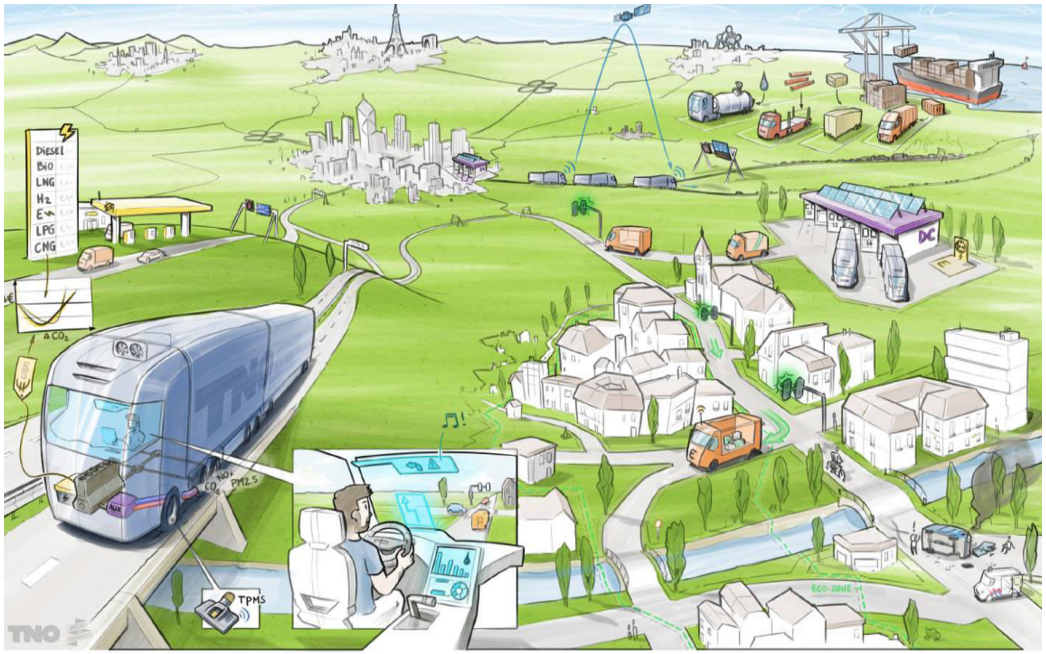
IMPLEMENTING CARBON FOOTPRINTING AND ACCOUNTANCY IN INDUSTRY LOGISTICS OPERATIONS



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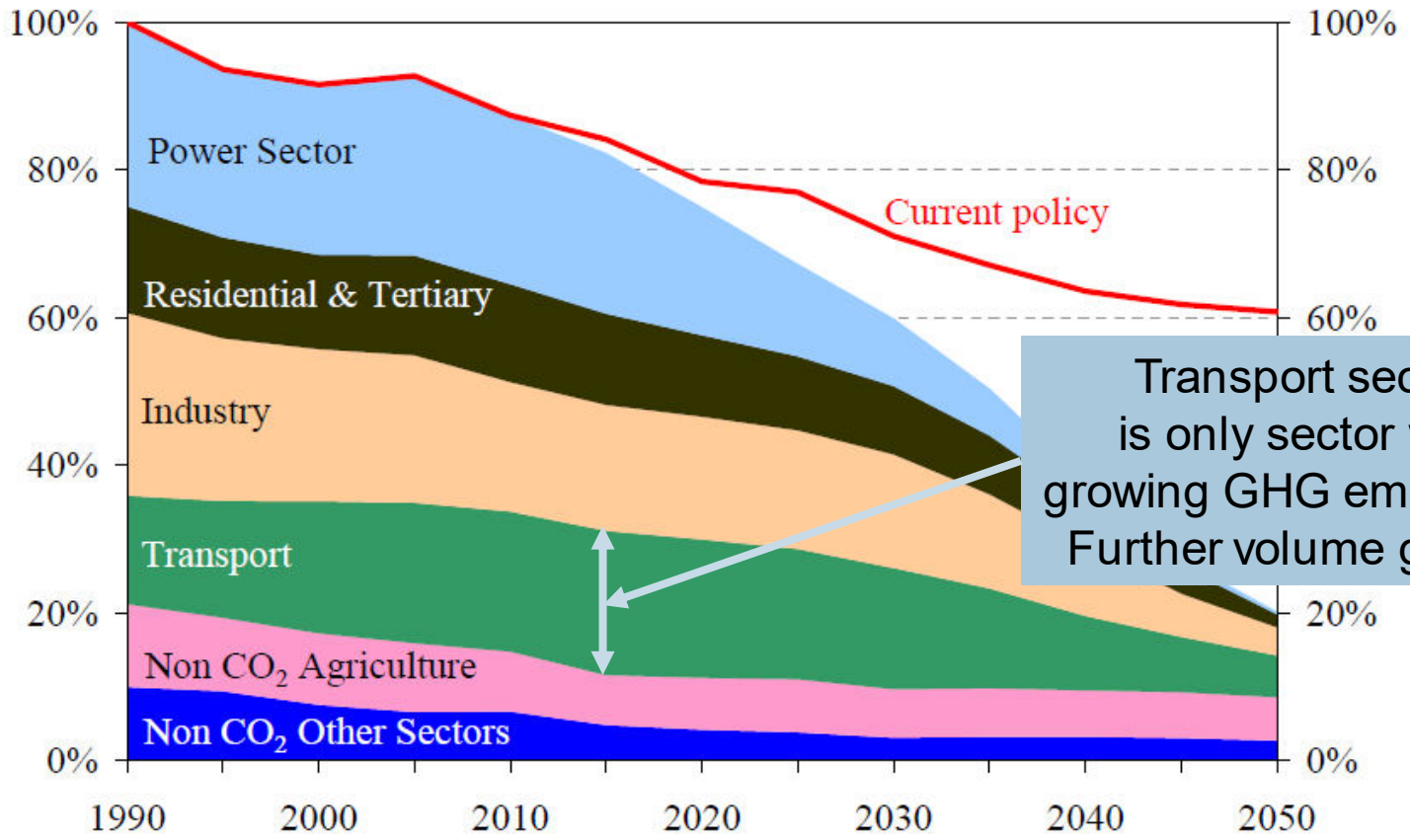
OVERALL CLIMATE GOAL EU: -80% (to 95%) in 2050 relative to 1990

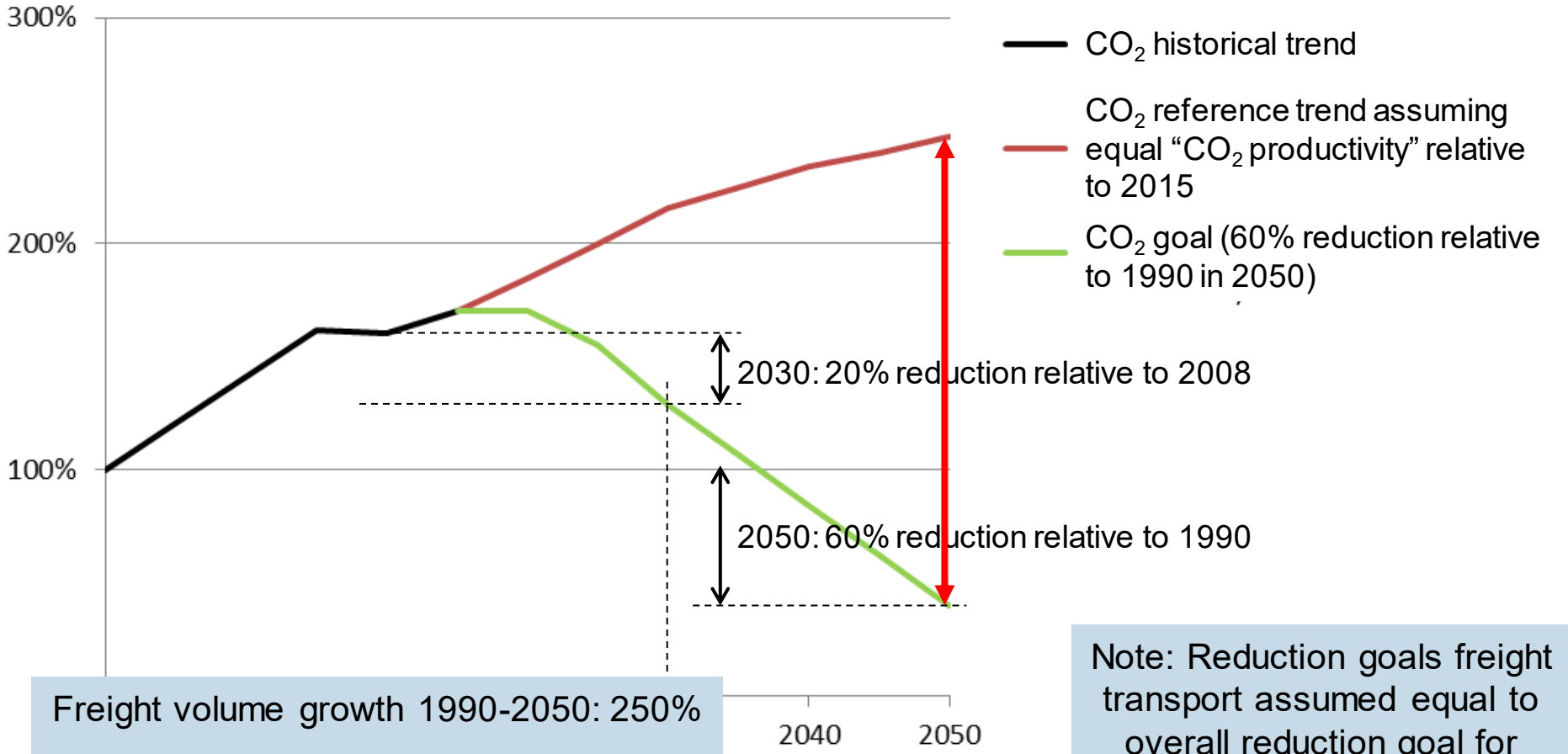
Figure 1: EU GHG emissions towards an 80% domestic reduction (100% =1990)



Source: Roadmap for moving to a competitive low-carbon economy in 2050

Reduction goal Paris: Freight transport

CO_2-emissions freight transport in EU



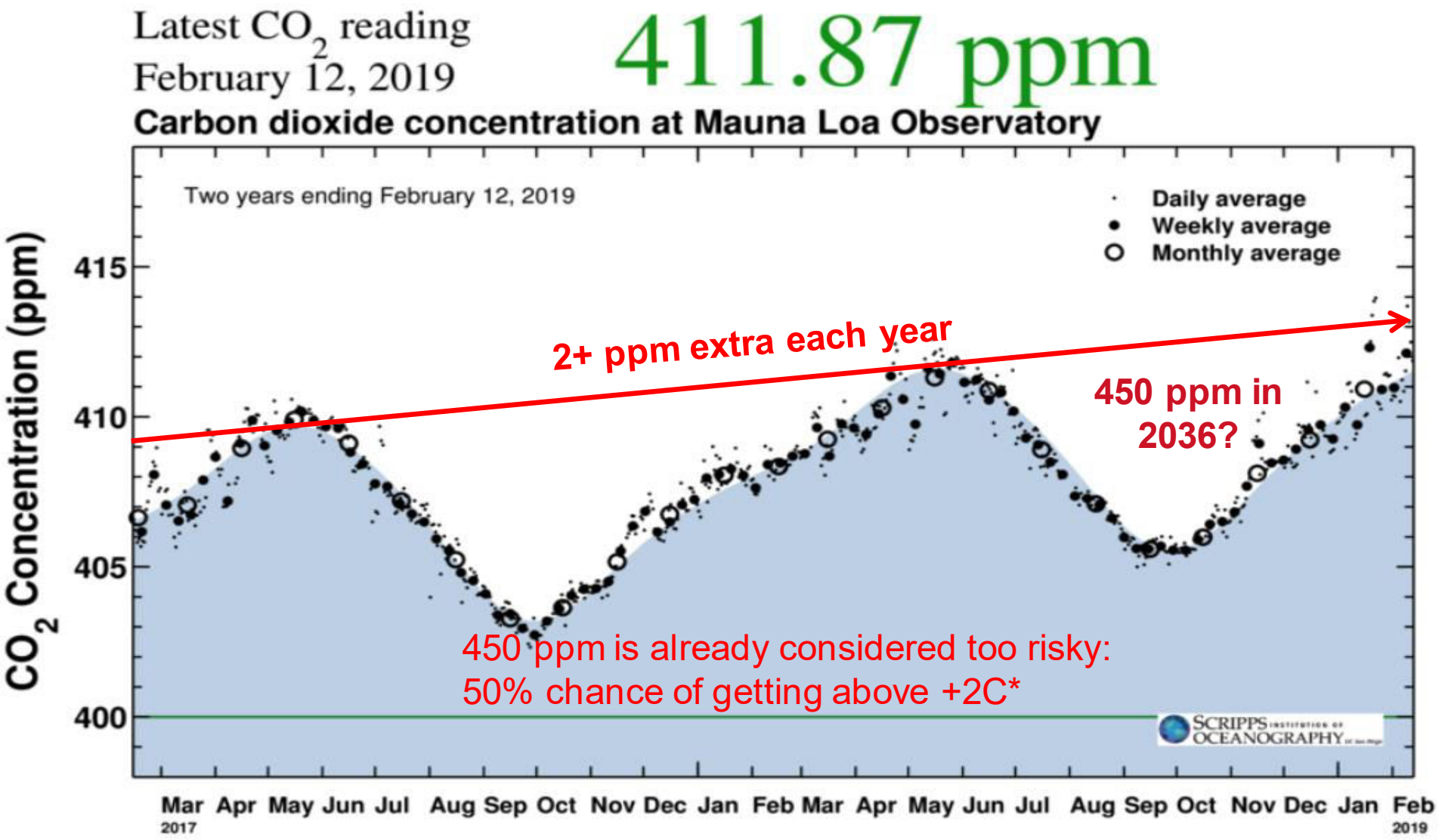
Freight volume growth 1990-2050: 250%

Reduction of absolute emissions: 60%
➔Per ton-kilometre transported:
FACTOR 6!

Trends to 2050",

Note: Reduction goals freight transport assumed equal to overall reduction goal for transport sector in EU Whitepaper (2011)

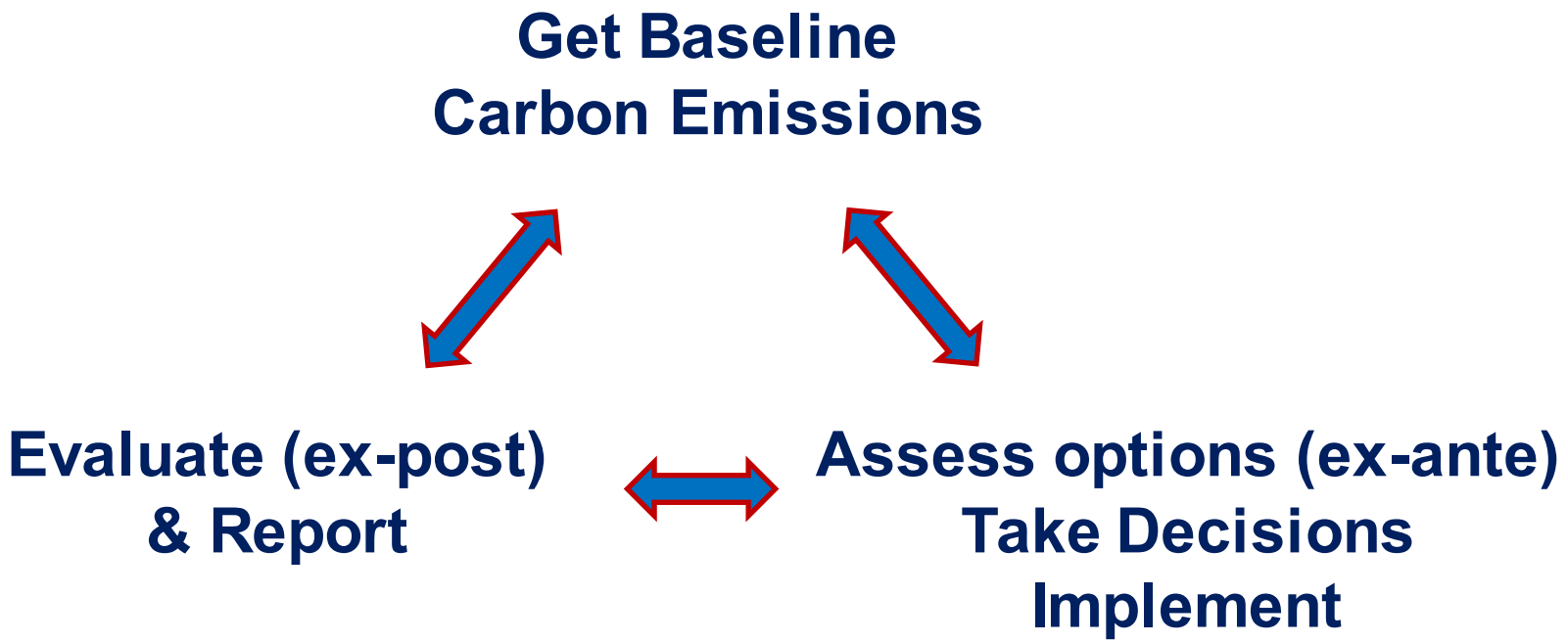
THE URGENCY



*The AR5 Working Group III provided the most viable scenario to achieve the goal of keeping the global temperature rise until 2100 within 2 °C compared with the pre-industrial level: to limit the greenhouse gas concentration to 450 ppm CO_2e (the shorthand for carbon dioxide equivalents).

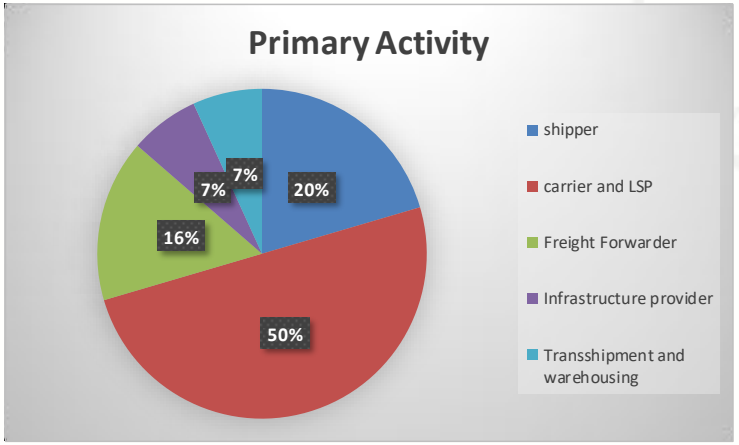
CARBON FOOTPRINTING AS A TOOL FOR EMISSION REDUCTIONS

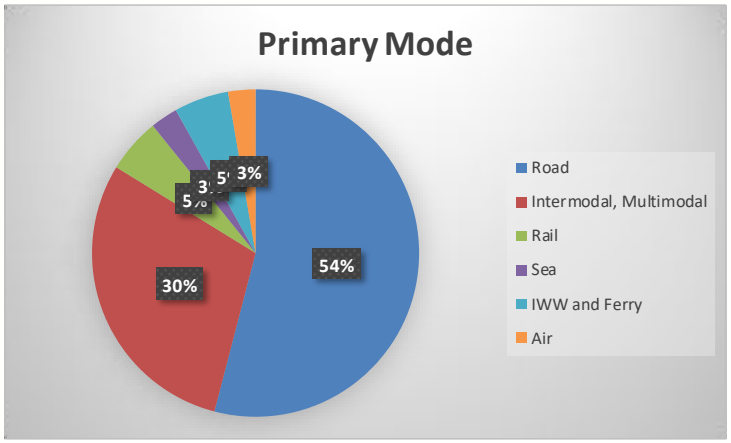
- **Carbon footprint** is the total set of greenhouse gas emissions caused by an individual, event, organization, or product, expressed as carbon dioxide equivalent

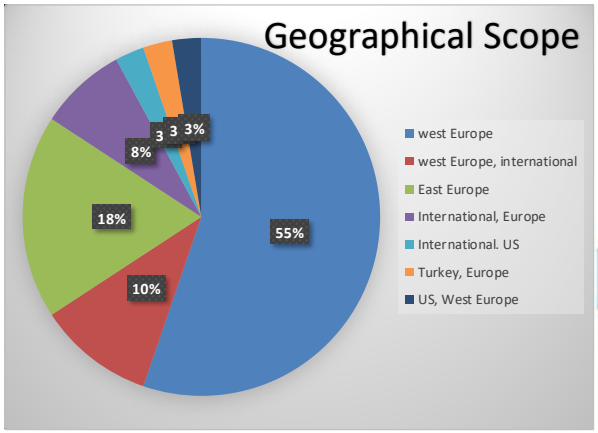


LEARN TEST CASES:

- 38 organizations are LEARN testbed partners
- 32 test cases have been completed
  - All modalities
  - All types of primary activity
  - Various company sizes
  - Diverse geographic coverage, EU + world







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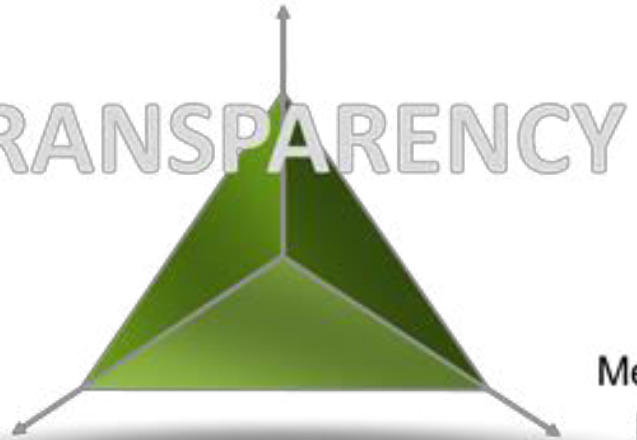
Logistics Emissions Accounting & Reduction Network

MAIN LESSON: COMPUTING CO2 EMISSIONS IS A BALANCING ACT

Simplicity
Methodology needs to be easy to understand and use

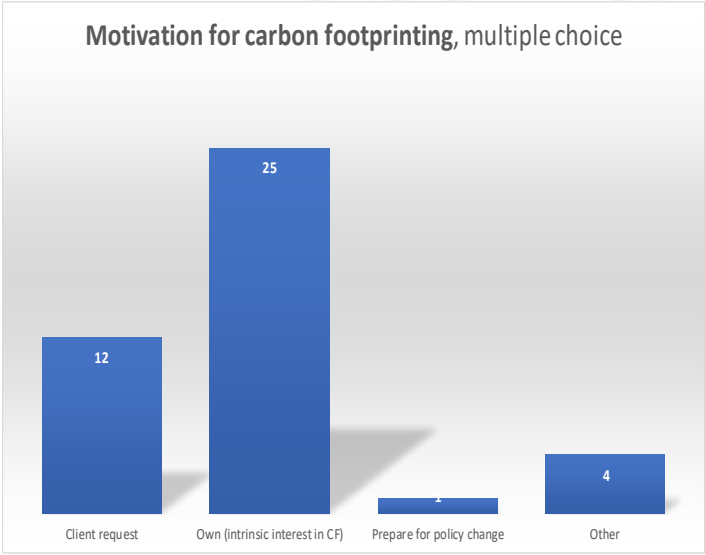


Accuracy
Methodology needs to take all emission into account, fair allocation, changes should become visible in data

Flexibility
Methodology needs to be practically applicable (various companies, business models and modes of transport)

SPEAR POINTS

- **Users of transport and logistics (Shippers and Freight Forwarders)**
  - Corporate social responsibility: specific targets, specific executives
  - Reliance on emission factors does not reflect green efforts
  - Transparency over carbon footprint of a product and organization
  - Getting impact: Ex-ante & Ex-post assessment of the options
  - Getting carbon footprint & accountancy in SLA tendering process



- **Carriers and LSPs**
  - Satisfaction of customer requests
  - Getting ahead of competition with provision of CF data
  - Anticipation of regulatory framework
  - Getting insight in own performance, CO2 and network cost reductions, KPIs
  - Corporate sustainability strategy
  - Getting recognition for green efforts
  - Expectation of better environmental performance than competition

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Challenges to Standardizing Emissions Calculation of Logistics Hubs as Basis for Decarbonizing Transport Chains on a Global Scale

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Fraunhofer-Institute for Material Flow and Logistics

with Uwe Clausen & David Rüdiger

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German Aerospace Center (DLR)
Institute for Transport Research

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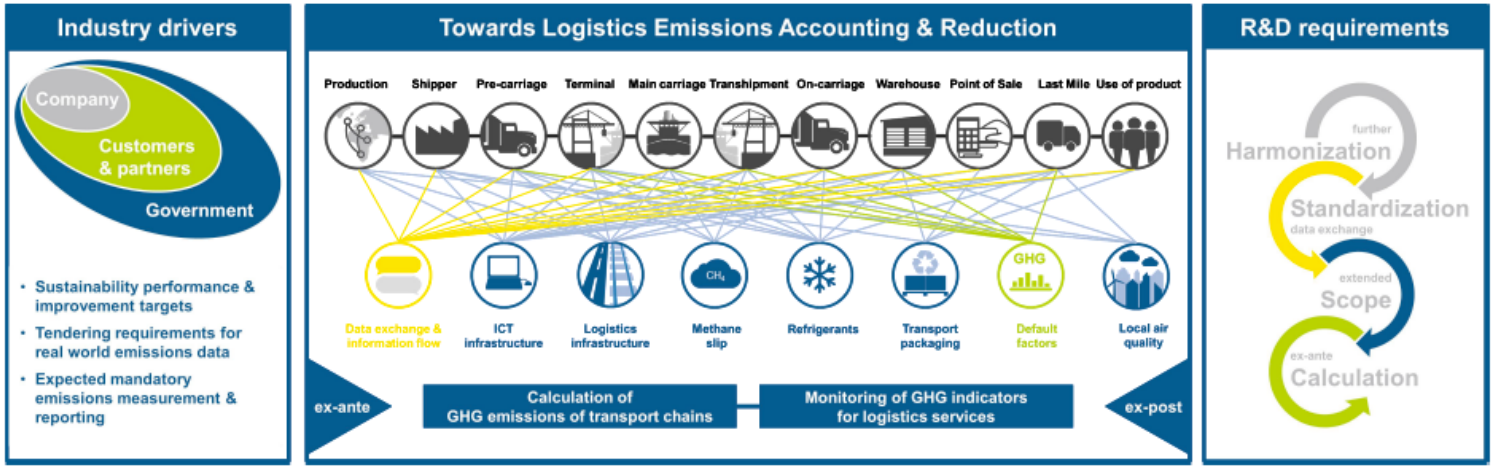
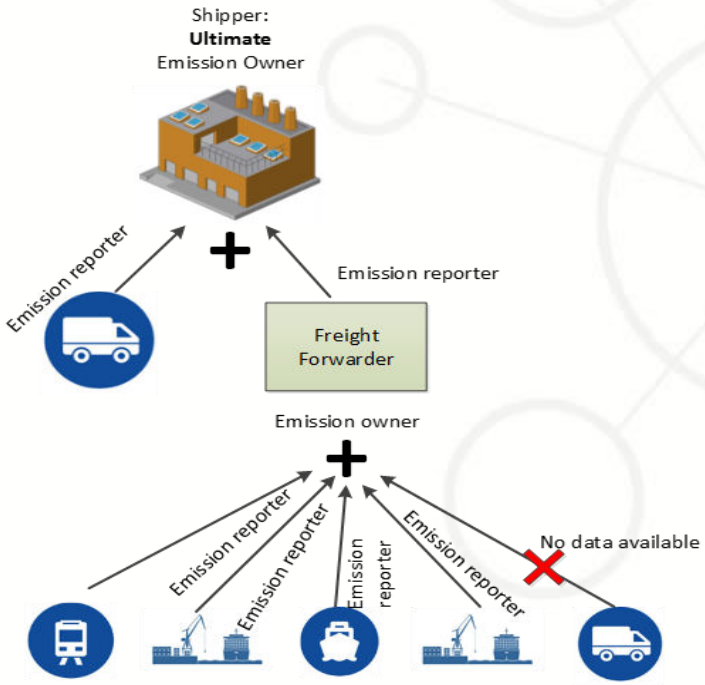
Identification of gaps: industry drivers & research & development requirements to logistics emissions standardization efforts



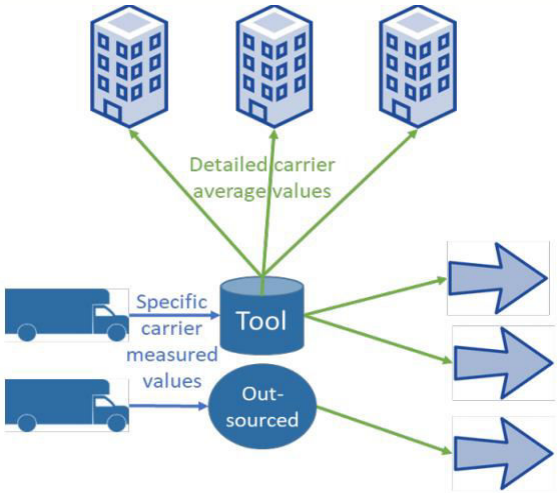
Support global standardization of carbon footprint of transport operations!
- Requirements & guidelines for quantification & ISO norm -

RESEARCH NEEDED ON EMISSION DATA EXCHANGE

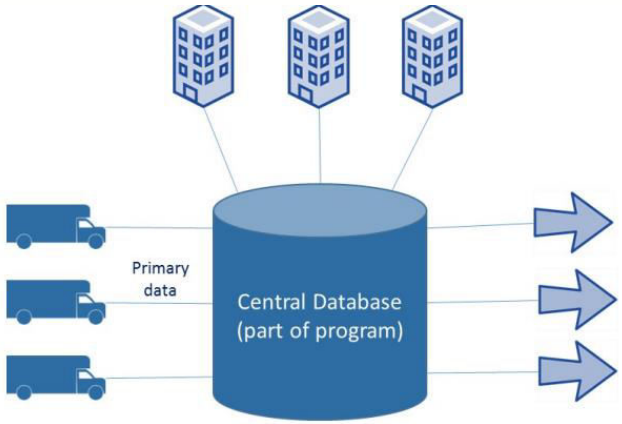
- Large shippers want emission exchange platform
  - Avoid data gathering from hundreds LSPs
  - One link to a platform
  - LSPs data are not shared
- Large LSPs
  - Avoid data sharing with hundreds cargo owners
  - Computation complexity is hidden in a platform
  - Need guaranties for data non-disclosure



Davydenko et. al. (2014)



Lewis et. al. (2017)



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GLEC Declaration on Logistics GHG Emissions

BUSINESS TO BUSINESS REPORTING
at service level to customers

Minimum:
- GHG total (based on WTW, CO_2e, Scope 1, 2, 3)
- GHG per tonne-km
- Tonne-km
- Reporting year
- Breakdown by modes and logistics sites and pre- and on-carriage
- Input data source by mode

Negotiable:
- Multi-years, other time periods
- Breakdown by shipment level, trade lane, business unit, geography, product, other
- Breakdown by WTW and TTW

PUBLIC REPORTING
at company level in to public, government, investors, programs

Minimum:
- GHG total (based on WTW, CO_2e, Scope 1, 2, 3)
- GHG per unit of production (shipper)
- Reporting year
- Breakdown by scope 1, 2 and 3
- Breakdown by modes and logistics sites
- Percentage logistics supply chain coverage
- Disclose if input data was independently verified

Smart Freight Leadership:
- GHG per tonne-km for each mode (LSP/carrier)
- GHG per tonne-km (shipper)
- Breakdown WTW and TTW global level
- Past years (at least 1)
- Breakdown by business units
- Input data sources for each mode
- Input data was independently verified

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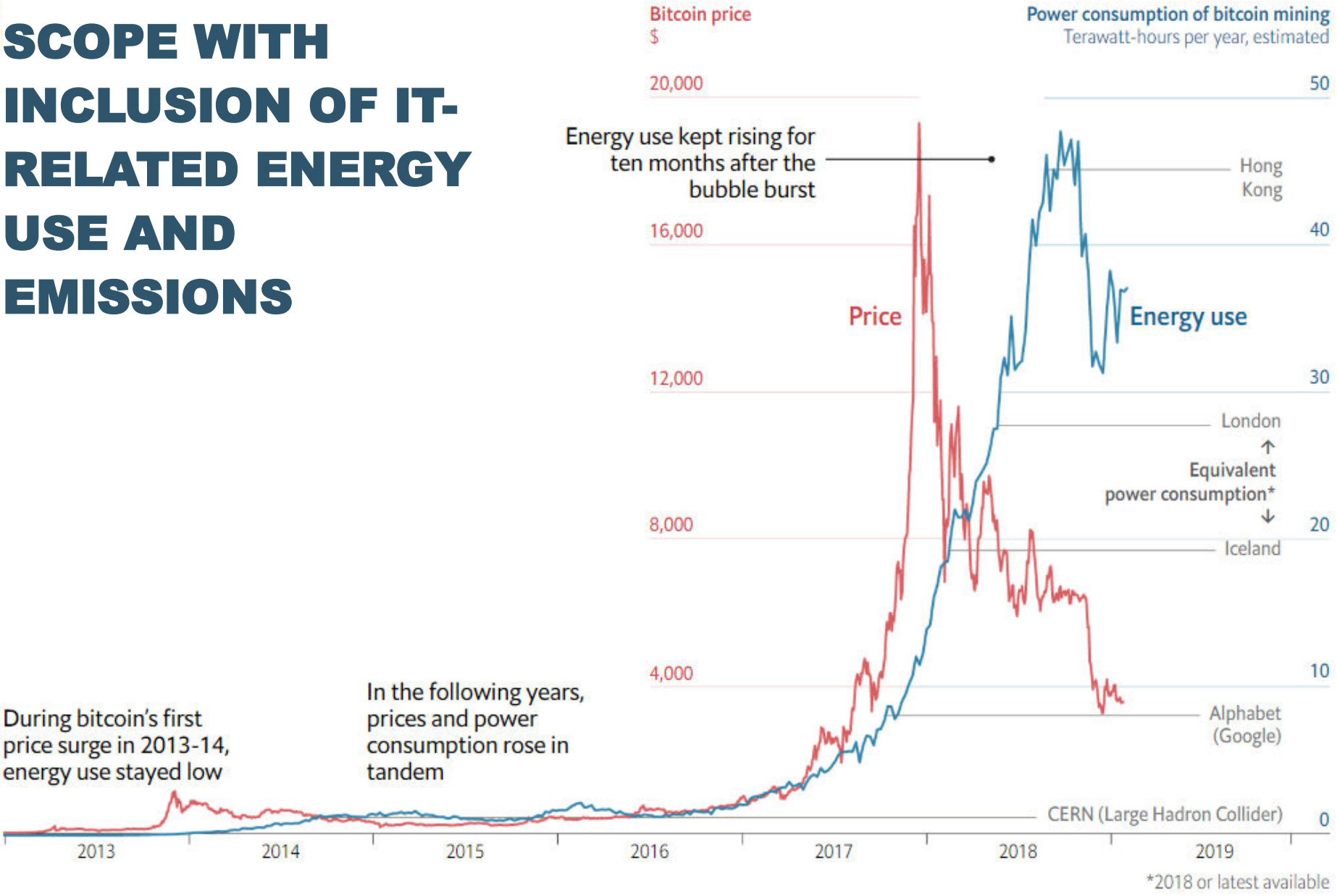
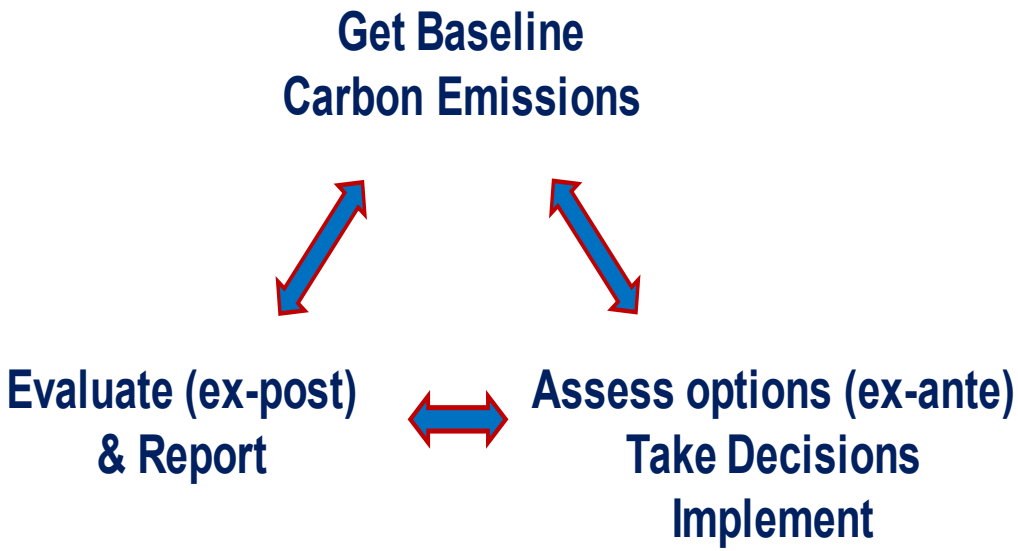
EXTENSION OF SCOPE WITH INCLUSION OF IT-RELATED ENERGY USE AND EMISSIONS



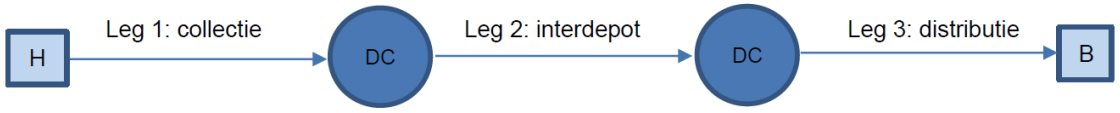
Source: the Economist, 2019

HOW IT (SHOULD) WORK

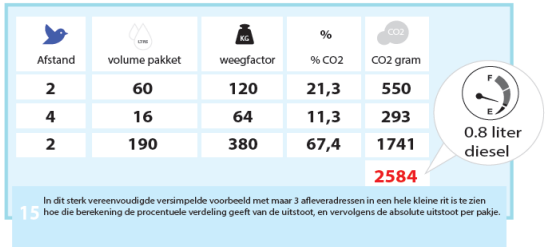
- **Two main levels** where CF contributes to sustainability
  - **Design of supply or transport chain**
  - **Choice of transport service provider**
- Supply & transport chain design has a potential for very substantial emission reductions
- Service providers compute their footprint and innovate, invest to reduce emissions



CARBON FOOTPRINT OF E-COMMERCE



- Aggregate network
- Transport data (PC4, weight / volume package)
- Fuel data and transport act. data



- Same Day
- Evening Delivery
- Next Day

- Follow up research on consumer choices: is it better to go to the high street or order online?

OUTLOOK FOR DECARBONIZATION

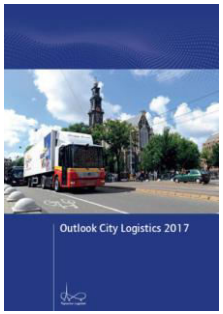
Dry bulk

Perishables

Liquid bulk

Non-perishables

Semi-finished

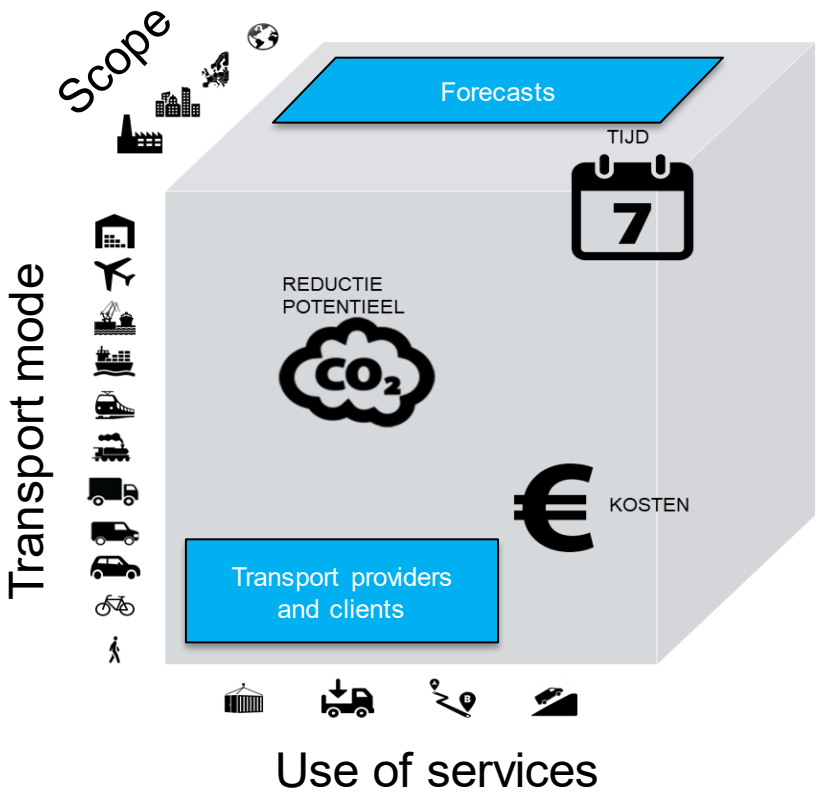


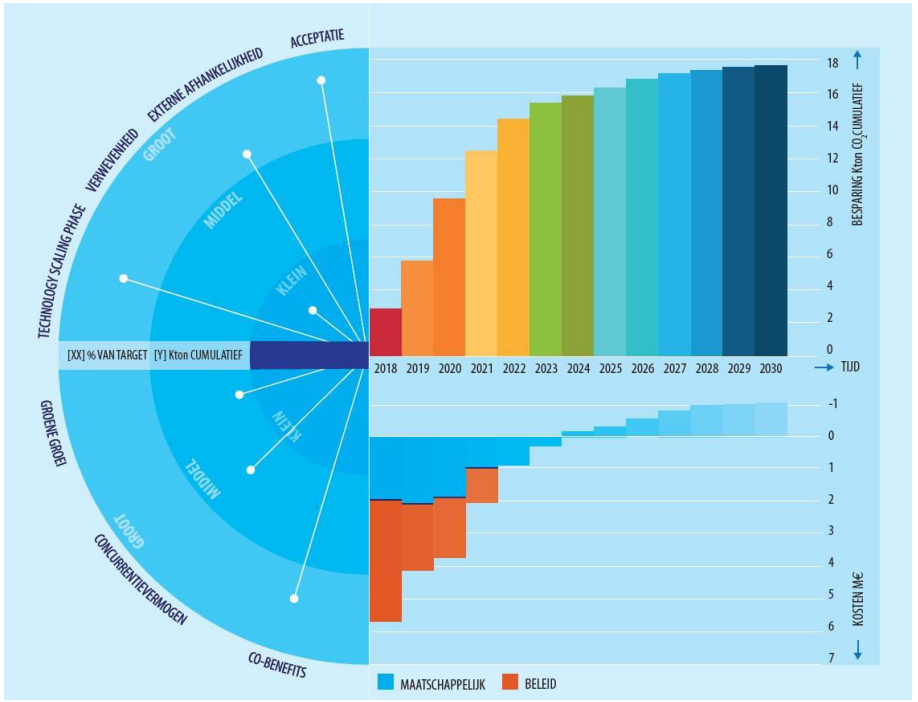
- General cargo
  Large retail, partial deliveries and home deliveries (big)
- Temperature controlled logistics
  Large retail, wholesale, small specialist and home delivery groceries
- Parcel and express
  B2C and B2B
- Facility logistics
  Services and goods deliveries to public and commercial buildings
- Construction logistics
  Infrastructure, buildings (preparation, structure, fit-out) for large construction companies, SME/Self-employed, building materials supply
- Waste collection
  Households (collectively organised) and businesses (individually organized)

http://publications.tno.nl/publication/34623970/3BRqOC/boer-2017-outlook.pdf

https://topsectorlogistiek.nl/download-outlook-hcf/

DECAMOD MODEL





- Effectiveness of measures short term and long term (2050)
- “Easy mode” and complex mode
- Cost-benefit indices (investments and ROI)
- Actuality and relevance

CARBON FOOTPRINTING AND ACCOUNTANCY

DECARBONISATION OF TRANSPORT AND LOGISTICS

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