel use is not collected directly. Estimates based on estimates of ship power, fuel type, days at sea etc.
Transhipment	• Cargos do not always travel directly to the UK but go via hubs.

We use a bottom-up approach to estimate emissions

To estimate emissions, we use a bottom-up approach based on distance travelled and carbon intensity of ships <u>arriving at UK ports</u>.

Current emissions

- Uses Lloyds data and includes adjustment for transhipment of cargos
- Sensitivity adjusting top-down for UK distances
- Range for 2006 international shipping emissions is 12-16 $MtCO_2$ (plus 2 $MtCO_2$ domestic)

Projections to 2050

- Future demand for shipping
- Range of scenarios for future carbon intensity

Demand drivers for projections

We project demand for 12 cargo and 4 passenger types using three approaches

Decarbonisation →

- Applies to crude oil, petroleum, gas and coal
- Projections consistent with wider work on energy sector

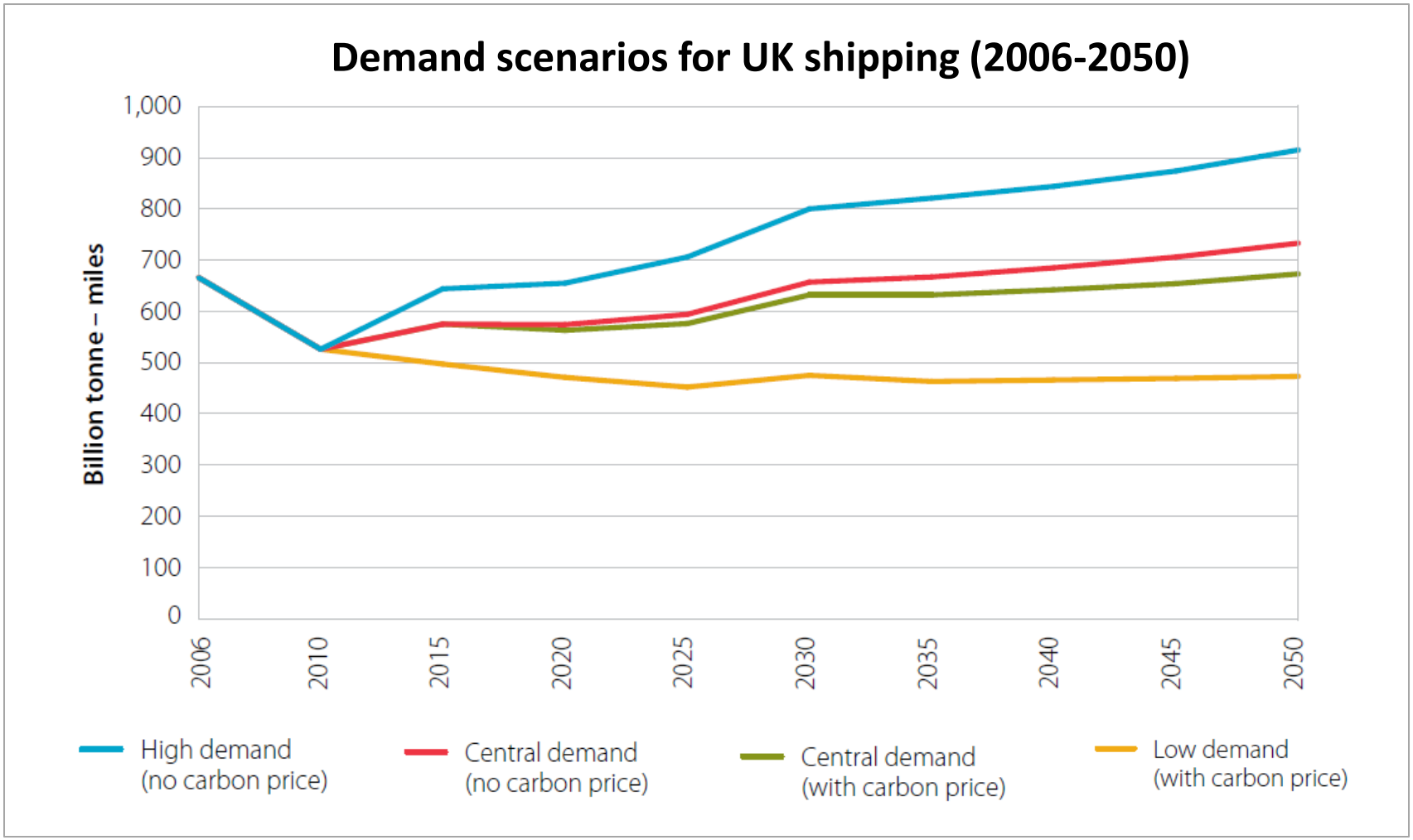
Extrapolation of trends →

- Applies to unitised cargo, passengers

Scenarios →

- Applies to iron and steel and ores.

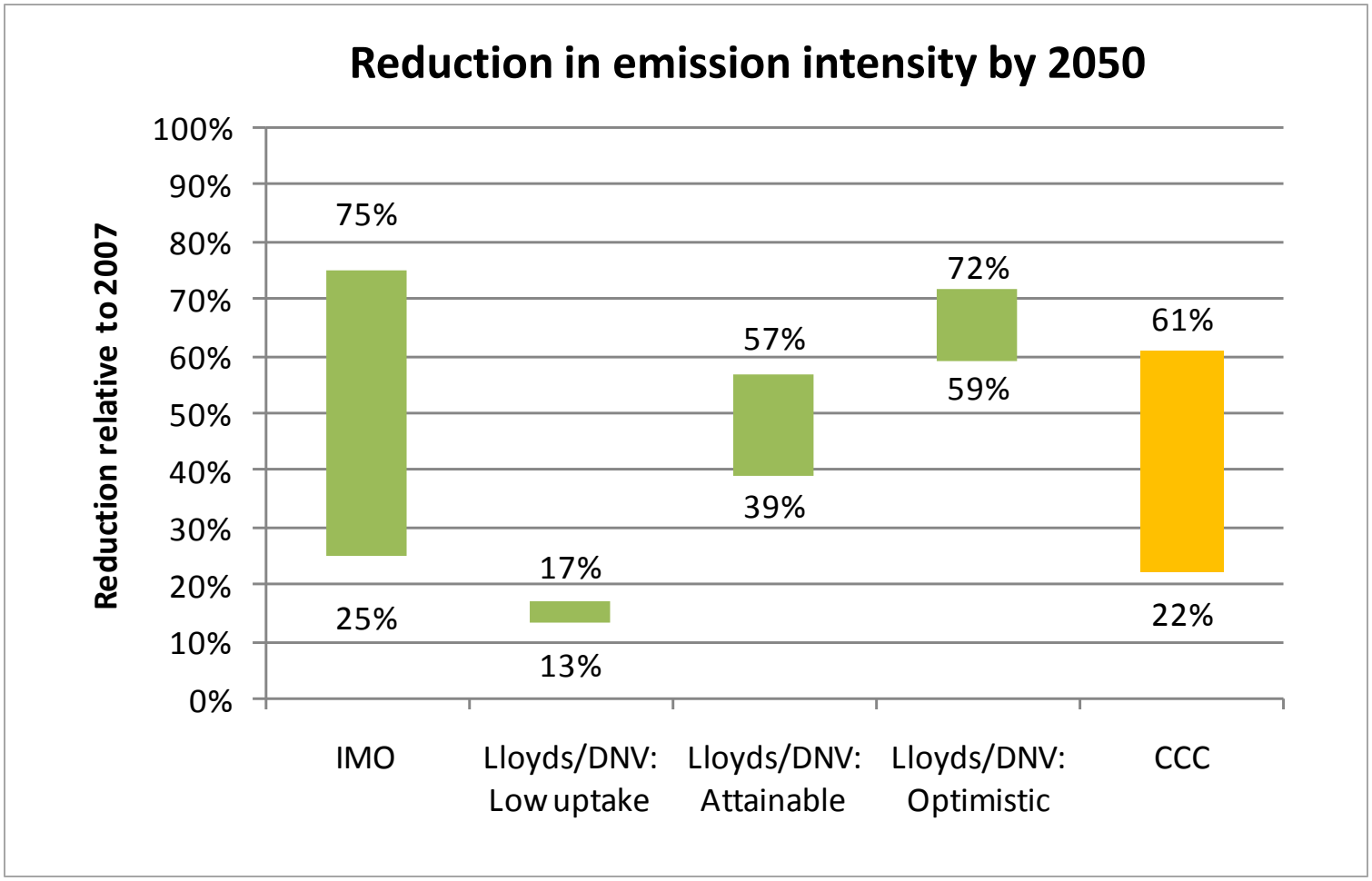
Demand for shipping could be broadly flat to 2050



There are a range of options for reducing shipping emissions

- **Larger ships**, as carbon efficiency improves significantly with ship size
- **Operational** measures, for example speed reduction and improved performance monitoring and maintenance
- **Technological** measures, for example propulsion and engine upgrades, and hull modifications
- **Alternative fuels**, for example biofuels and LNG

Our abatement scenarios are within the range suggested by other studies



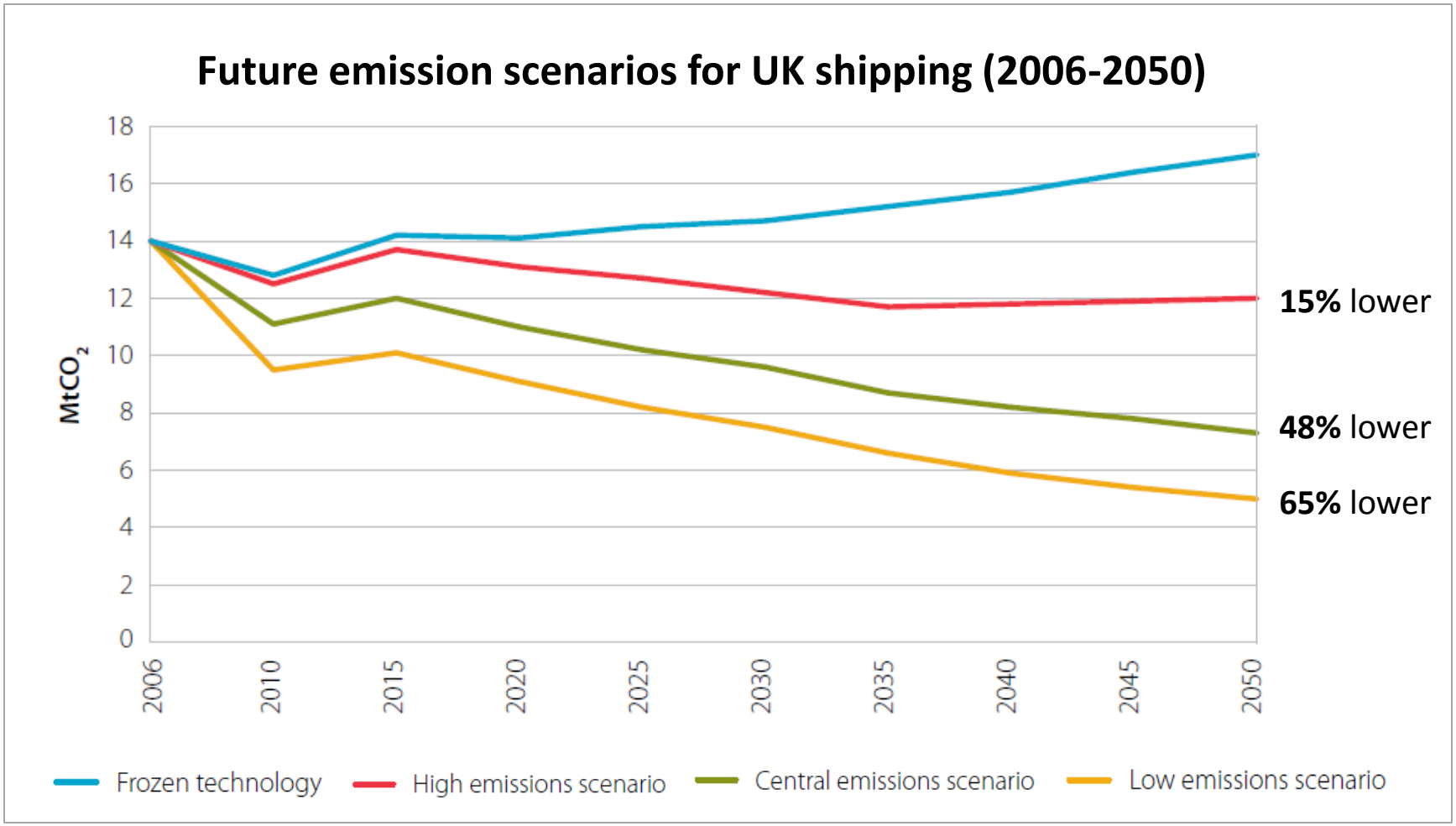
Note: Emission intensity measured as gCO_2/tonne nautical-mile. Excludes increases in ship size.

We combine demand and carbon intensity assumptions in three scenarios

We overlay three abatement scenarios on our central demand projection, and consider a number of sensitivities.

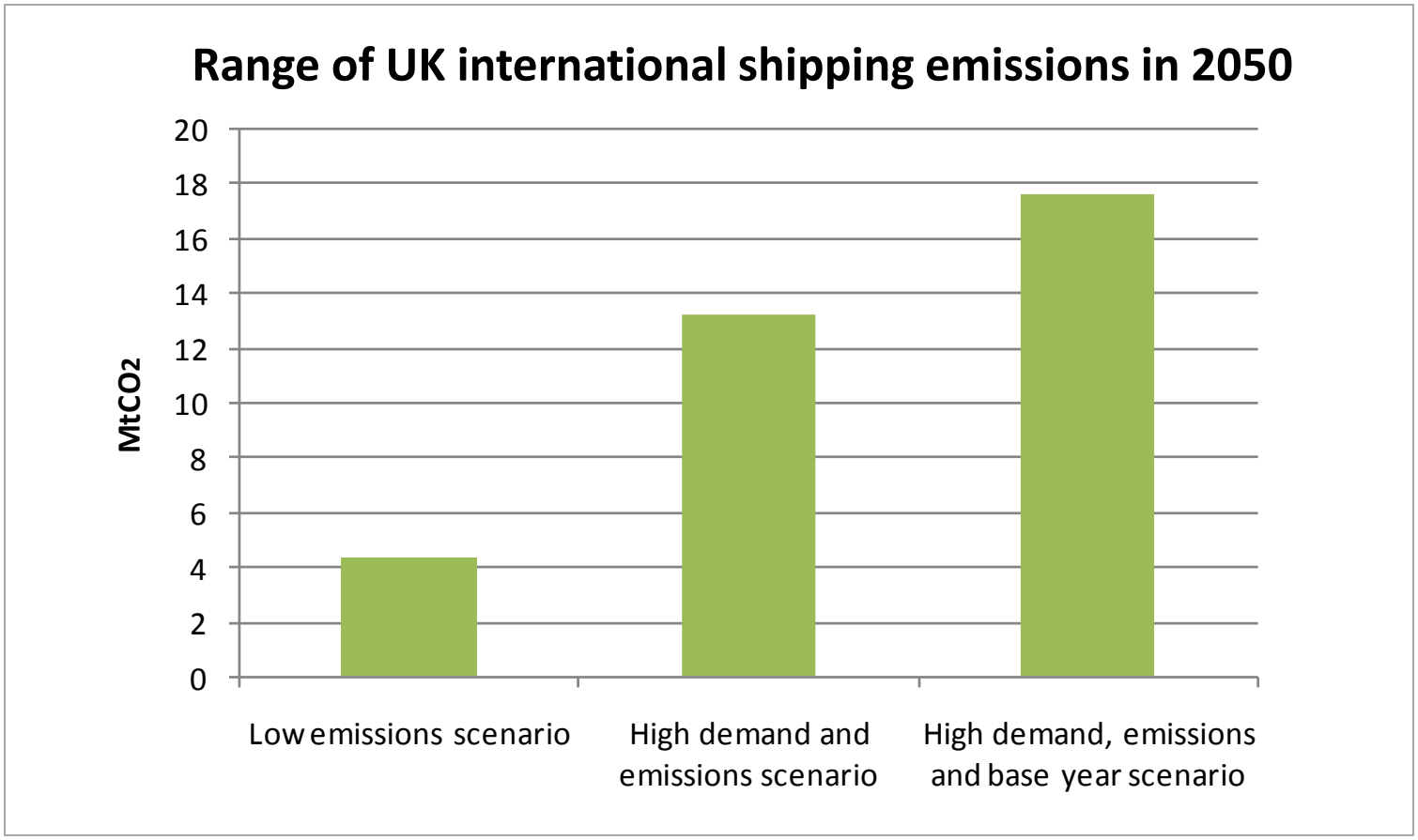
High emissions	• IMO's EEDI is achieved, but very limited further abatement
Central emissions	• Abatement goes beyond EEDI, including slow steaming and some biofuels • Increases in unitised cargo ship sizes
Low emissions	• Full take-up of abatement potential, with greater but still limited penetration of biofuels • Increases in bulk and unitised cargo ship sizes

Overall, scope to go well beyond EEDI – Government should push for new policies



Note: Estimates include domestic and international shipping.

Emissions are material in context of 2050 target and should therefore be included



UK shipping emissions could account for up to 11% of allowed emissions in 2050

We propose three options for inclusion in carbon budgets

International shipping emissions are included:

1. In the 2050 target and carbon budgets now
2. In the 2050 target and carbon budgets when progress has been made developing internationally agreed methodologies
3. In the 2050 target now, but in carbon budgets at a later date.

We will recommend which option should be pursued as part of our advice to Government in Spring 2012

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Thank you

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