Getting the measure of GHG emissions from transport - land, air and water

REA – Decarbonising Trucks, Trains, Boats & Planes

3rd December 2019

Colin Smith

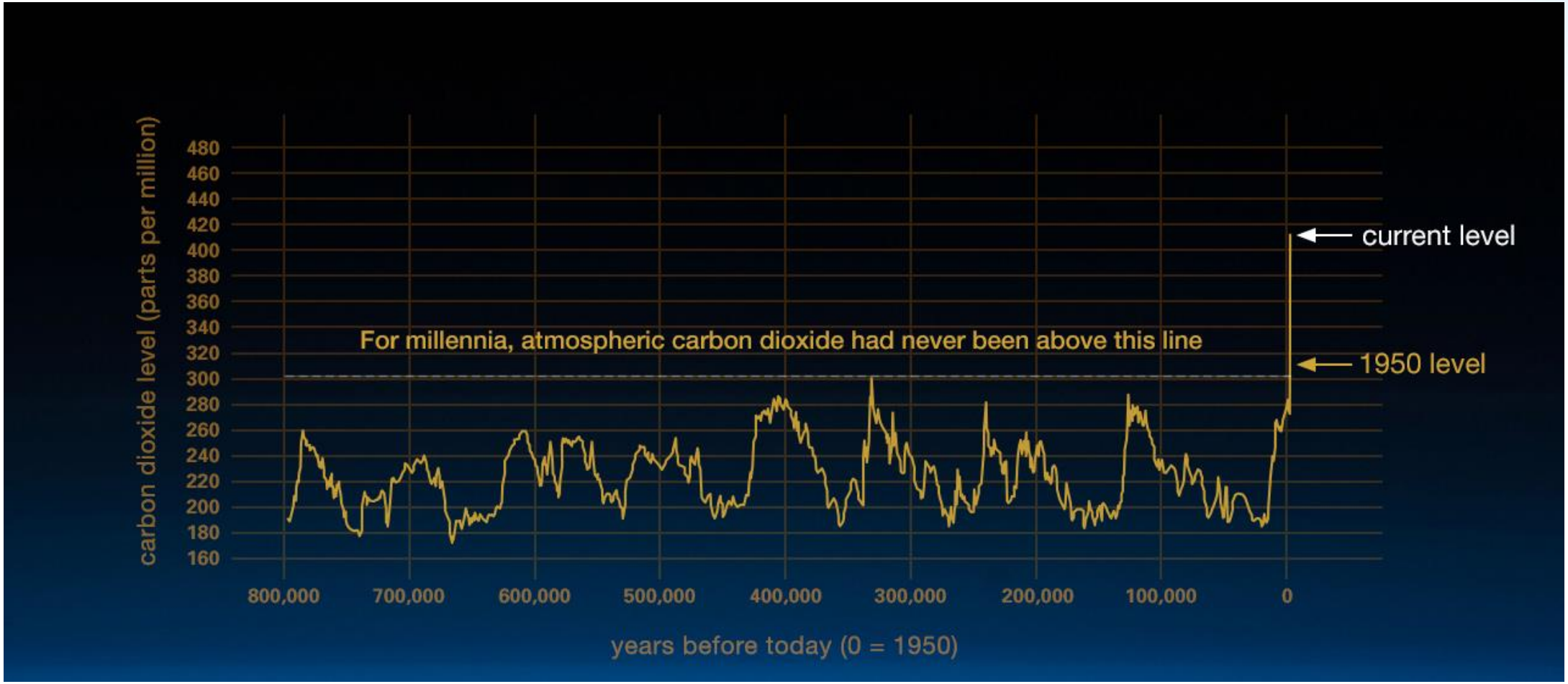
Programme Manager, Transport,

Energy Saving Trust

The Climate Challenge

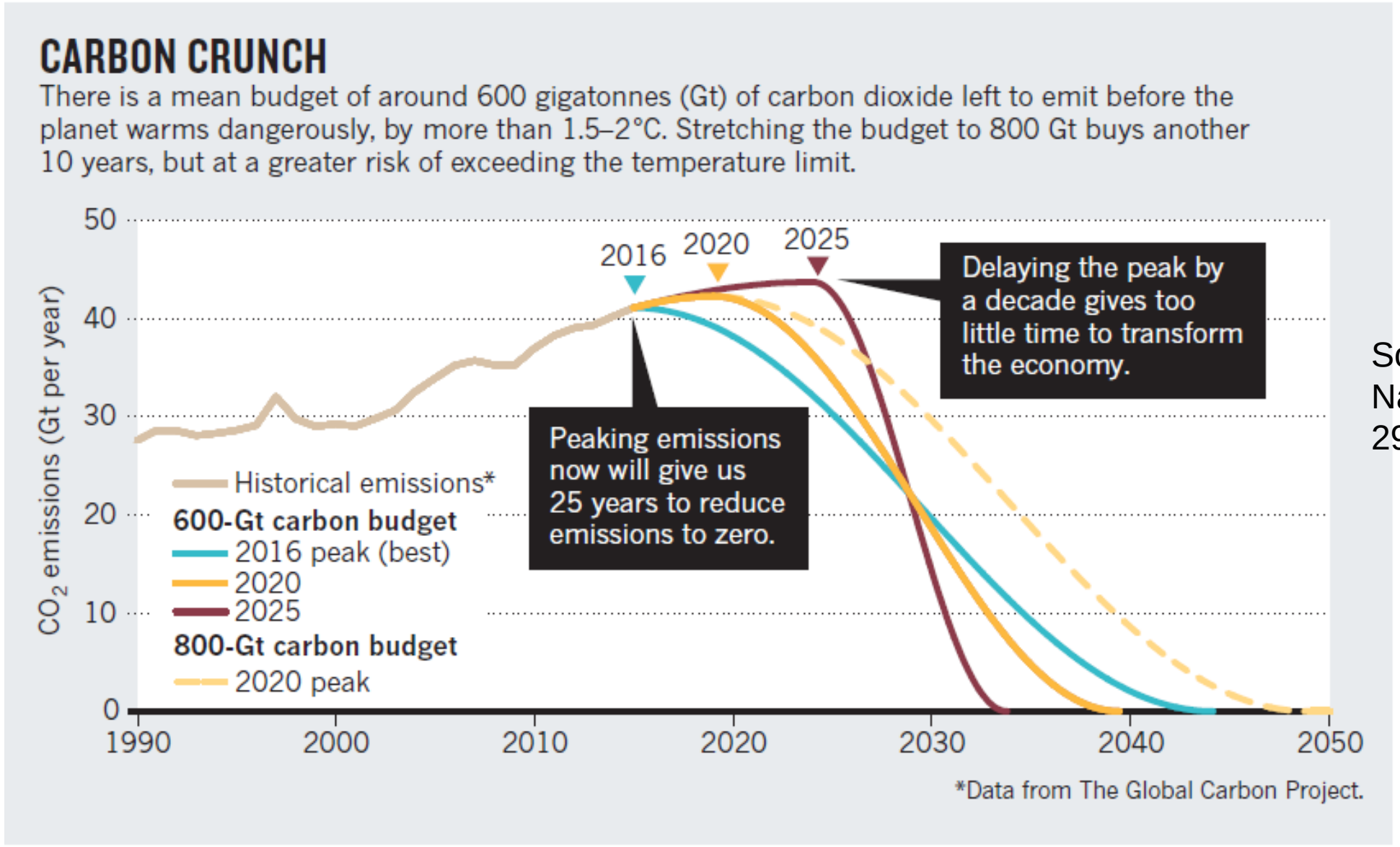
energy saving trust

408 ppm CO_2



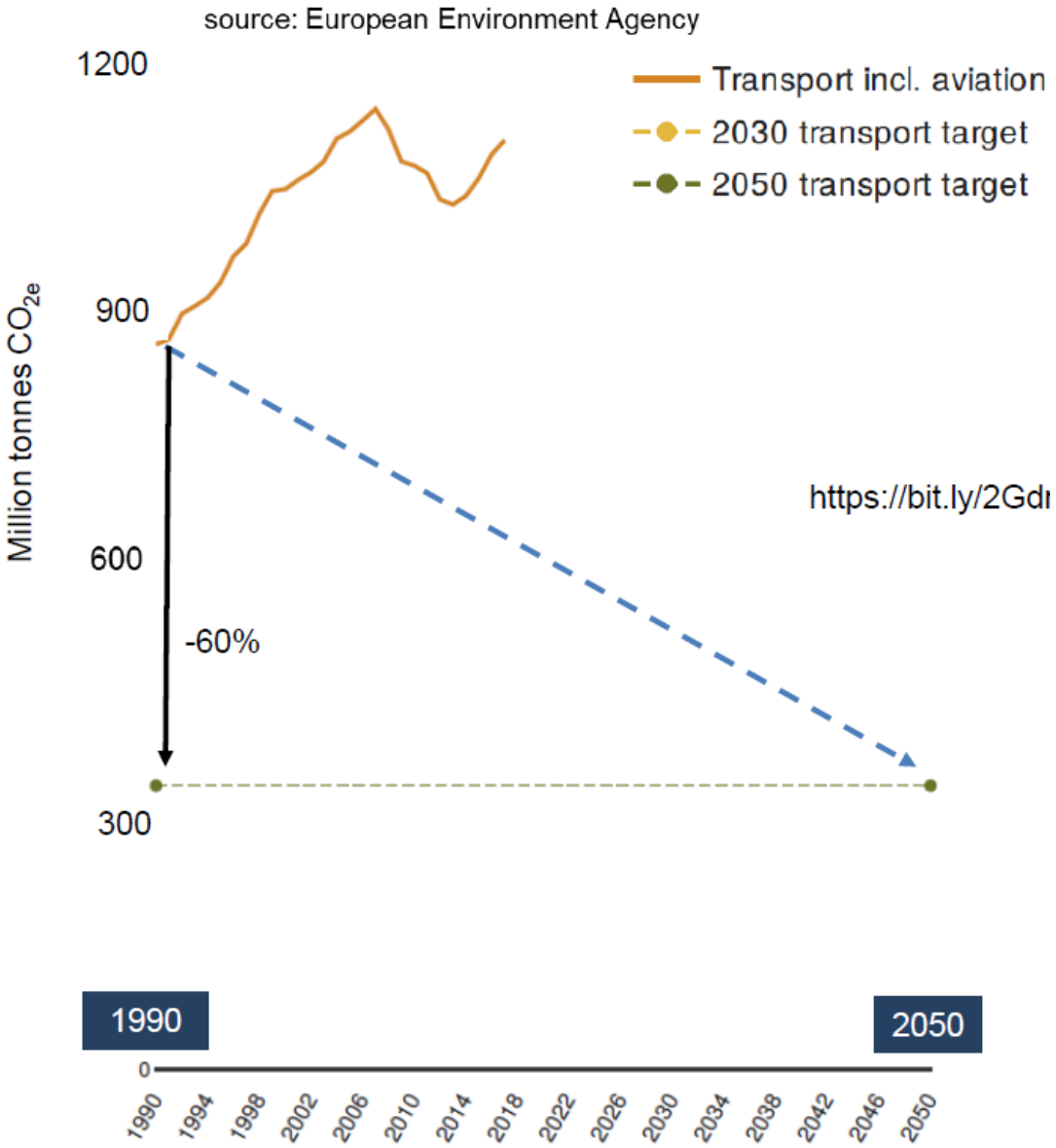
Source - NASA

Which do you prefer….the green or black run?



Source: Figueres et al, Nature, Vol 546
29 June 2017

What has happened thus far……..



"If countries implement all their transport pledges, transport CO_2 emissions in 2030 would still be at about 2015 levels" (ITF 2018)

From commitments to action to reductions – “Talk to Walk”

energy saving trust

Plan
- Motivate
- Estimate
- Commit
- Set targets
- Consider options

Do
- Implement actions
- Data harvest

Check
- Measure
- Report
- Assure
- Declare

Act
- Use the outputs
- Compare
- Promote
- Offset

Adapted from McKinnon (2018) Decarbonizing Logistics

Collaborate

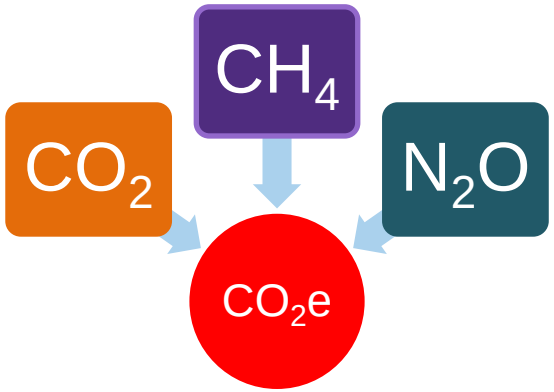
SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

DHL

REPORT REDUCE RECORD
Logistics Emissions Reduction Scheme

CDP
DISCLOSURE INSIGHT ACTION

What to measure and report for better business decisions?



Seeing the full picture = WTW


Well to (truck) Wheel

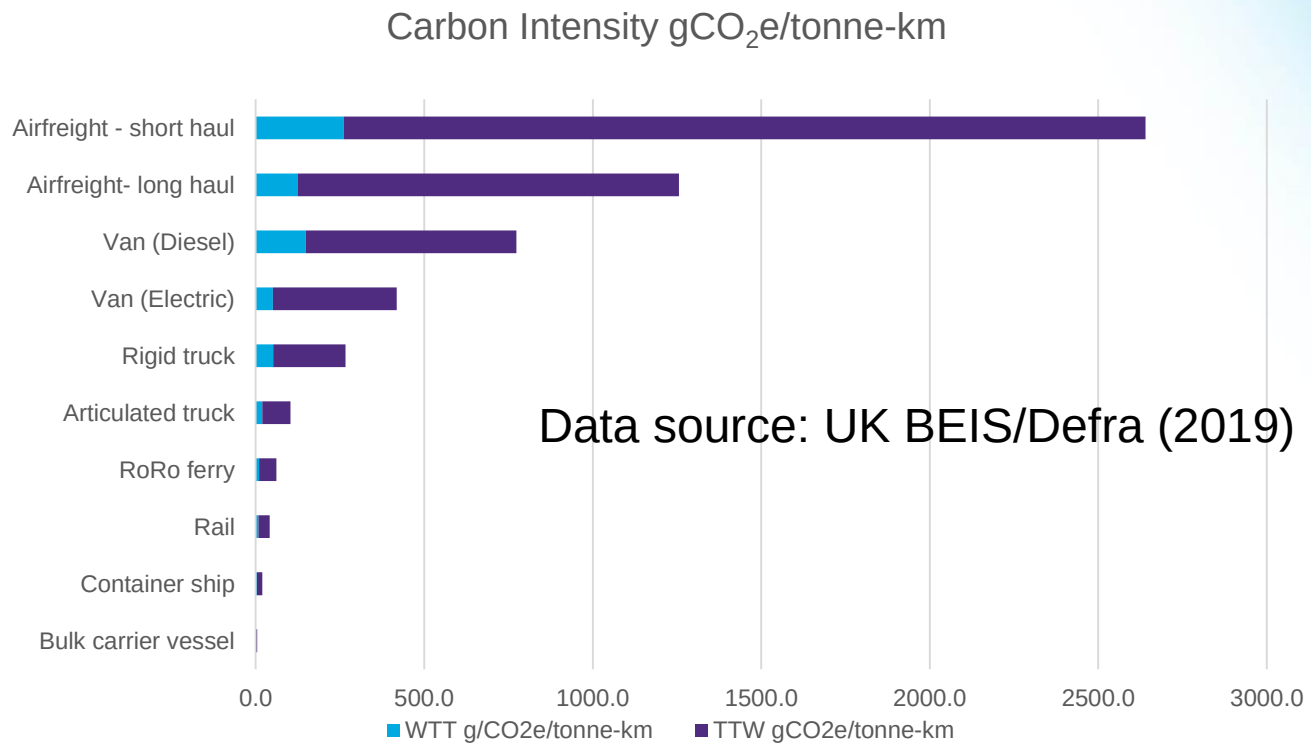

Well to (train) Wheel


Well to Wake


Well to Wing

Absolute GHG Emissions is only part of the story…….

Freight Efficiency or Carbon Intensity will also help measure and identify opportunities to reduce



Data source: UK BEIS/Defra (2019)

From a global framework to a global standard for better business decisions

energy saving trust

Global Logistics Emissions Council Framework

for Logistics Emissions Accounting and Reporting

GLEC GLOBAL LOGISTICS EMISSIONS COUNCIL

Smart Freight Centre

- Facilitated by the Smart Freight Centre
- Industry led
- Collaborative approach
- Harmonised measurement and reporting
- Enhancement of existing practice

ISO

"NEW"
Carbon footprint of transport operations – requirements & guidelines for quantification
Being developed under
ISO/TC207/SC7 WG14
ISO/AWI 14083

CEN

Revision of EN 16258:2012 under Vienna Agreement

bsi.

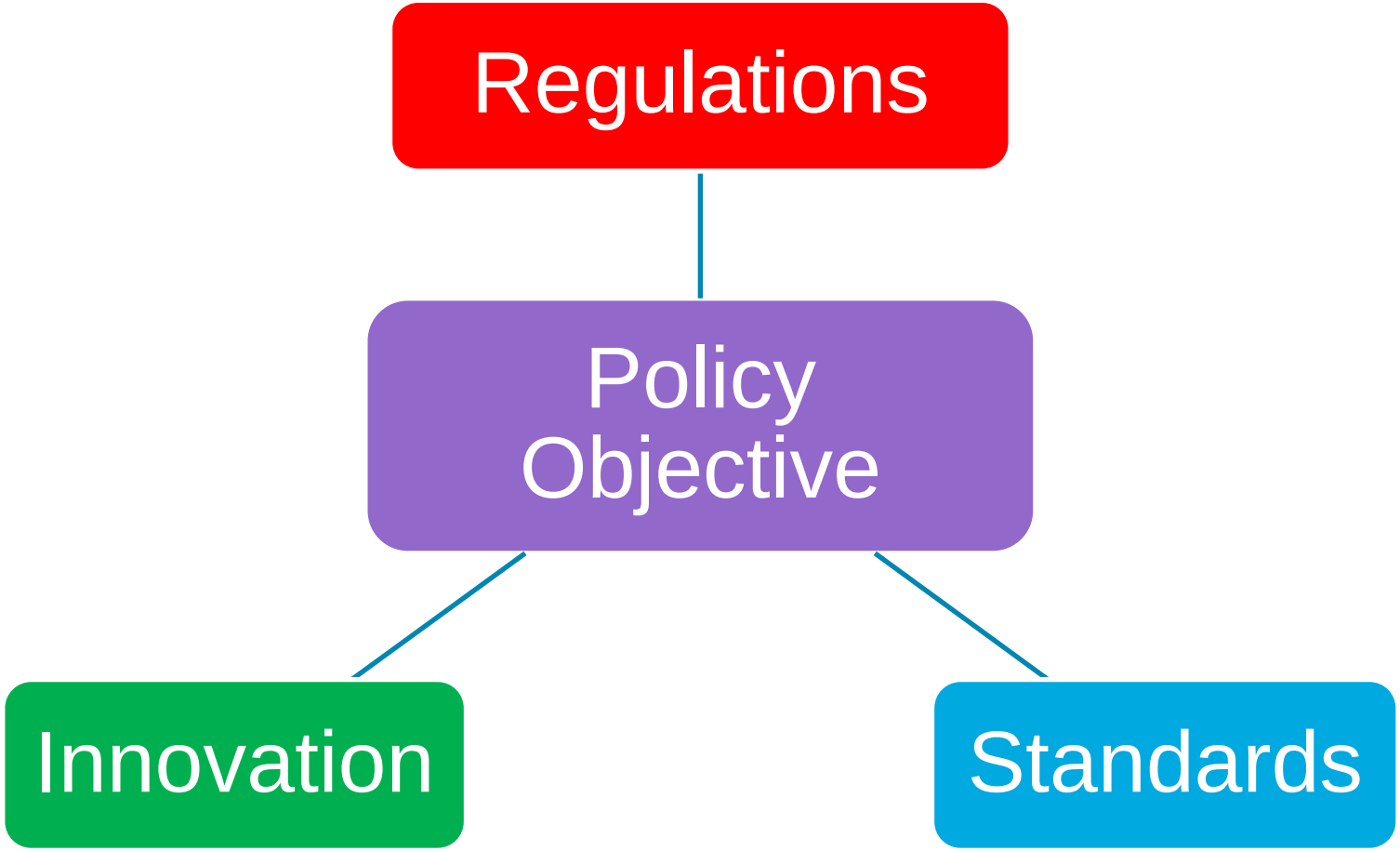
UK participation under BSI committee SES/1/7

Which of these comes first?

Regulation

Innovation

Standards



Areas for action

To achieve EU Target …

needs 83% reduction in carbon intensity of EU freight transport

possible scenario
leveraging freight decarbonisation parameters

30% modal shift road to rail

Rail improves energy efficiency by 50% and reduces carbon intensity of energy by 50%

+

20% improvement in truck routing efficiency

+

30% increase in loading of laden trucks

+

30% reduction in empty running of trucks

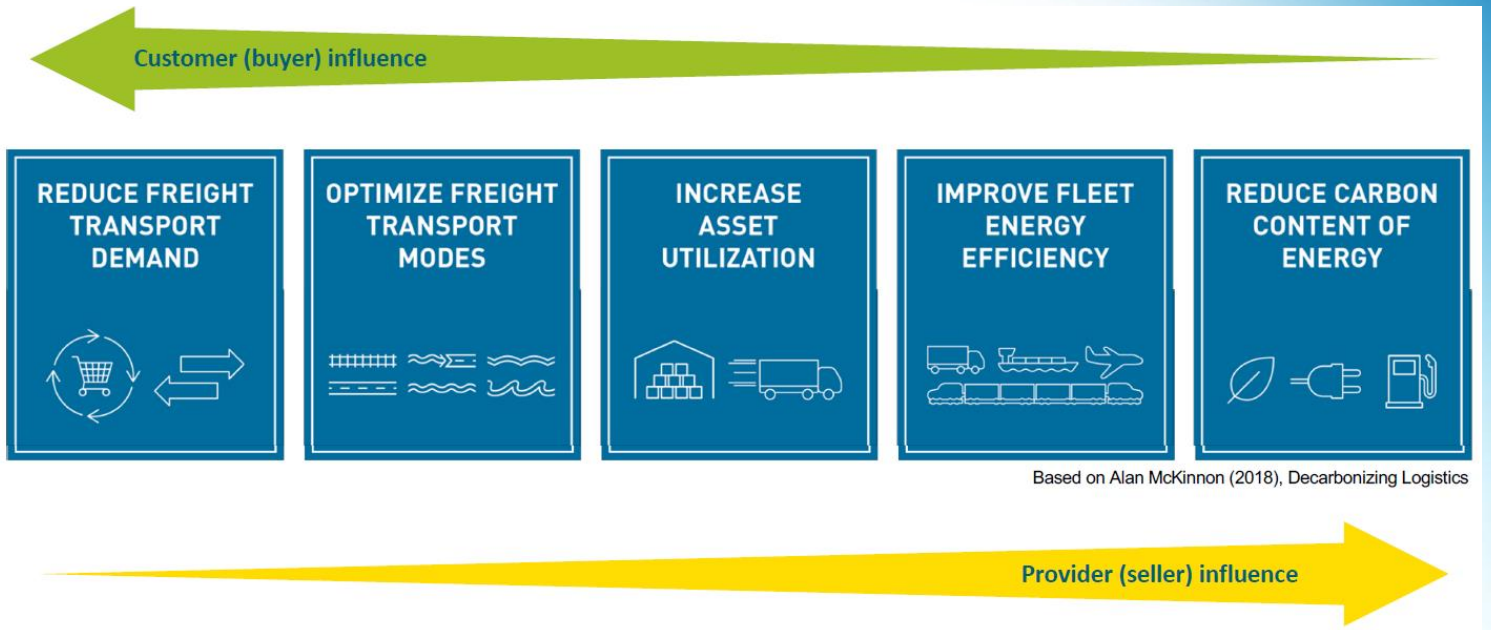
+

50% increase in energy efficiency of road freight

+

50% reduction in carbon intensity of this energy

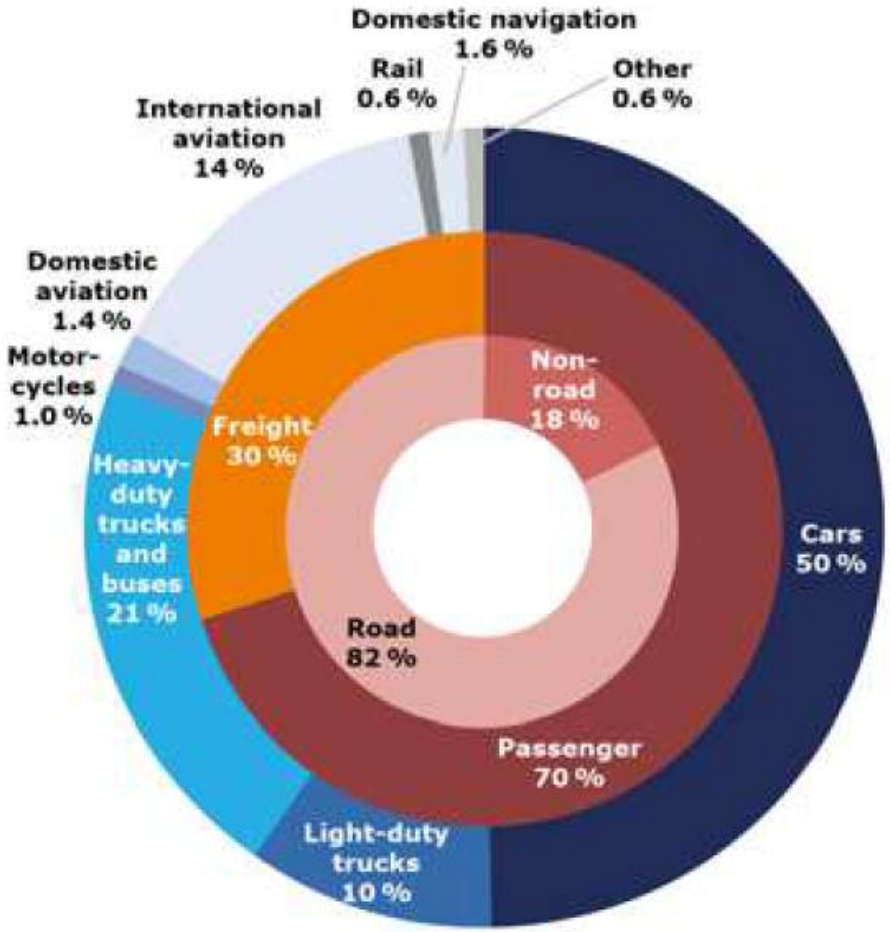
Source – McKinnon (2018) Decarbonising Logistics



Source – Punte, SFC LEARN International Workshop Feb 2019

EU Overview of transport emissions

- 26% of GHG emissions or 895MtCO_2e
- 82% is road
- 70:30 split passenger freight

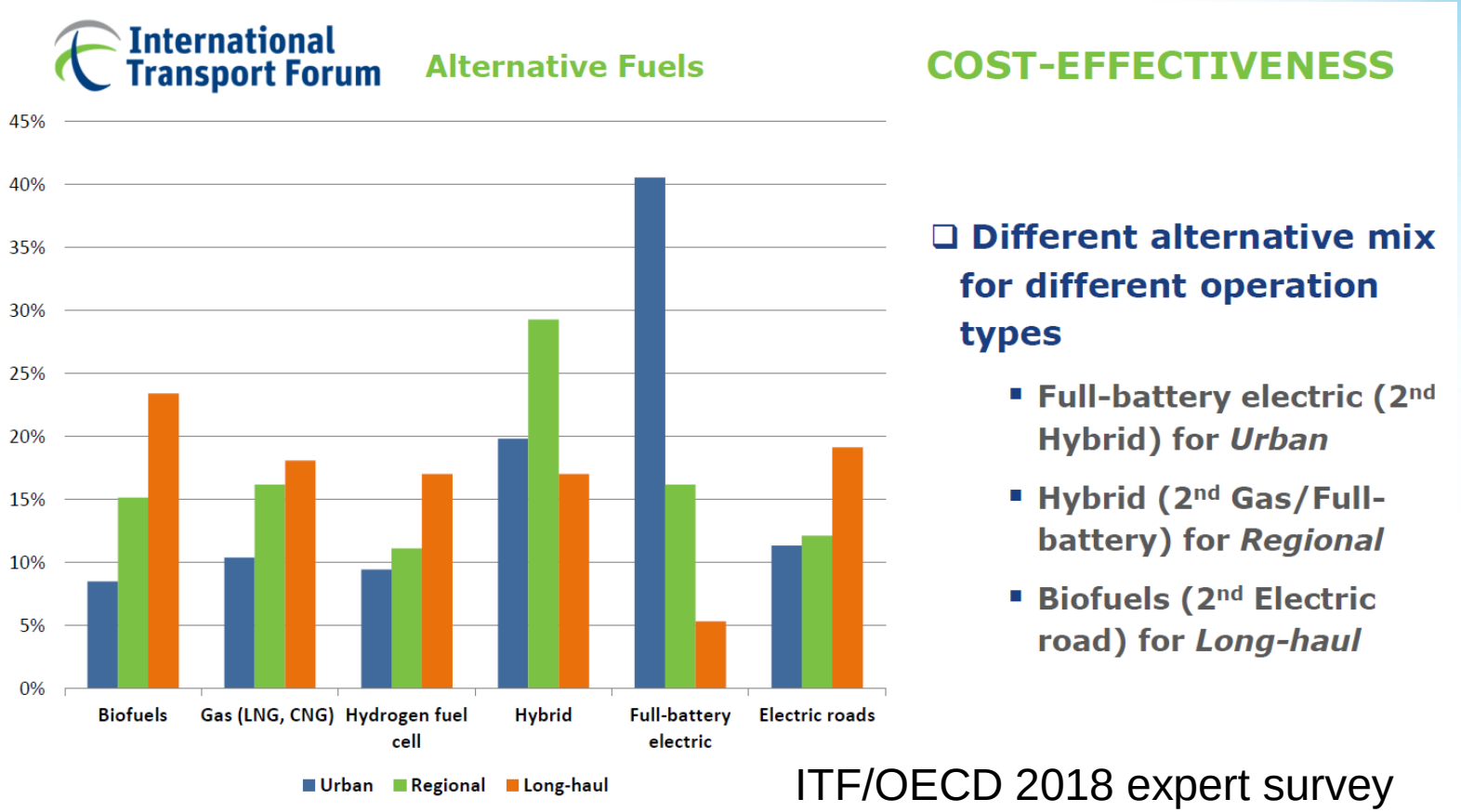


Land – Truck

Challenges

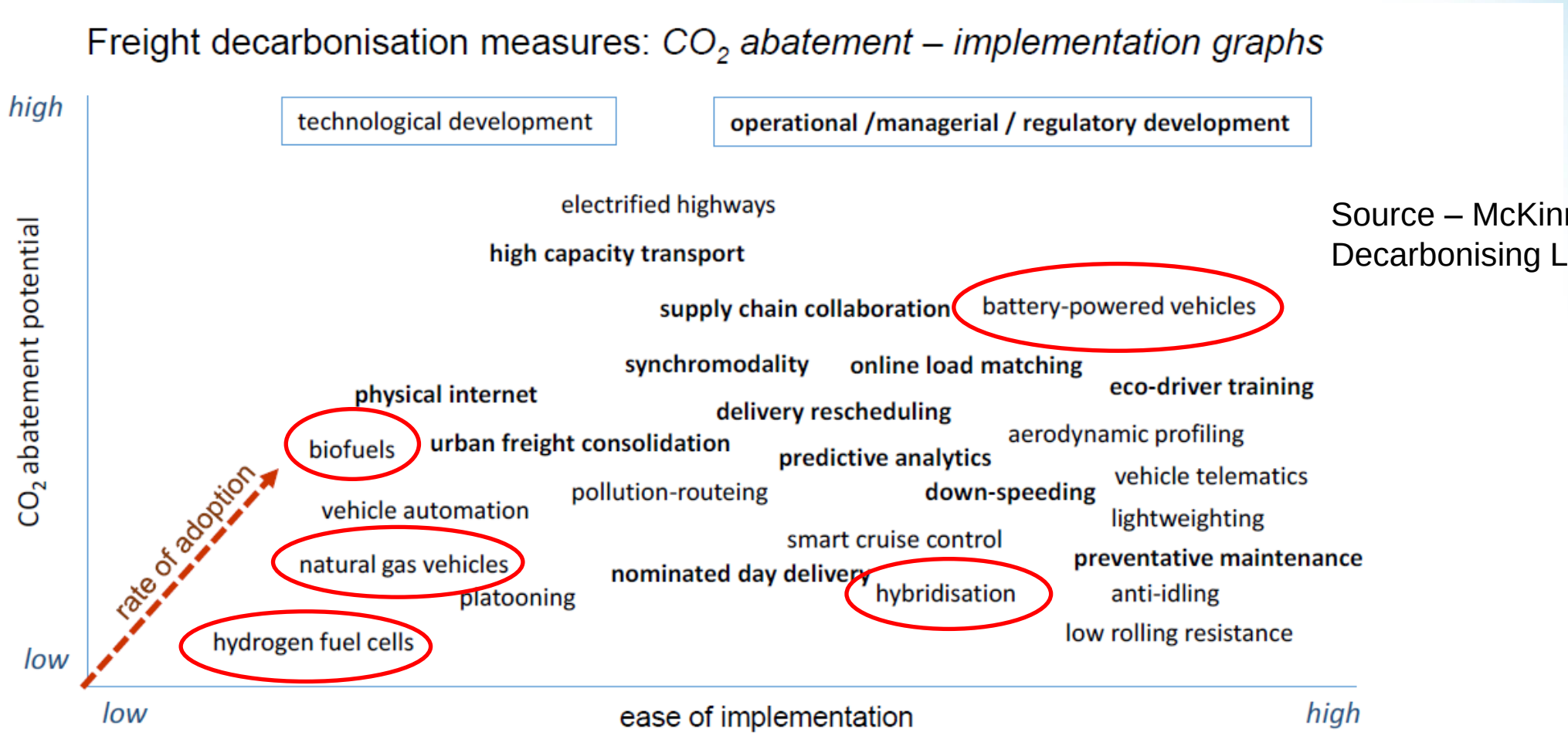
- 21% of transport related GHG emissions in EU is from heavy duty road transport
- 95% of road energy dependent on oil
- Activity in terms of tonne-km expected to grow by 26% from 2015 to 2030

Disagreement by experts on the most cost-effective pathway for trucks



ITF/OECD 2018 expert survey

Land – Truck



Source – McKinnon (2018) Decarbonising Logistics

Technology and energy supply bias: *under-estimation of the possible logistics management contribution*

- difficult to quantify potential carbon savings from logistics management options
- past experience discouraging: *trends in empty running, vehicle load factors and freight modal shift*

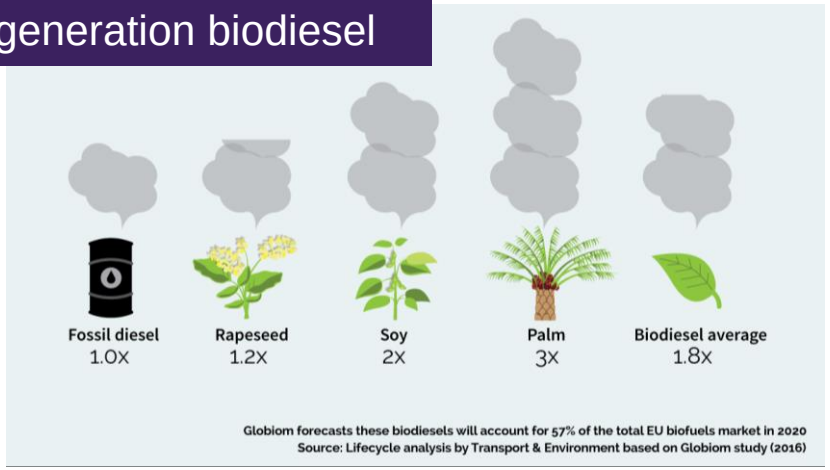
Land – Truck

Disagreement on whether Full Battery Electric or Hydrogen Fuel Cell Trucks will be viable

Biomethane
- Supply constraints
- Re-fuelling infrastructure
- Potential methane slip/leakage

Hybridisation/Range Extender combined with renewable fuels

Life cycle GHG emissions of 1st generation biodiesel



2nd generation biodiesel (HVO) is expected to grow significantly
- 5.5 billion litres in 2018
- 13 billion litres in 2024 but still only 10% of biofuel

Source- IEA

Advanced (biofuels from waste feedstocks such as waste fats, oil and grease (FOG)
- WTW GHG emissions very dependent on feedstock source and energy required to produce.

Land – Trains

- GHG emissions from rail is less 1% of total in EU
- In EU 30% of energy in rail dependent on oil
- Rail freight activity to grow by 45% from 2015 to 2030
- 7% of global freight moved on rails
- But in terms of tonne-km share is declining - moving less tonnes of coal ☺

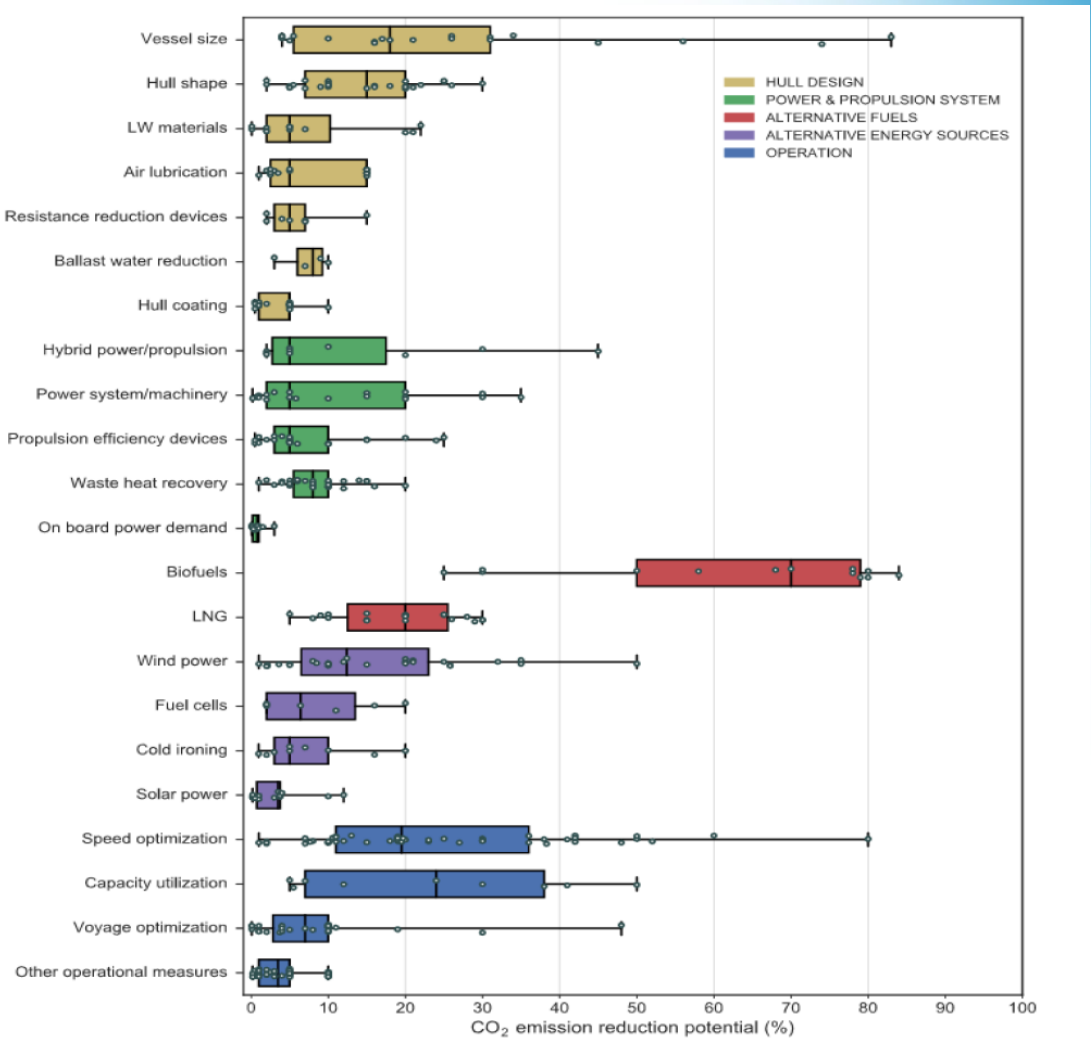
  Alternative options to electrification
  - ➢ Hydrogen fuel cell trains
  - ➢ Biofuels – biodiesel or bioLNG

Regional variations in electrified rail networks
- ➢ Europe 53%
- ➢ South Korea more than 80%
- ➢ North America less than 5%

Water – Boats

- Maritime freight activity predicted to grow by 21% from 2015 to 2030
- 13% of emissions in EU
- Relies on Heavy Fuel Oil which is both carbon intensive and highly polluting
- IMO aims to halve emissions by 2050
- “Slow Steaming” - 27% reduction in emissions by 10% reduction in speed
- Bigger boats – 50% more capacity increases fuel consumption by 33%

Alternative energy pathways
- ➢ Advanced biofuels
- ➢ Hydrogen fuel cells
- ➢ Ammonia
- ➢ Hybridisation with sustainable fuels



Source: Bouman (2017)[334]

Air – Planes

- Aviation accounts for 3% of GHG emissions in Europe
- GHG emissions from aviation increased by nearly 80% from 1990 to 2015
- Any energy and emissions efficiency gains outweighed by increase in activity
- Aviation energy almost entirely dependent on oil

- Drop in biofuels (Biojet or SAF) 2-4 times more expensive than standard fuel currently
- Would need 5 x current biofuel used in road
- Single biofuel product strategy versus diversified portfolio
- Long term biofuel purchase agreements
- Currently 15 million litres of SAF supplied in 2018 or 0.1% of total (Source IEA)

Passenger Planes
- Fair allocation of GHG emissions between passengers and freight

Freight Planes
- Load factors tend to be higher

ICAO - Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) starting in 2021

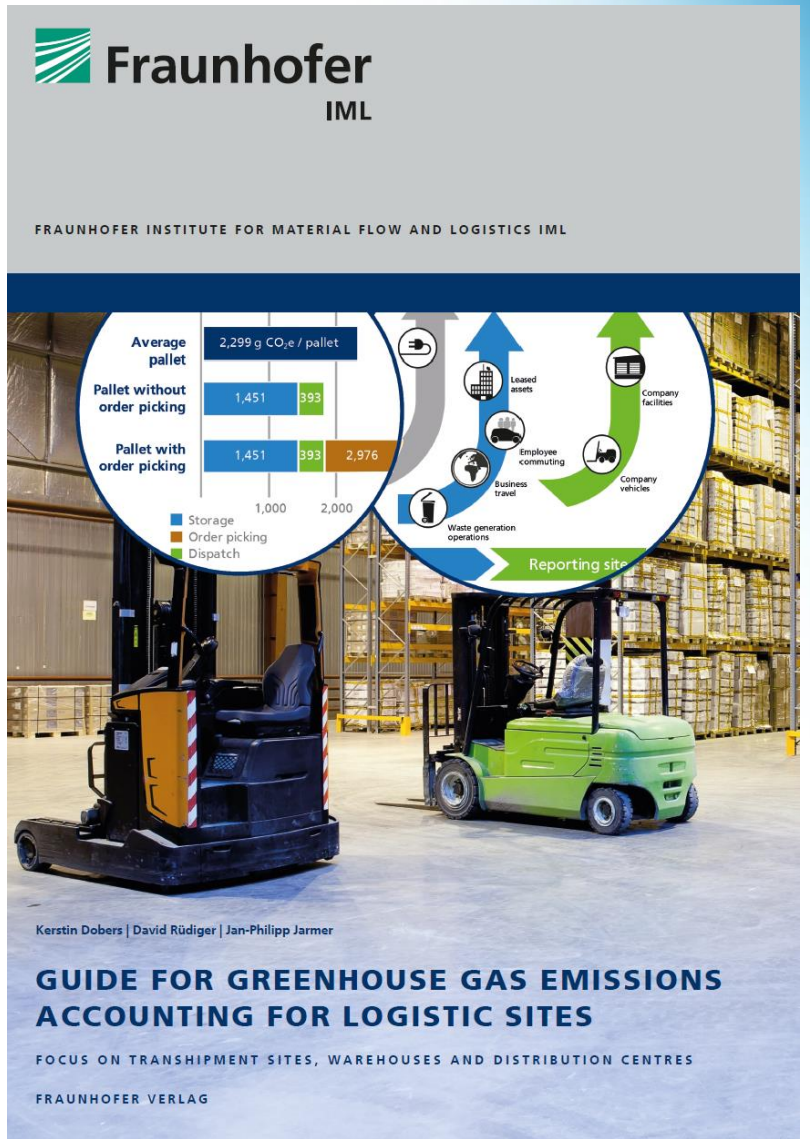
1,518 million kilograms of fuel in 250 planes in 2018 (Source DP DHL Sustainability Report)

Don’t forget Logistics Sites – Ports, Terminals, Warehouses

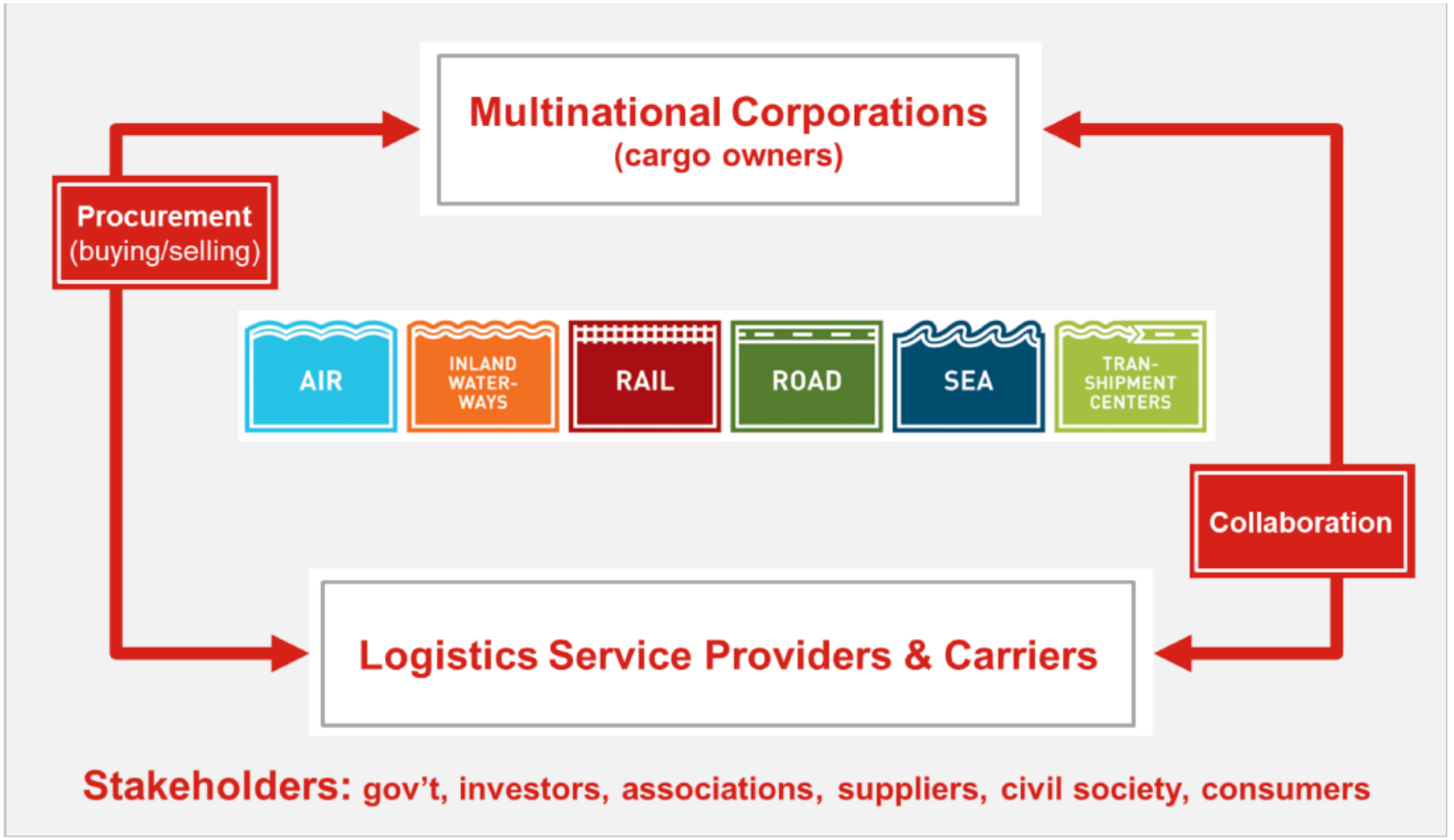
An output from the EC Horizon 2020 funded LEARN Project

LEARN
Logistics Emissions Accounting & Reduction Network

Source: GLEC Framework –sample transport chains



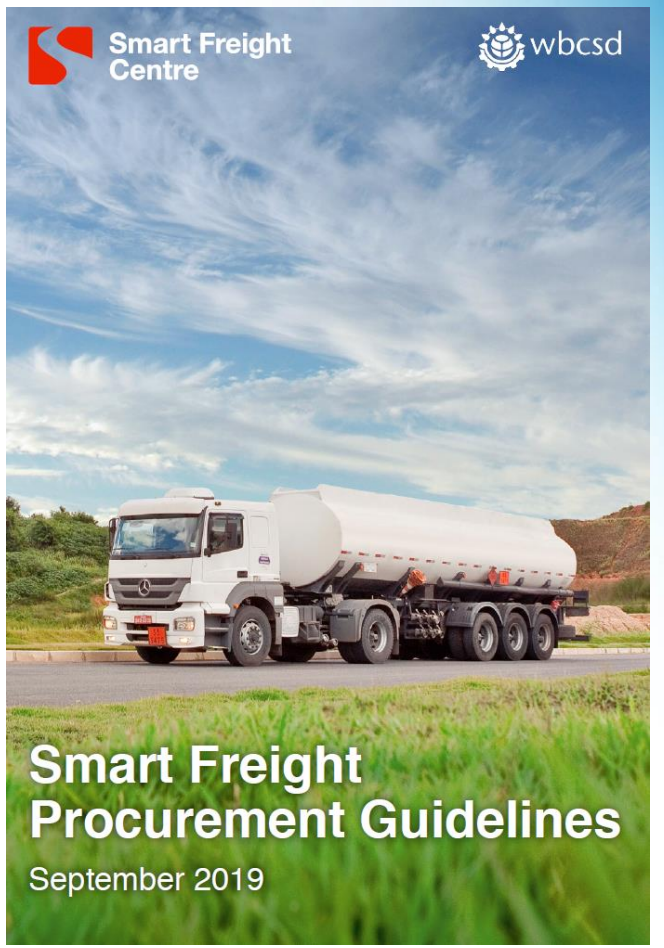
The role of the buyer and supplier relationship – sustainable procurement



Source – Sophie Punte, SFC LEARN International Workshop Feb 2019

The role of the buyer and supplier relationship – “smarter” procurement

- Price
  - Cost of service
- Service
  - On schedule
- Sustainability
  - Lower GHG and AQ impact



Source – Smart Freight Centre

Assurance – building trust in the partnership

1st party audits

self-declaration

2nd party

Supplier audits by the buyer

3rd party

Independent audits

INTERNATIONAL ACCREDITATION FORUM IAF

IFRS®

IASB

Reporting for investors moving to a broader stakeholder audience (ESG)

Environmental	Social	Governance
• Climate • Air pollution • Water • Waste/Circular economy	• Social impacts • Employees • Diversity • Equality	• Assurance • Audit

"Equally important is that the magnitude of the challenges facing the world - climate change, poverty, biodiversity loss - these are issues that we care deeply about. We've got less than 10 years to get this right - incremental change is not enough. We are prepared to spend serious money on this and if that means lower profits, so be it. Whatever it takes to get the job done,"- Stephen Badger, Chairman, Mars

CDP
DISCLOSURE INSIGHT ACTION

Dow Jones Sustainability Indexes

Alan Jope, the current Unilever chief executive, told the BBC that its focus on doing right by society and the environment was not out of fear of nationalisation, taxation or regulation, but out of fear that its products would be shunned by a new generation of consumers unless they got this stuff right.

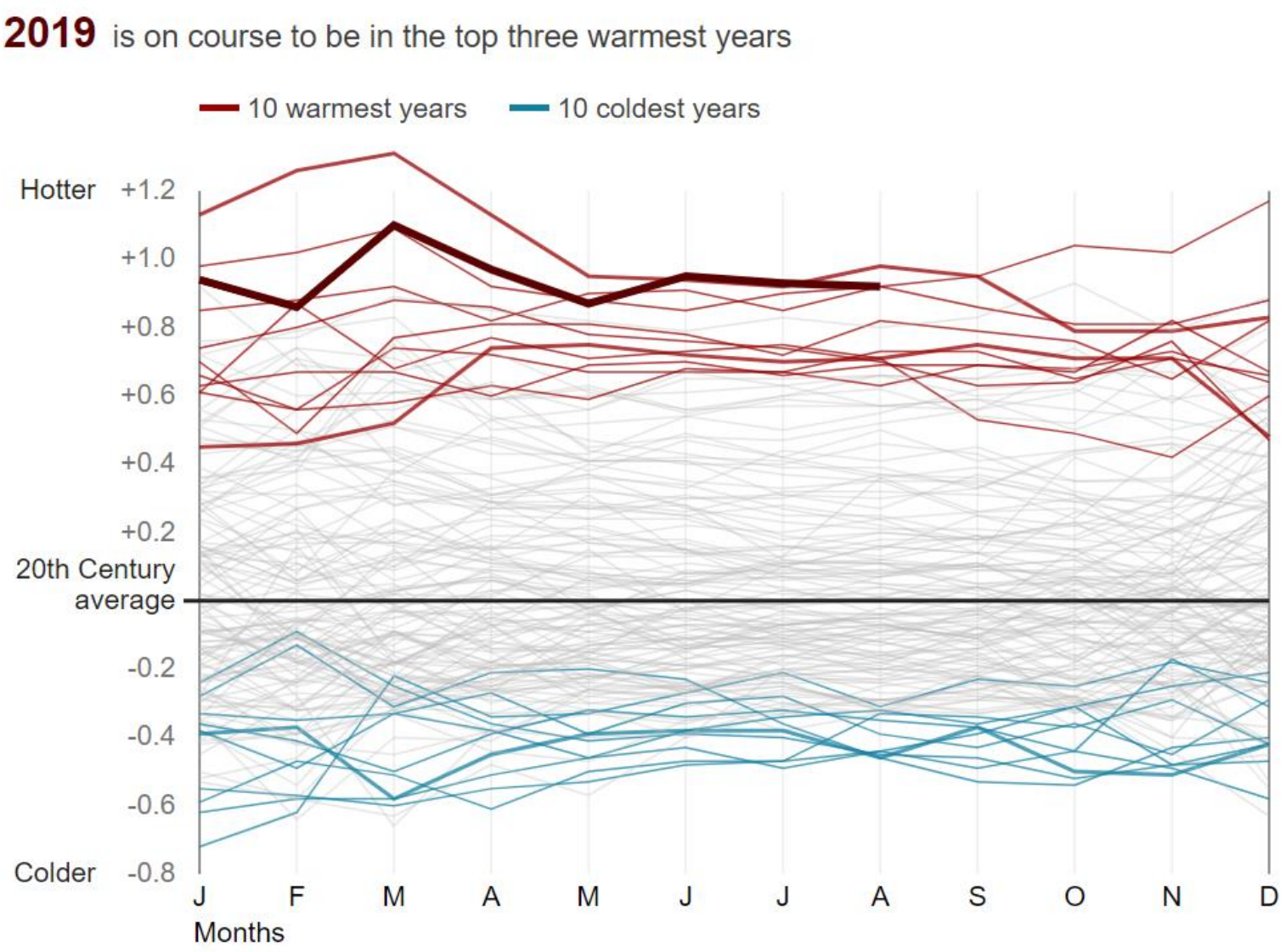
Thank you for your attention

Colin Smith
Programme Manager, Transport,
Energy Saving Trust
colin.smith@est.org.uk

Getting the measure of GHG emissions from transport - land, air and water

Back up slides

The Climate Challenge



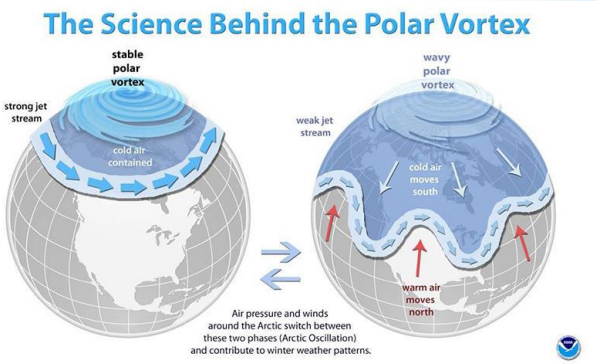
20 warmest years on record occurred in the last 22 years

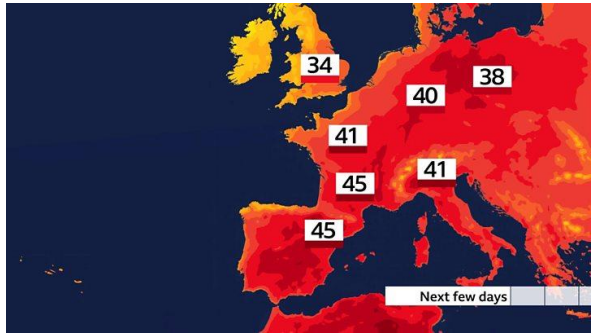
The top 4 years being 2015 - 2018

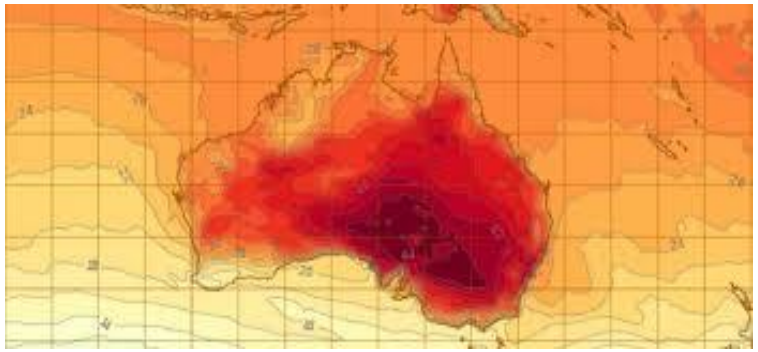
…..with 2019 on course to go straight in to the top 3

Source NOAA and BBC

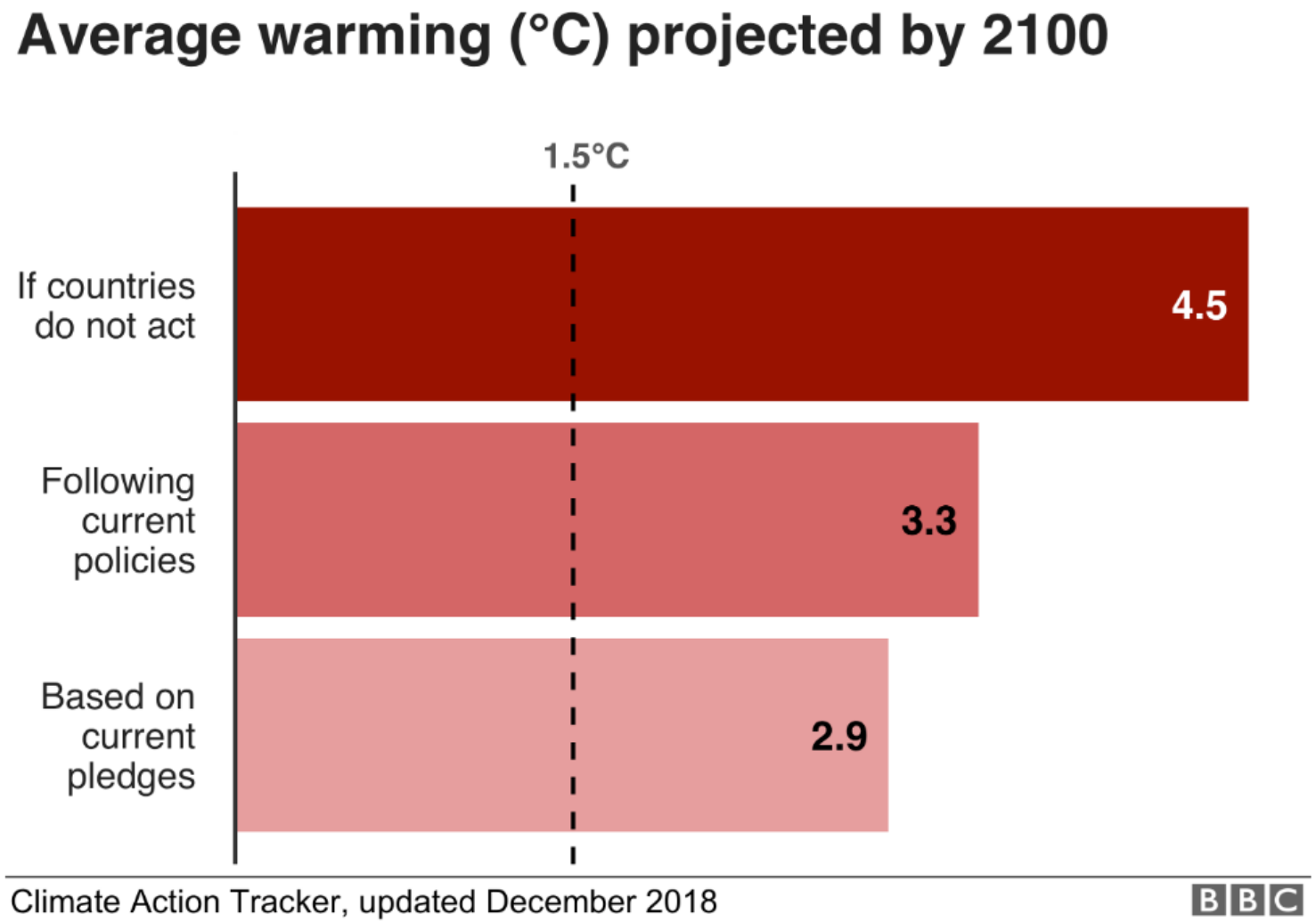
Extreme weather events





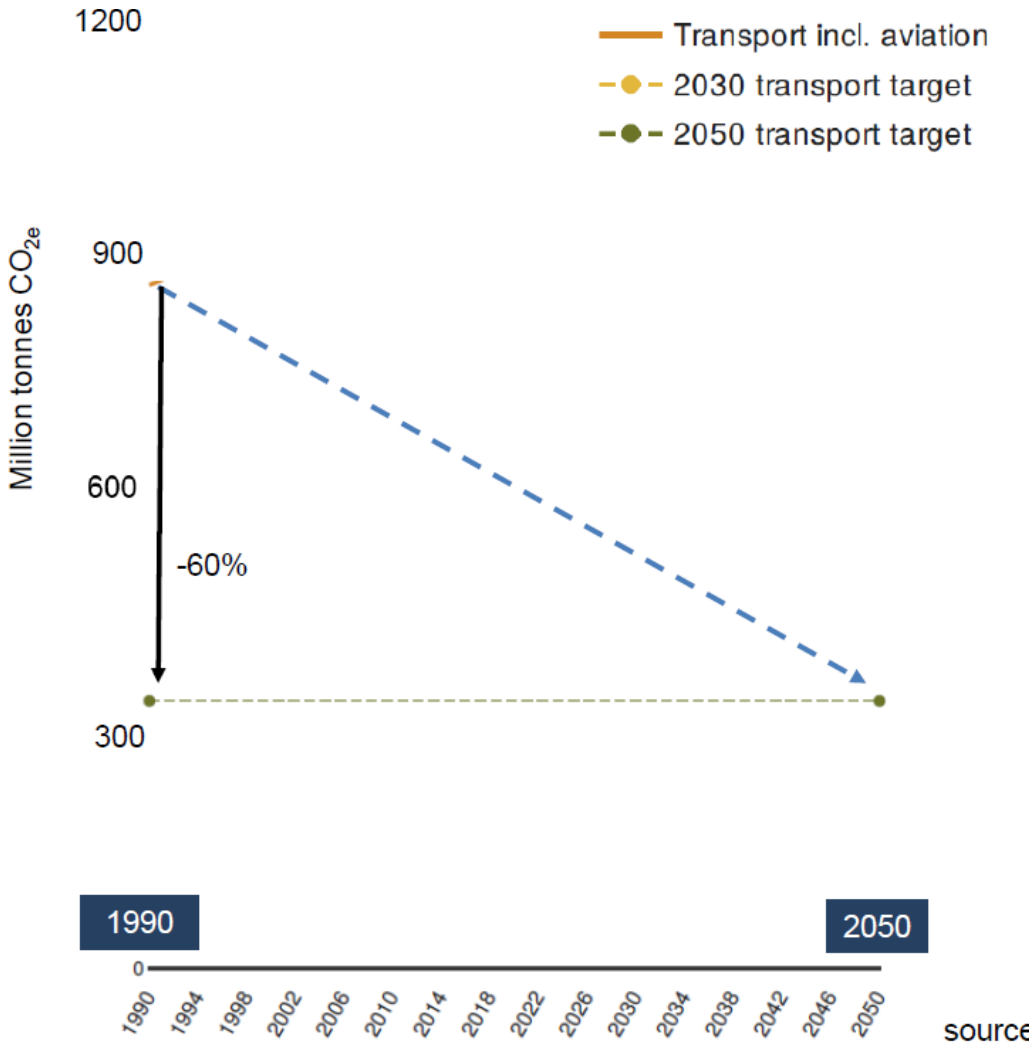


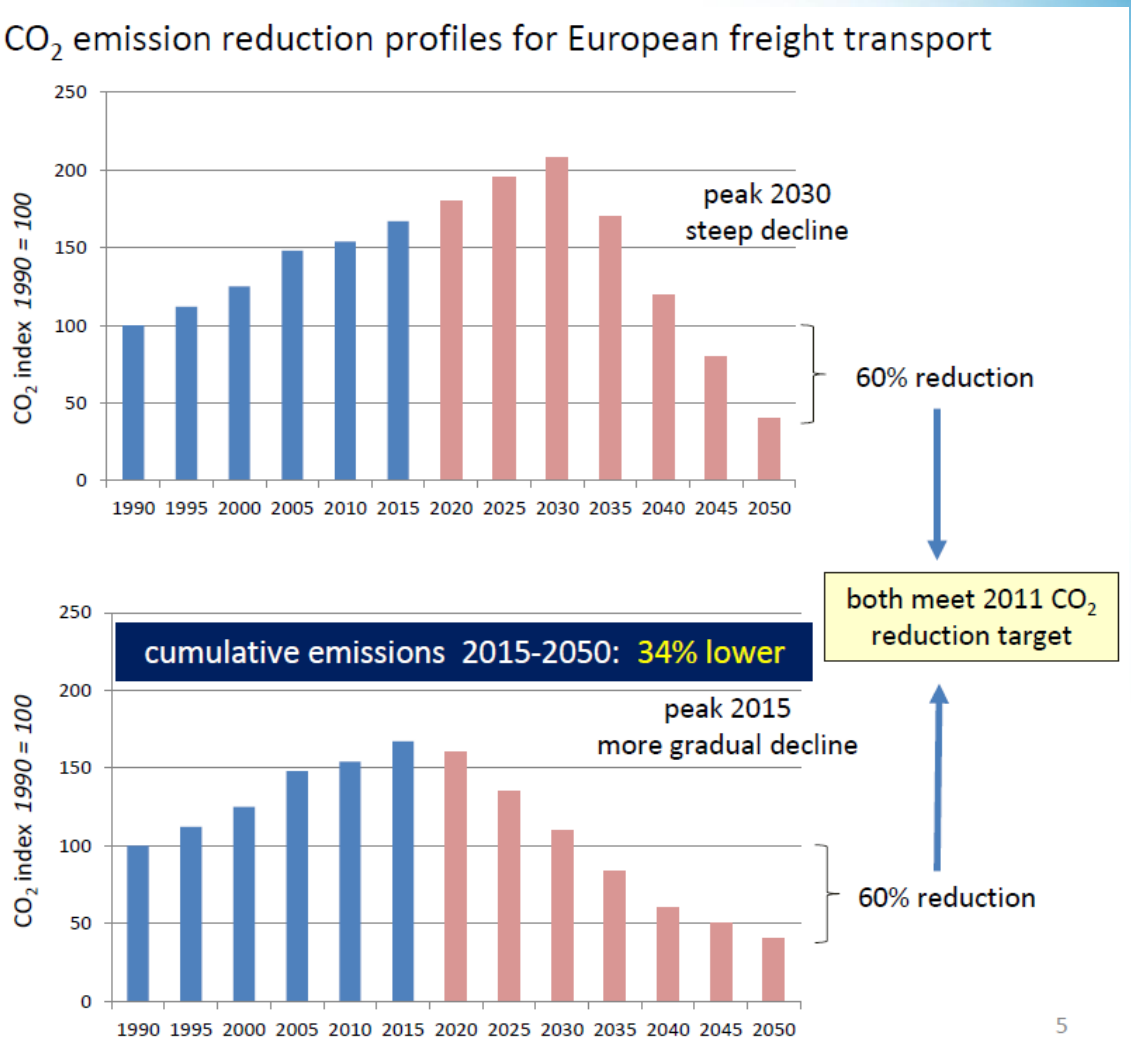
The Climate Challenge



Need to cut CO_2 emissions globally by 50% 2030 and end them by 2050 - IPCC

What needs to happen…..





Sources: IEA and McKinnon

No shortage of schemes, associations, programmes or tools

Source: Sophie Punte Smart Freight Centre