Carbon-CAP

Consumption-based Accounting and Policy

- Funded by EU FP7, 3 Mio Euro
- October 2013-December 2016
- TNO, UL-CML, WU, UCL, NTNU, CE, CU, DIW, ICTSD, CS, EU DG JRC-IPTS

Introduction to consumption-based carbon accounting and policies

Prof. Arnold Tukker,

Project Coordinator, TNO and

Leiden University - CML

Carbon-CAP Side Event, EU Pavillion, COP22, Monday 07-11-16

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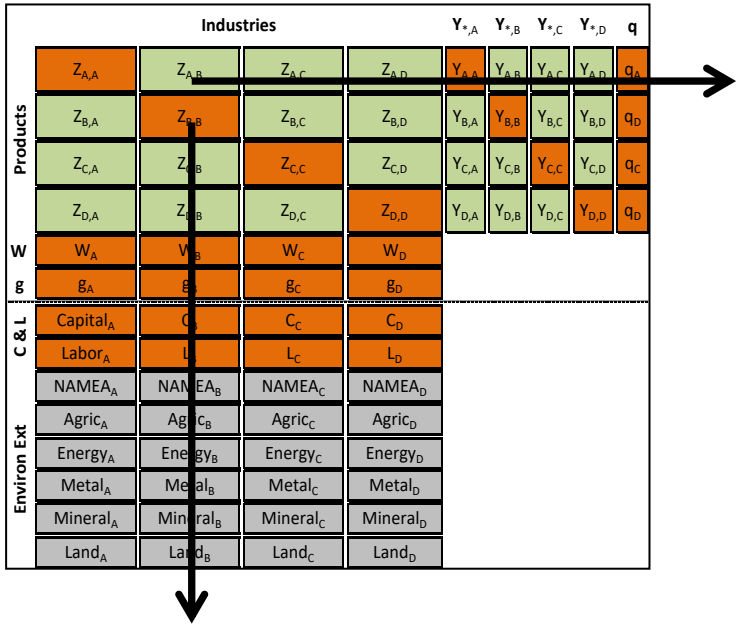
Concept: link territorial emission to a picture of global economic relations

- For now, we don't manage the 2° degree goal
- We now rely on industry perspective emission accounts and policies
- A consumption / value chain perspective can give additional levers to reach the goal



Territorial/Industry perspective:
Emissions & policies by sector

Consumpion/Value chain perspective:

- Consumption product x = VA sector 1 + VA sector 2…
- Per sector we have CO2 emissions and production
- Emissions product x = Sum emissions per unit VA

…is hence simply re-distributing territorial emissions to final consumption categories

We use for this EXIOBASE, build in 4 major EU projects by my team including Carbon CAP

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Why complement production-based accounts and policies?

- Added value:
  - New perspective -> additional policies
  - Addressing consumption as a driver
  - Additional perspective on dividing responsibilities
- Relevance:
  - Consumption drives CO2 emissions
  - Trade and embodied CO2 grow quicker as GDP

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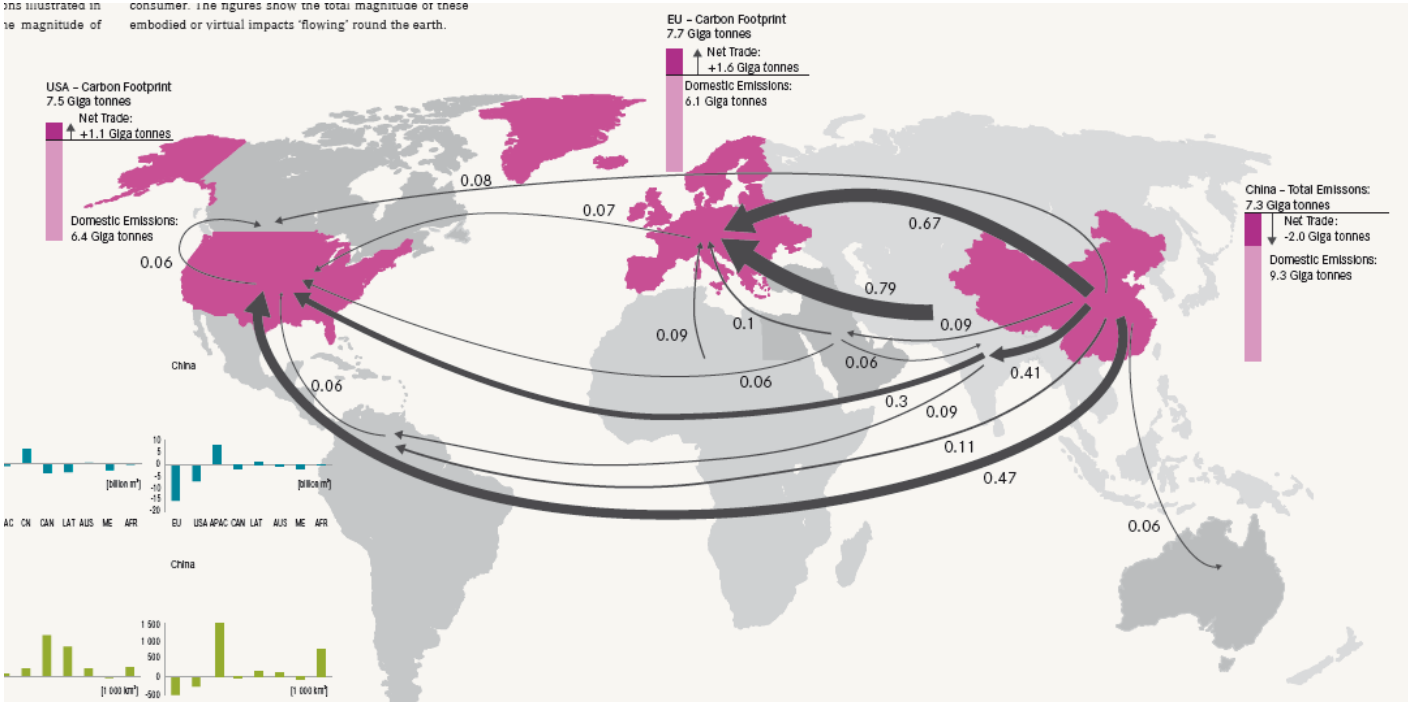
Example: carbon embodied in trade

- China exports 2 Gt embodied carbon…
- ..imported by the EU and US….
- ..but produced by often less resource-efficient industries and with high-carbon energy systems...



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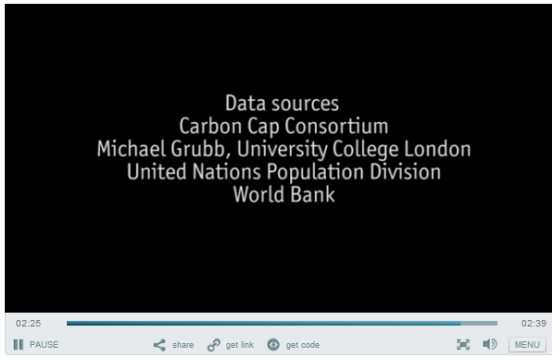
Example: results used by the Economist, 26-11-15

Carbon footprint per capita vs. GDP



http://www.economist.com/news/international/21679288-china-and-india-are-perceived-be-worst-emitters-carbon-dioxide-see-what-happens-when-we

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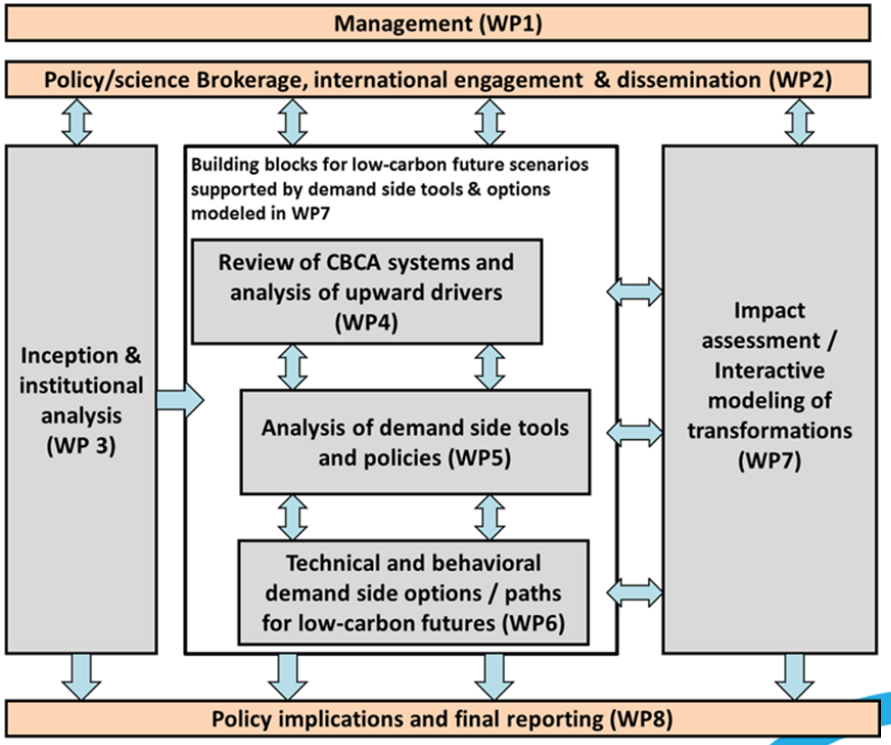
Challenges and answers of Carbon CAP

- Uncertainty in accounting is unknown -> WP4
- Consumption – based policies are new and unknown -> WP5, WP6
- Added value of such policies is unkown -> WP7
- Hence not (yet) accepted for use in official contexts (UNFCCC, COP) -> WP2
- Indeed, fear uncertainties may block progress in negotiations



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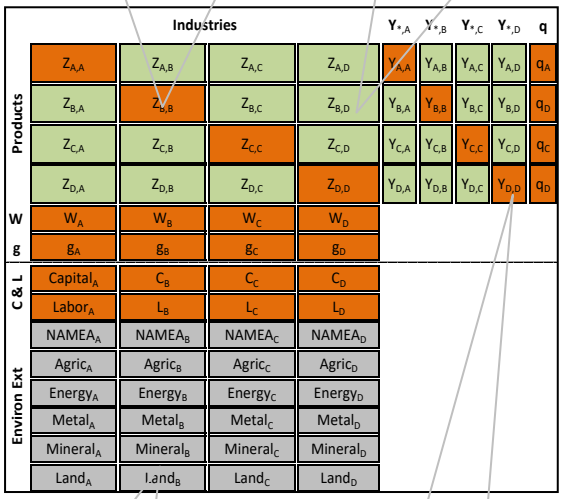
Feasibility and conclusions

- In this session we hope to show
  - It is not fundamentally new
  - We re-distribute emissions per sector to consumption
  - Uncertainty is manageable: territorial emissions (!) and GDP dominate
  - This new perspective can lead to useful, additional policies
  - That Carbon CAP results may enhance acceptance of the consumption-based perspective…
  - …supporting the 2° goal

Uncertainties (work of Anne Owen, Leeds University)

Transactions within countries *20-30 %*

Trade between countries *10-20%*



CO2 emissions by country, sector: *30-40%*

GDP by country as % of global GDP: *20-30%*

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Thank you for being here today!

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Consumption-based carbon accounts: towards a robust role in policy making

Prof. Arnold Tukker,
Project Coordinator, TNO and
Leiden University - CML

OECD ICOA Side Event, OECD Pavillion, COP25, Thursday 3 December, 2015

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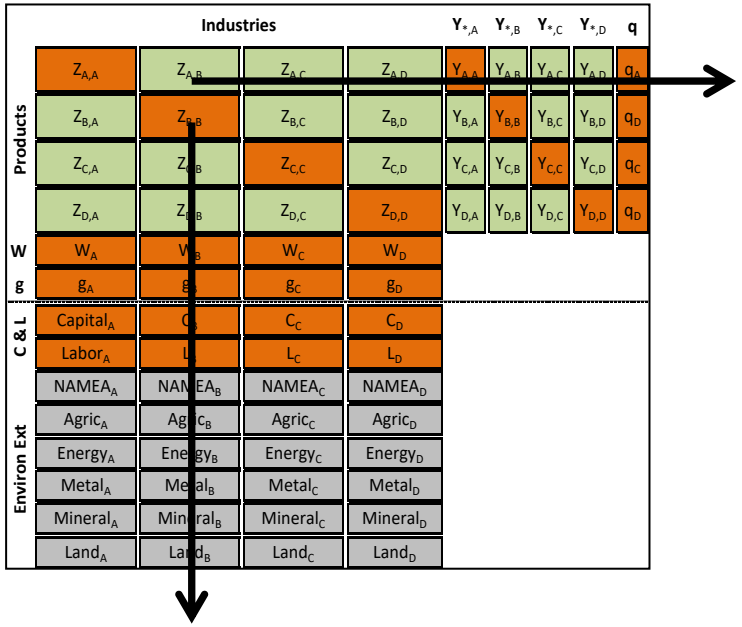

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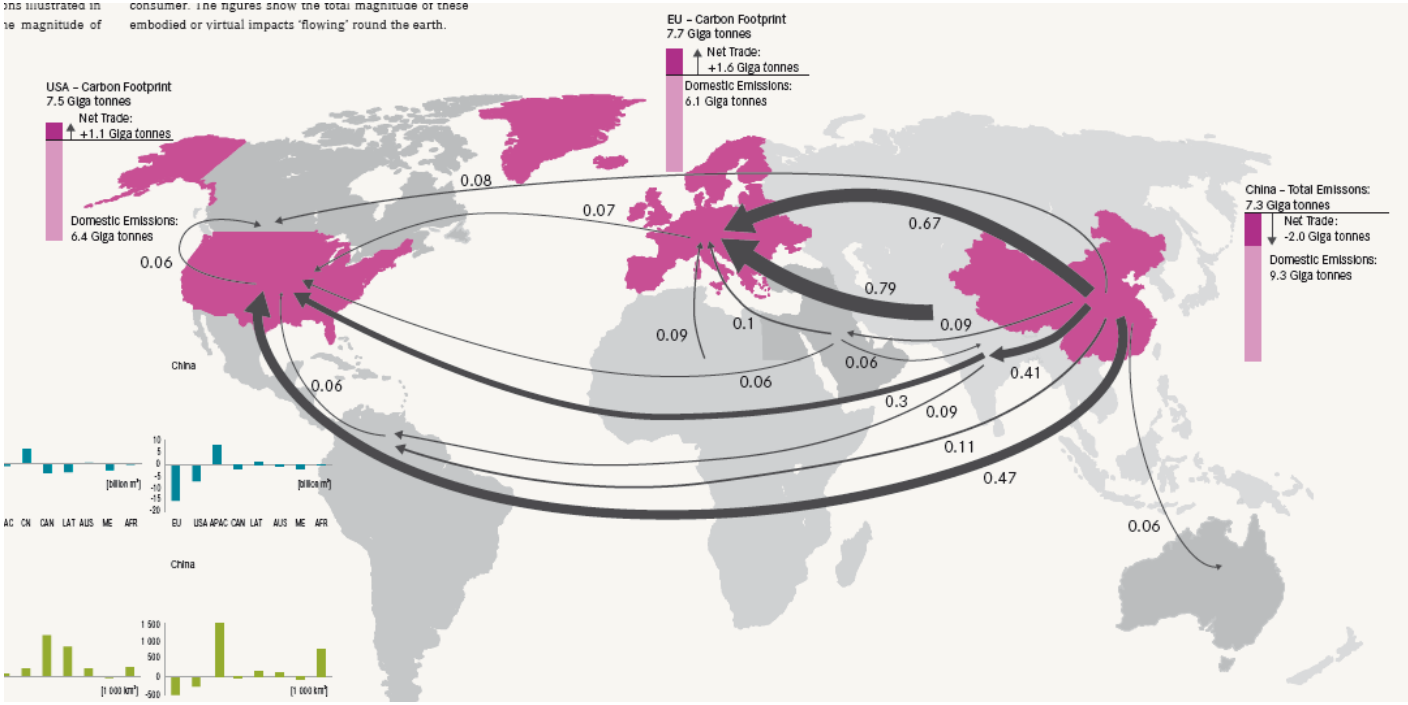

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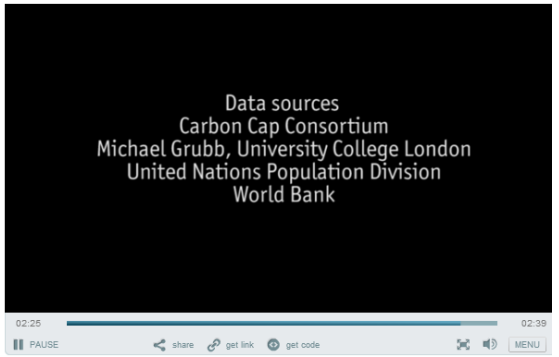

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Potential and challenges

- Potential CBA & CBCP
  - Additional perspective on how to share responsibilities
  - Addresses consumption as a driver
  - May give clues for developing more efficient policies
- What are the challenges
  - Uncertainty: negotiations blocked by discussion over data
  - Options and policies not yet clear
  - Added value of policies not yet clear
  - That is what we analyse in Carbon CAP/EXIOBASE

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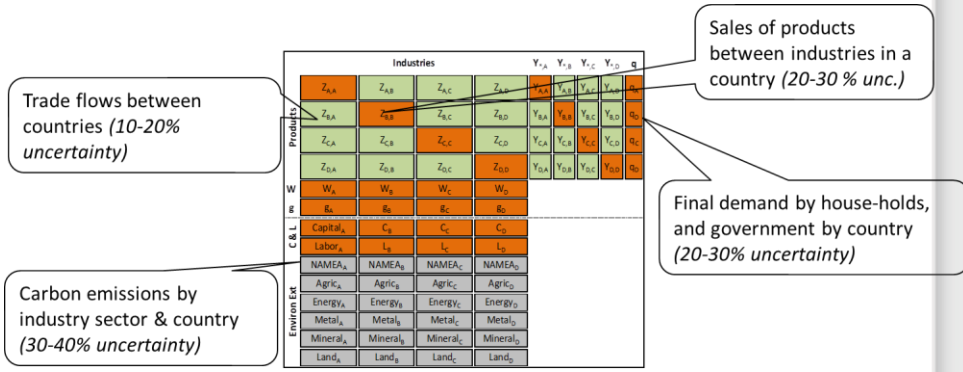
Main gaps

- Now 5 main global databases
  - EXIOBASE
  - EORA
  - GTAP
  - WIOD
  - ICOA



- Stunning finding about differences in carbon footprint per country
  - Territorial emissions: 30-40%
  - Final demand (GDP as % of global): 20-30%
  - National IO part: 20-30%
  - Trade: 10-20% (higher for small countries)

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Towards global harmonisation

- Science can improve main uncertainties
  - Harmonize emission data
  - Harmonize final demand
  - Use integration procedures that keep national IO tables intact
  - Talk with NSIs about main discrepancies in trade
  - But take care: for carbon you can work with aggregated tables, for water, land, resources not
- We also we need to move to something more official too
  - NSIs, Eurostat, OECD, UN SD are hesitant to adjust country tables -> always an aggregated common denominator
  - Maybe: OECD, or UN SD makes an aggregated semi-official GMRIO
  - Scientists then apply their detailing procedures

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Thank you for being here today!

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Leftover slides

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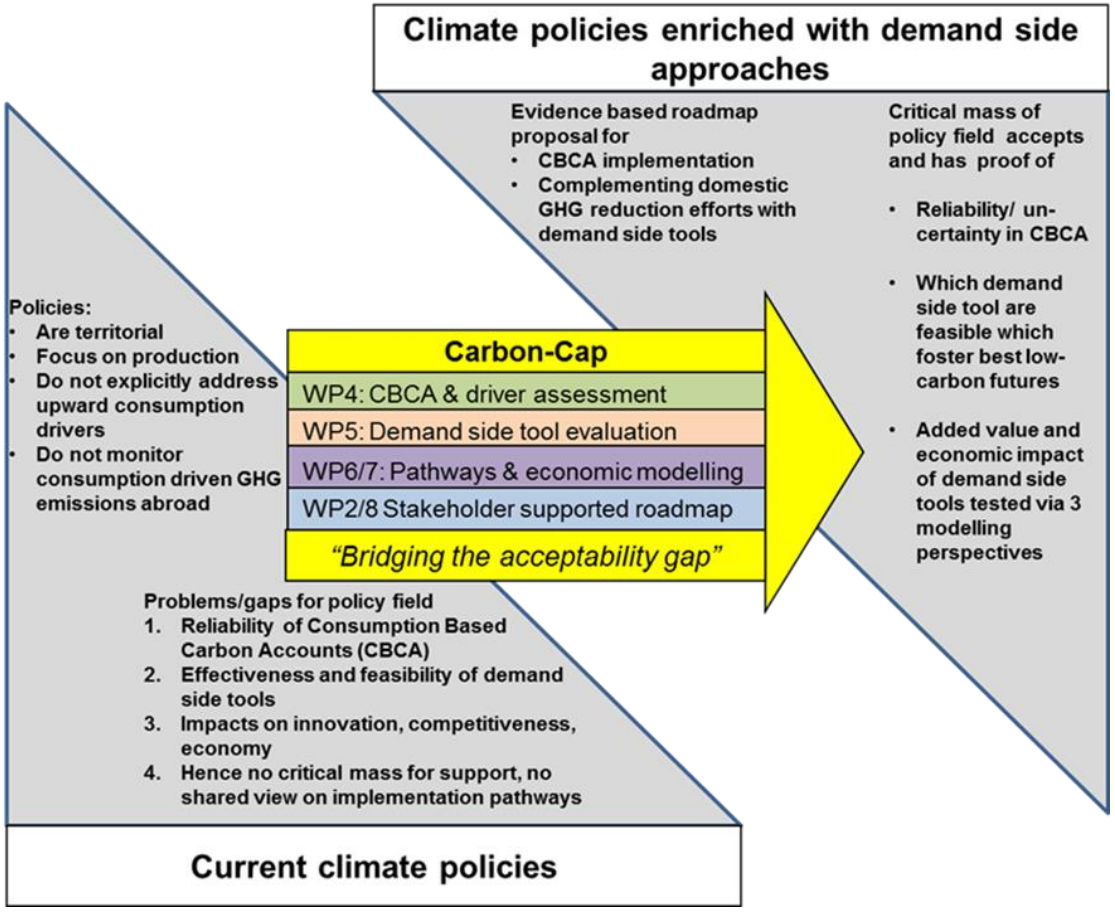
Work Breakdown



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Main gaps

- Gap 1 *(WP4, Multi-regional input output analysis):* Can we make consumption-based carbon accounts? With what (un)certainty? [
- Gap 2 *(WP5, 6: Options and policies):* What demand-side carbon options and policies can we identify?
- Gap 3 *(WP7: environmental & economic modelling of traditional and consumption oriented policy scenarios):* How effective and acceptable are they?
- Gap 4 *(WP2, 8: stakeholder discussions & integrated conclusions):* How do we come to a shared view of added value of consumption – based accounts and policies?

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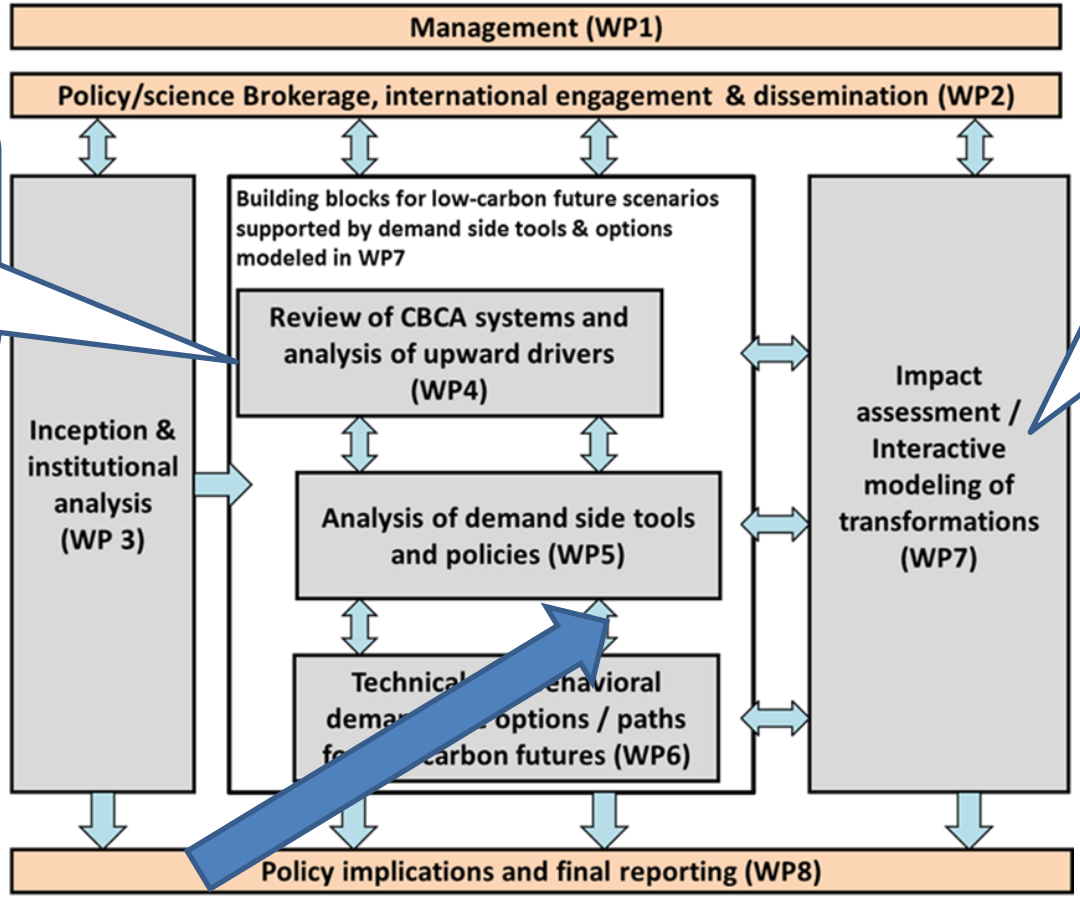
Work flow

Multi-regional EE IO database (EXIOBASE) used



Models used:
E3ME (Cambridge)
FIDELIO (DG JRC IPTS)
EXIOMOD (TNO)

We are here…

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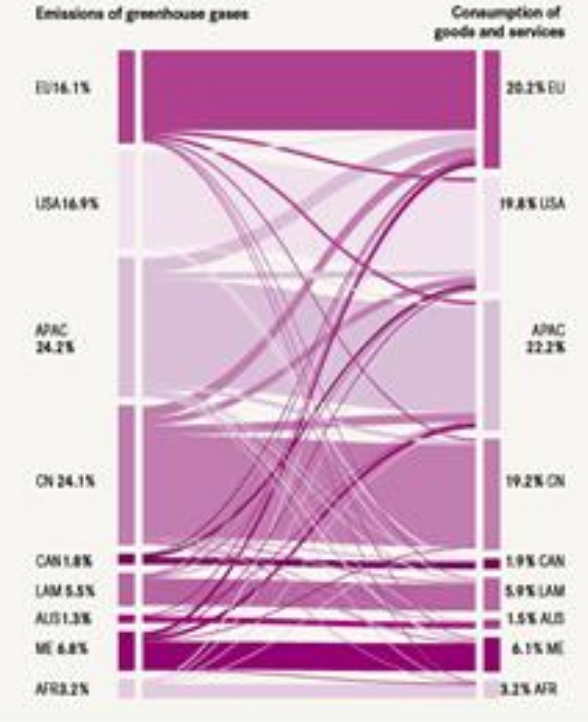
Examples

- Territorial and consumption based carbon emissions by continent



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Examples

- Carbon footprint rankings by country

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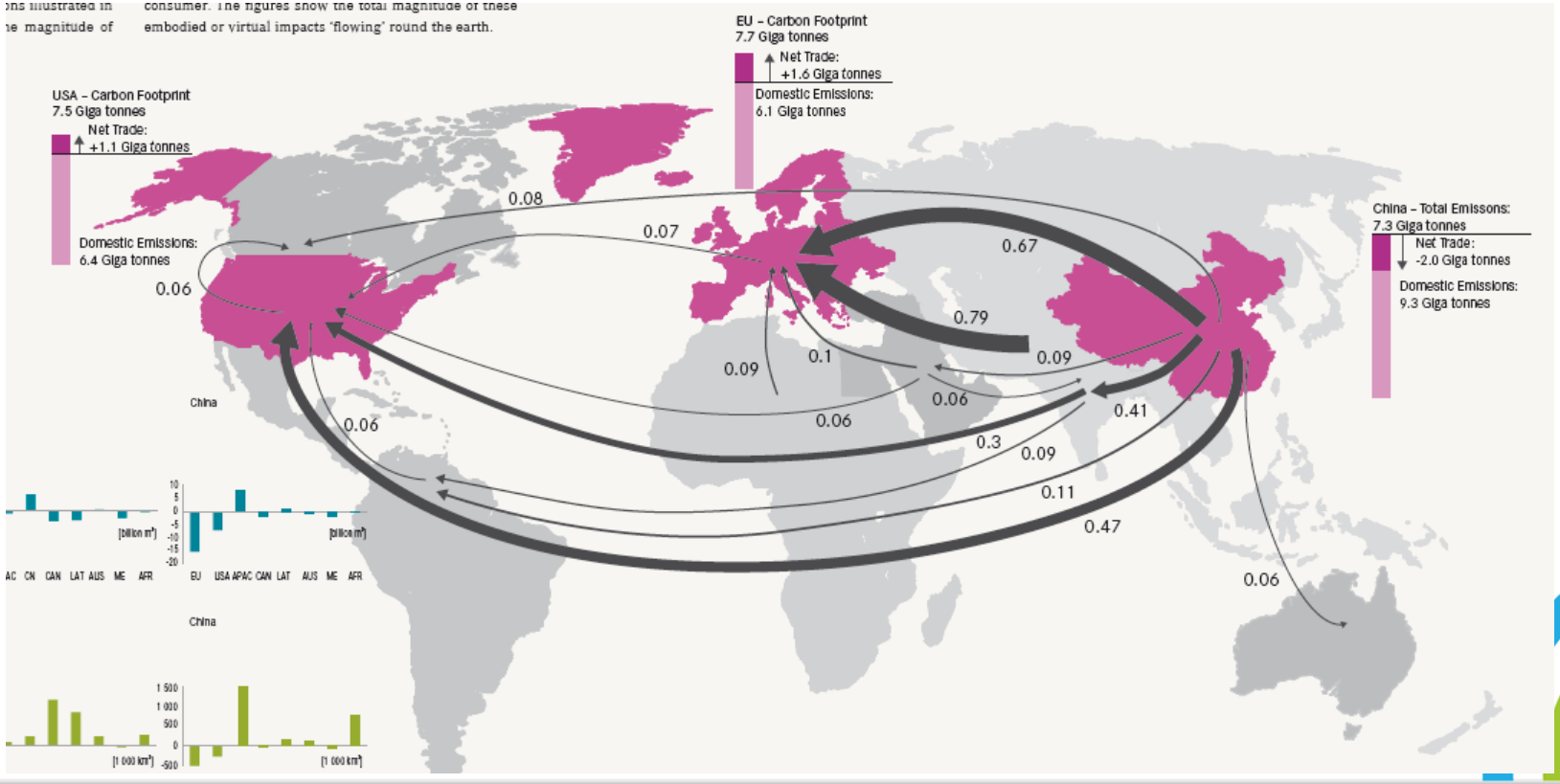
Examples

- Carbon embodied in trade



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Conclusions

- Carbon CAP sets consumption central
- Wants to overcome 4 main gaps
  - Uncertainty
  - Understanding of possible policies
  - Understanding of effectiveness of policies
  - Creating a common view on usefulness
- Via
  - Analysis with MRIO time series
  - Identification of policy options
  - Identification of technical and behavioral options
  - Assessment of the economic and environmental implications of traditional and consumption oriented policy scenarios via 3 models
  - Intensive stakeholder interaction

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Questions so far?

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An introduction to the concept of consumption based emissions accounting and related policies

Prof. Arnold Tukker,

Project Coordinator, TNO and Leiden University - CML

Addressing consumption-based emissions: the Chinese perspective

Event co-organised by Carbon CAP and the Climate Group, Beijing, 10 November 2015