

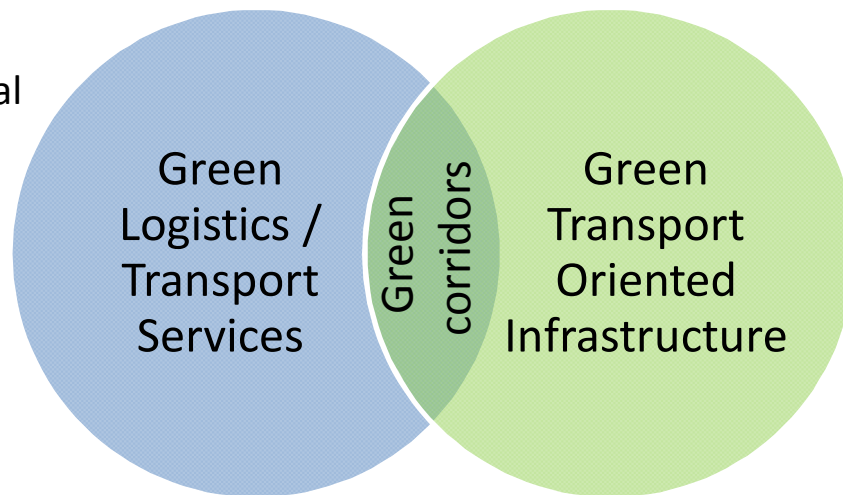
How to assess eco-efficiency of Green Corridors (1)

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EU GREEN CORRIDORS CONFERENCE
TOWARDS CLIMATE NEUTRAL FREIGHT TRANSPORT
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The ecological and economic added value of a Green Corridor is generated by its ability to bring different public private stakeholders together to develop joint problem understandings, common goals and policy objectives and to develop and implement new eco-efficient solutions in the benefit of all stakeholders and society

- “ Supply chain network design and management
- “ Vertical and horizontal collaboration
- “ Operations
- “ Technology / energy
- “ Behaviour /culture



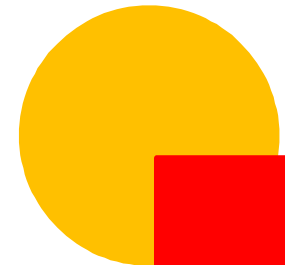
- “ Physical infrastructure
- “ Regulations
- “ Multi modal consolidation points
- “ Traffic management
- “ Intelligent Transport systems
- “ Customs
- “ ...

According to the WBCSD definition, eco-efficiency is achieved through the delivery of "competitively priced goods and services that satisfy human needs and bring quality of life while progressively reducing environmental impacts of goods and resource intensity throughout the entire life-cycle to a level **at least in line with the Earth's estimated carrying capacity.**"

EU goal: global average temperature should not increase by more than maximum 2°C ≈ CO₂ at 350 – 400 ppm

Components of eco-efficiency:

- “ Prosperity (growth)
- “ **Energy and ecological intensity** (efficiency)
- “ **Vulnerability** to system failures
- “ Caps



Energy and ecological intensity (efficiency)

- “ Greenhouse gas emissions, air pollutants (NO_x, SO₂, PM10), noise, land use, ...
- “ GHG Emissions (and SO₂)

$$\text{Total Emissions} = \text{Output} * \frac{\text{Energy}}{\text{Output}} * \frac{\text{Emissions}}{\text{Energy}}$$

↓
(mass or volume, distance, speed)

- “ Green corridors can improve each of these factors
- “ Green corridors can improve eco-efficiency on the supply side but also on the demand side (transport and speed avoidance and transport reductions measures)



Vulnerability / Resilience

- “ System failures are events such as climate change, disasters (Amoco Cadiz), terrorist actions, accidents, theft, traffic jams(?), waiting hours(?), ...
- “ Systems can be very efficient and vulnerable at the same time
- “ Probability of failure x impact of failure (damage)
- “ Failure avoidance
- “ Damage avoidance
- “ Damage control and recovery
- “ Need for a vulnerability index or indicators?

Increase in vulnerability as our transport systems become more and more complex and tightly coupled systems

Proportionality, the whole is equal to the sum of its parts, demonstrability of causes & effects

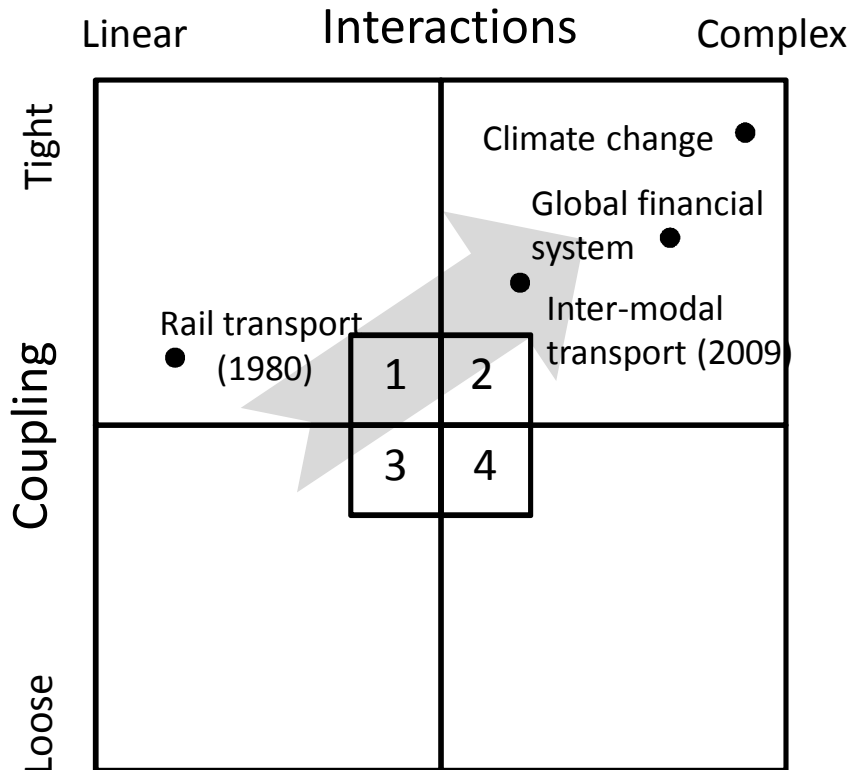
Perrow's Authority Rules

Complex but loosely coupled systems are best **decentralized** (4)

Linear and tightly coupled systems are best **centralized** (1)

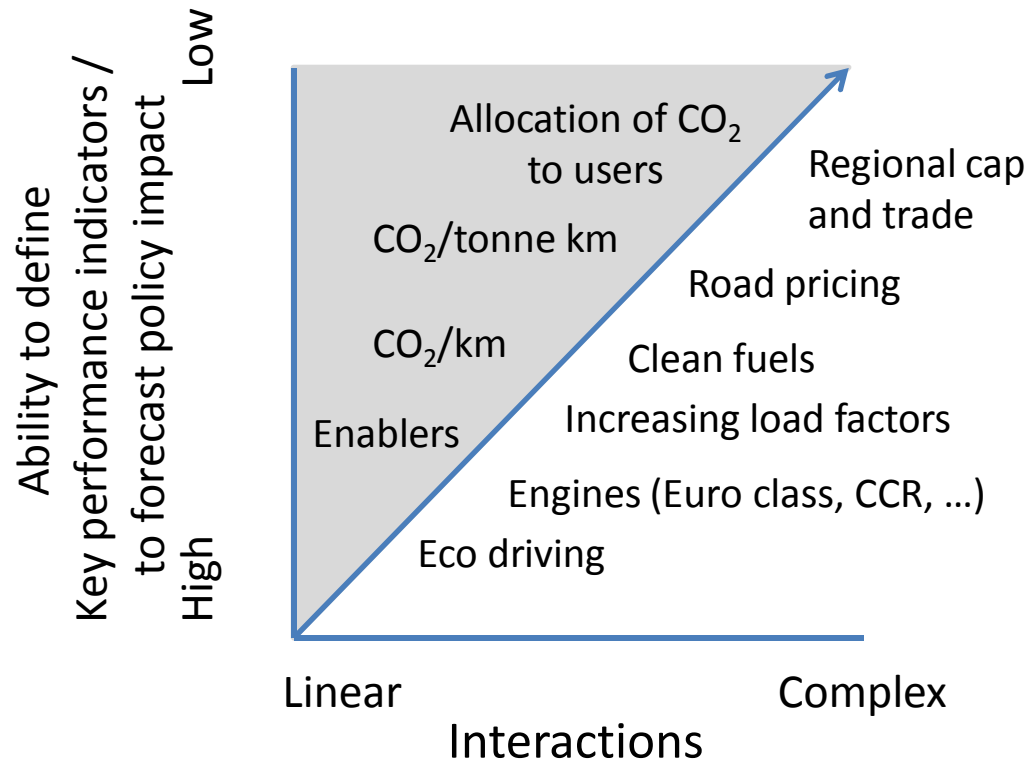
Linear and loosely coupled systems can be **either** (3)

Complex and tightly coupled systems can be **neither** (2) = Complex Adaptive Systems are difficult to understand and to manage (need for domain oriented designs & System of systems approach)

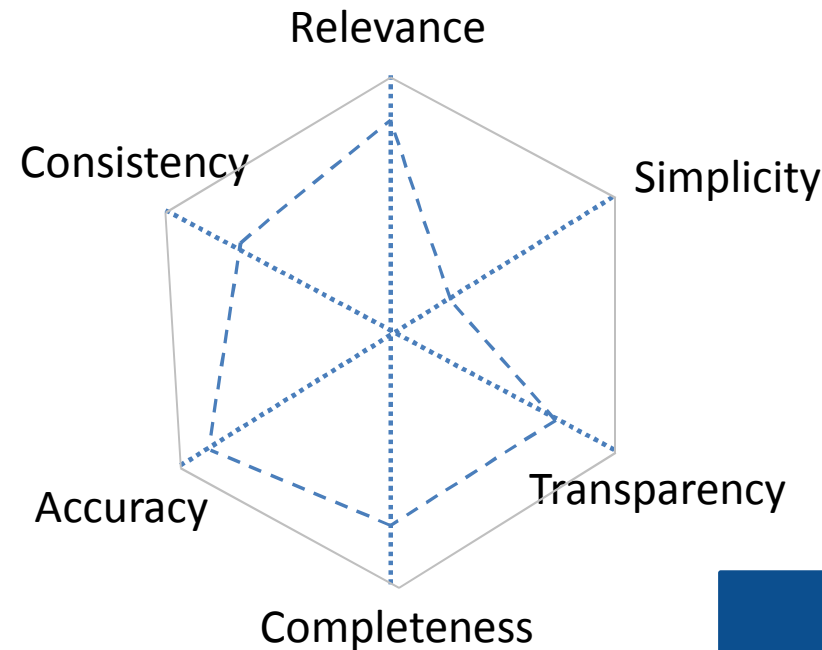


Based on: Perrow, Charles (1984). Normal Accidents: Living With High Risk Technologies. (Revised edition, 1999). Princeton, NJ: Princeton University Press.

How to assess environmental performance

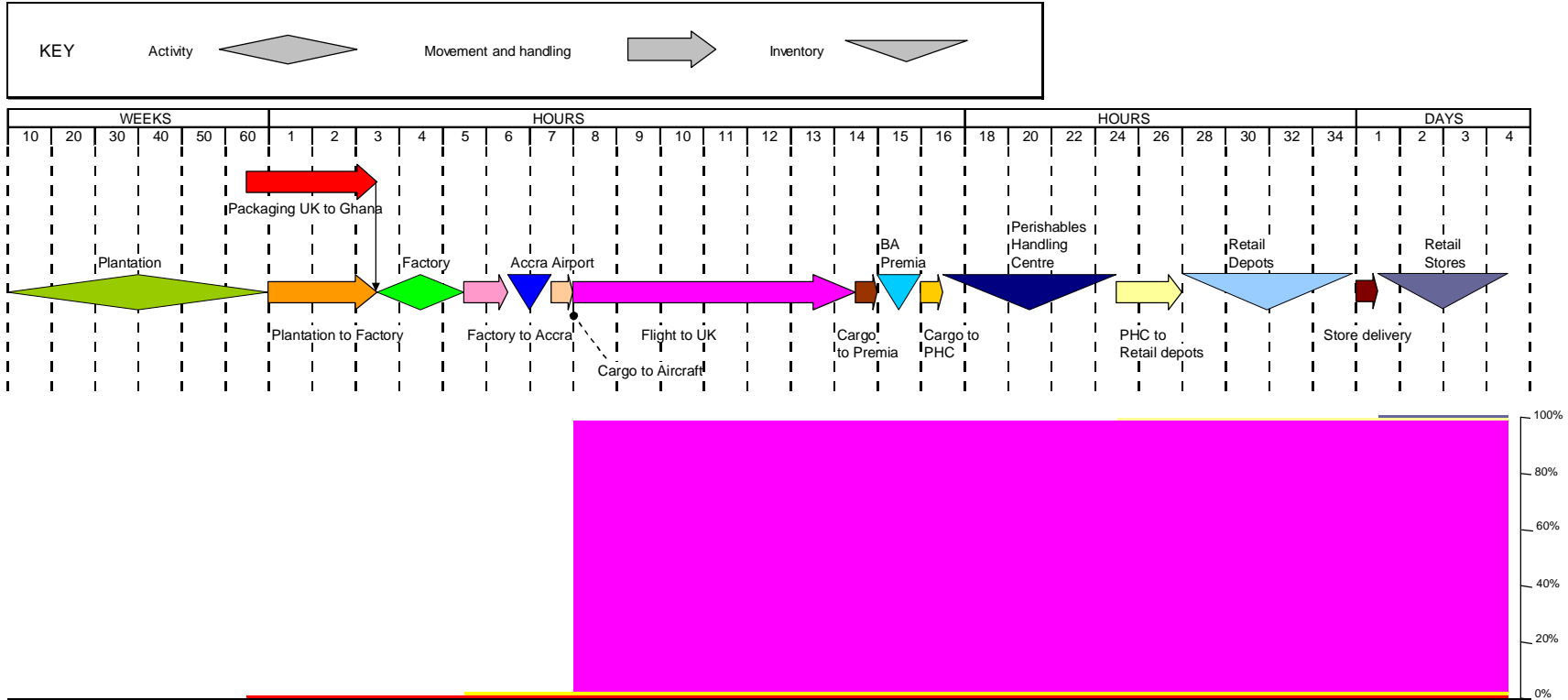


Criteria for emissions monitoring and reporting methodologies



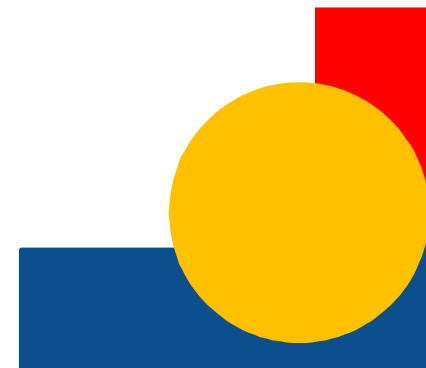
Fairness !
Acceptance in the market !

Carbon-To-Serve™ analysis (LCP consulting)



Process	Process Type	gCO2 / kg	Process	Process Type	gCO2 / kg
Packaging UK to Ghana	Shipping	12.35	Cargo to BA Premia	Road Transport	1.00
Packaging Ghana port to factory	Road Transport	54.55	BA Premia facility	Electricity usage	7.31
Plantation to Factory	Road Transport	7.63	BA Premia to PHC	Road Transport	0.32
Factory	Electricity usage	3.67	Perishables Handling Centre	Electricity usage	7.31
Factory to Airport	Road Transport	3.08	PHC to Retailer Depots	Road Transport	9.06
Accra Airport	Electricity usage	4.41	Retailer Depots	Electricity usage	10.26
Aircraft loading	Road Transport	1.00	Retailer Depots to Stores	Road Transport	5.77
Air freight	Air Transport	2,927.92	Retailer Stores	Electricity usage	8.55
Total kgCO2 / kg organic pineapple					3.06

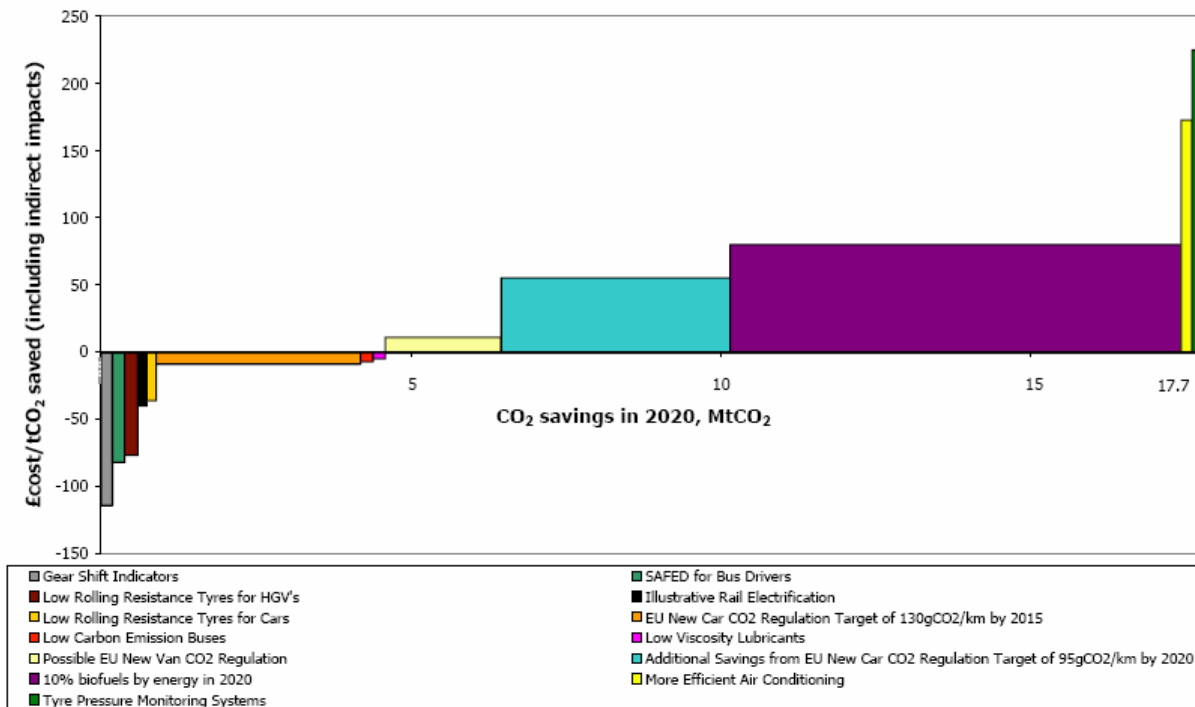
Source : Altmedes, Conlogic, LCP. IATA Supply Chain Green Footprint Project, 2008



Marginal Abatement Cost (MAC) curve modelling

Discounted cash flow analyses and Net present value calculation to evaluate and prioritize cost efficiency of mitigation measures.

Figure 4.3: Central case transport sector MAC curve



Source: DfT analysis (2009)

- “ Impact of uncertainty on discount factor (see CAPM)
- “ Common discount factor?
- “ Valuing emissions? How much is a tonne of CO₂ worth?

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www.climatetransact.eu

Public private initiative to create a common sustainable transport partnership programme in Europe based on existing good practices and tools in member states and in collaboration with the US EPA Smartway.

www.greenlogisticsconsultants.com

Global collaborative network with a focus on sustainable transport and logistics

Recommended reading: Transportation in a Climate-Constrained World, Andreas Schäfer, John B. Heywood, Henry D. Jacoby, and, Ian A. Waitz
The MIT Press, Cambridge, Massachusetts, London, England, 2009