



The Eora MRIO tables

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ISA, The University of Sydney
Australia*



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Guiding principles

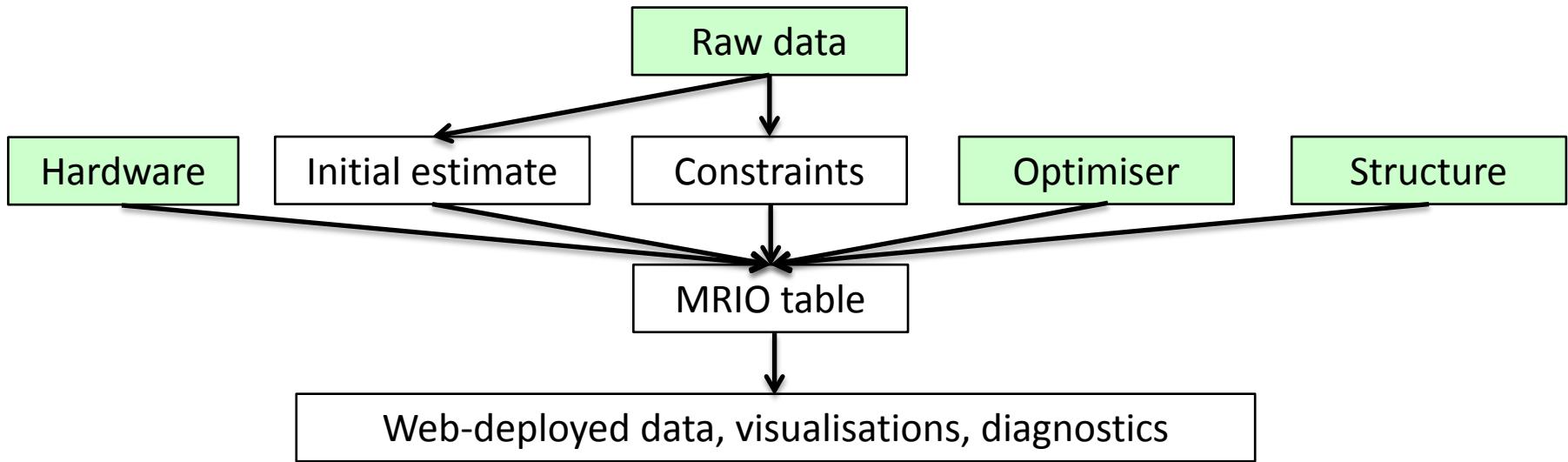
- Detail: 187 countries, 15000 sectors → LCA and footprint
- Dynamics: Time series 1990-2009 → trends and scenarios
- Flexibility: Basic prices, margins and taxes
- Transparency: Close adherence to the raw data
- Uncertainty: Standard deviation estimates → decision-making
- Reliability: Info on constraint violations → quality assurance
- Timeliness: Delay of 2 years
- Budget: 12 person-years initially, < 2 person-years /y continually;
- Openness: Public, free availability for research



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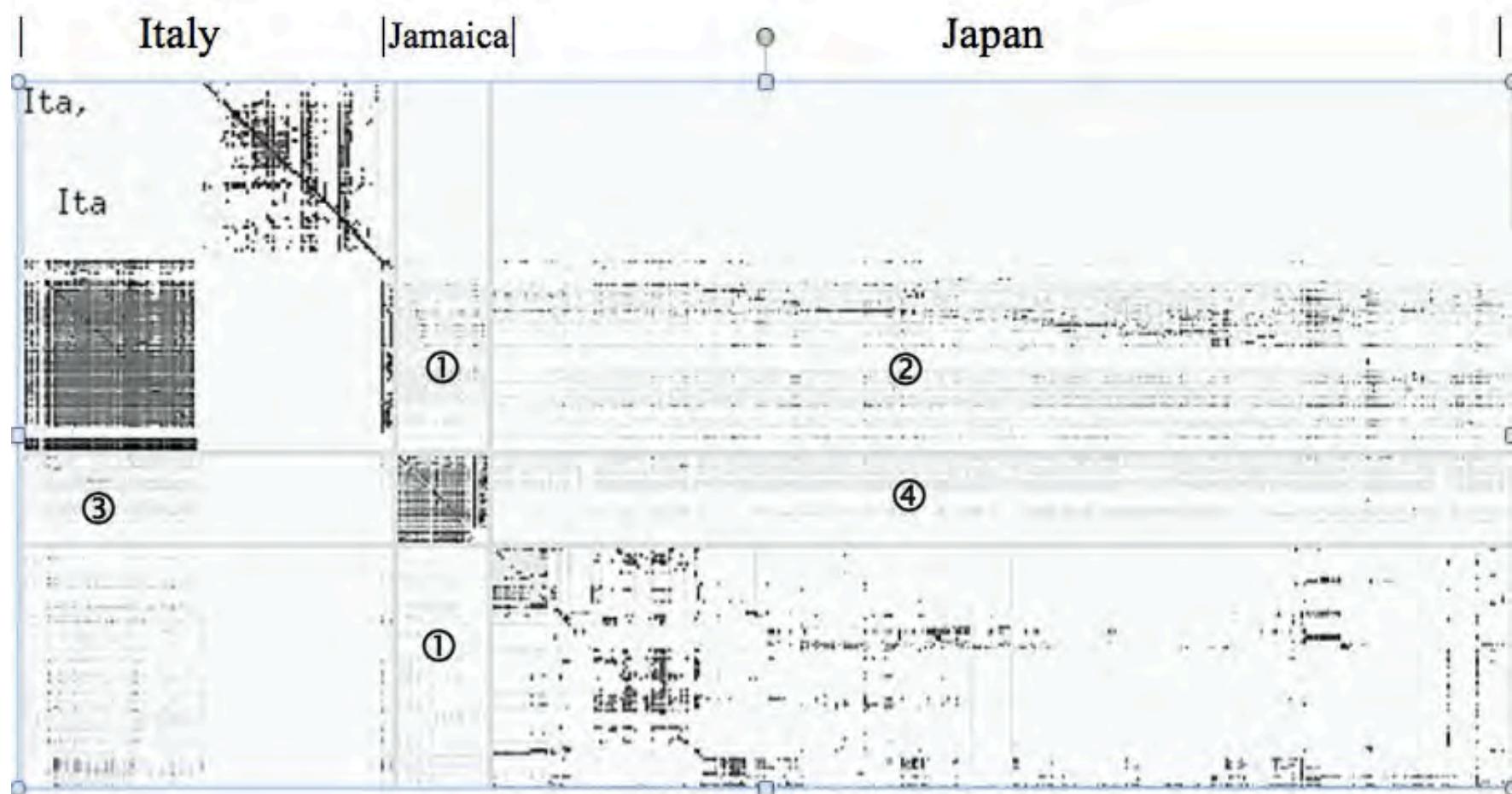
Conceptual framework



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Structure

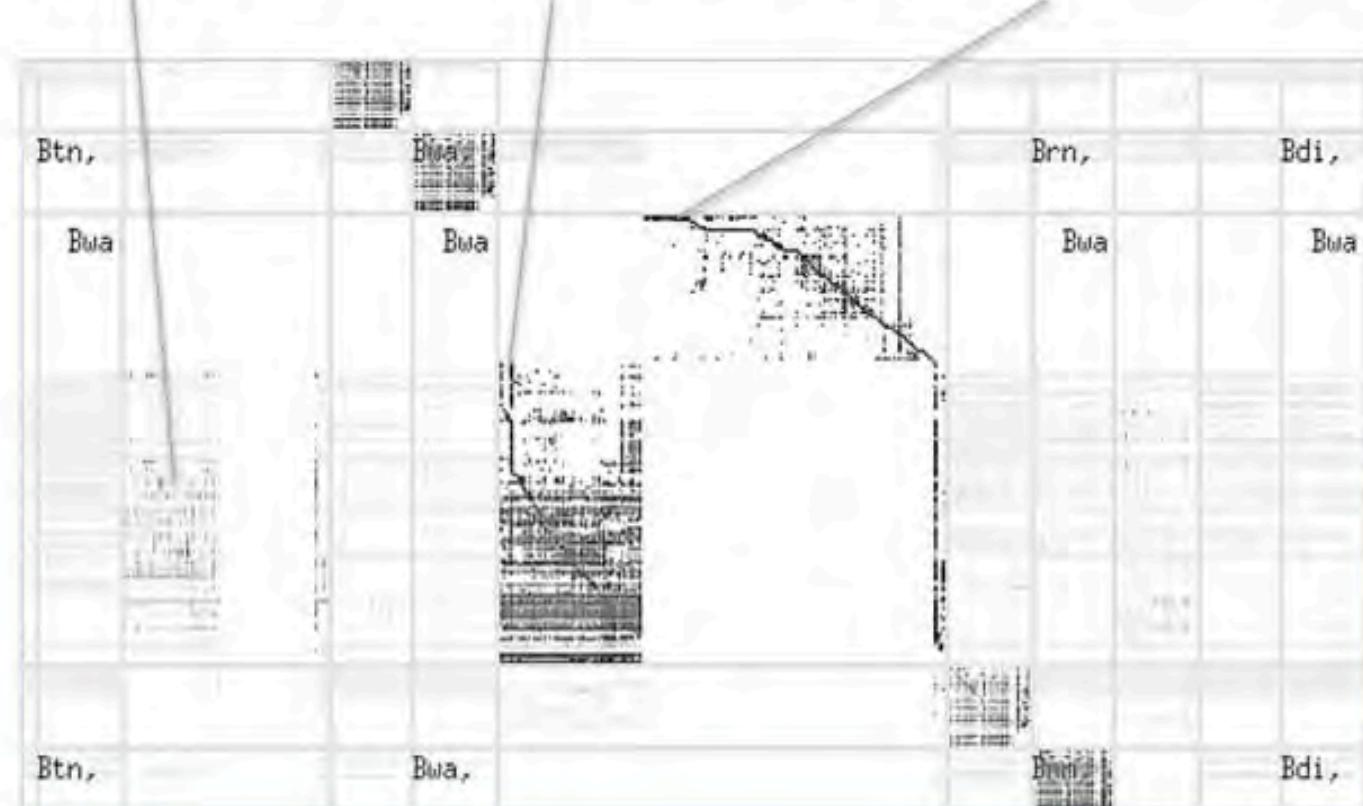


Original sectors – rectangular matrices

Bolivia/Brazil trade

Supply of Brazilian crops and livestock products to Brazilian food manufacturing

Joint production of crops in Brazil's agriculture industry



Hardware

Design considerations

- Number and speed of CPUs
- RAM vs disk storage
- Data type
- Sparsity
- Multithreading
- Scheduling
- Communication overheads
- Shared vs distributed memory





Raw data

Input-output tables from 74 national statistical offices,
Input-output data from Eurostat, IDE-JETRO and OECD,
UN National Accounts Main Aggregates Database,
UN National Accounts Official Data,
UN Comtrade international trade database
UN Servicetrade international trade database



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Initial estimate

$$T_{ij}^{ss(v)} = \frac{\tilde{T}_{ij}^{ss(v)}}{\tilde{T}_{..}^{ss(pu)}} \frac{T_{..}^{ss(pu), OC}}{v_{..}^{ss(ba), OC}} v_{..}^{ss(ba), MA} = \underbrace{\frac{\tilde{T}_{ij}^{ss(v)}}{\tilde{T}_{..}^{ss(pu)}}}_{\text{sector structure and valuation scaling}} \underbrace{\left(\frac{x_{..}^{ss(ba), OC}}{v_{..}^{ss(ba), OC}} - 1 \right) v_{..}^{ss(ba), MA}}_{\text{magnitude}}$$

$$y_{ik}^{ss(v)} = \underbrace{\frac{\tilde{y}_{ik}^{ss(v)}}{|\tilde{y}_k^{ss(pu)}|}}_{\text{supply structure and valuation scaling}} \underbrace{\frac{y_k^{ss(pu), OC}}{y_{..}^{ss(pu), OC}}}_{\text{use structure}} \underbrace{y_{..}^{ss(pu), MA}}_{\text{magnitude}}$$

$$v_{lj}^{ss(ba)} = \underbrace{\frac{\tilde{v}_{lj}^{ss(ba)}}{|\tilde{v}_l^{ss(ba)}|}}_{\text{use structure}} \underbrace{\frac{v_l^{ss(ba), OC}}{v_{..}^{ss(ba), OC}}}_{\text{supply structure}} \underbrace{v_{..}^{ss(ba), MA}}_{\text{magnitude}}$$

$$V_{ij}^{ss(ba)} = \underbrace{\frac{\tilde{V}_{ij}^{ss(ba)}}{|\tilde{V}_{..}^{ss(ba)}|}}_{\text{matrix structure}} \underbrace{\frac{x_{..}^{ss(ba), OC}}{v_{..}^{ss(ba), OC}}}_{\text{magnitude}} v_{..}^{ss(ba), MA}$$

Oosterhaven, Stelder & Inomata
ESR 2008

Bouwmeester & Oosterhaven
IO Seville 2008

Tukker *et al*
Ecol.Econ. 2009

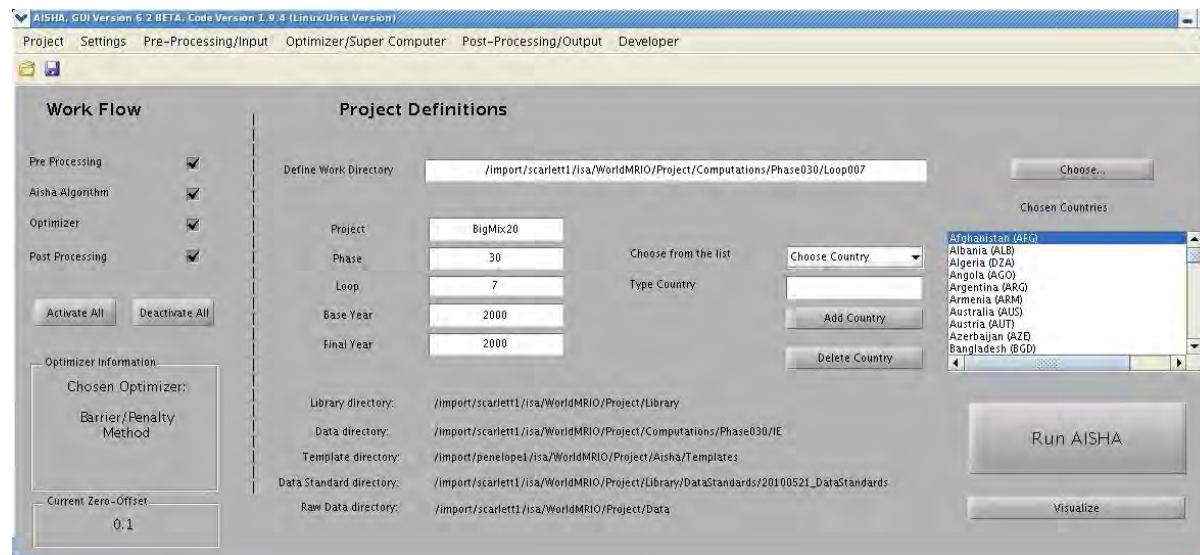
Lenzen, Kanemoto *et al*
IO Sydney 2010



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Constraints



AISHA

Geschke *et al*
IO Alexandria 2011



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Optimiser

$$\mathbf{p} = \begin{pmatrix} \mathbf{a} \\ \boldsymbol{\varepsilon} \end{pmatrix} \sim D \left[\begin{pmatrix} \mathbf{a}_0 \\ 0 \end{pmatrix}, \begin{pmatrix} \Sigma_a \\ \Sigma_c \end{pmatrix} \right] = D[\mathbf{p}_0, \Sigma]$$

Minimise $f = (\mathbf{p} - \mathbf{p}_0)' \hat{\Sigma}^{-1} (\mathbf{p} - \mathbf{p}_0)$, subject to $\mathbf{C} \mathbf{p} = \mathbf{c}$

$$\mathcal{L} = (\mathbf{p} - \mathbf{p}_0)' \hat{\Sigma}^{-1} (\mathbf{a} - \mathbf{a}_0) + \lambda(\mathbf{C}\mathbf{p} - \mathbf{c})$$

$$\sigma_{c,i} = \sqrt{\sum_j (G_{ij} \sigma_{P,j})^2} \quad \forall i$$



RAS, GRAS

SUT-RAS

LAD

KRAS

QP



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The Eora tables:

187 countries, 15909 sectors

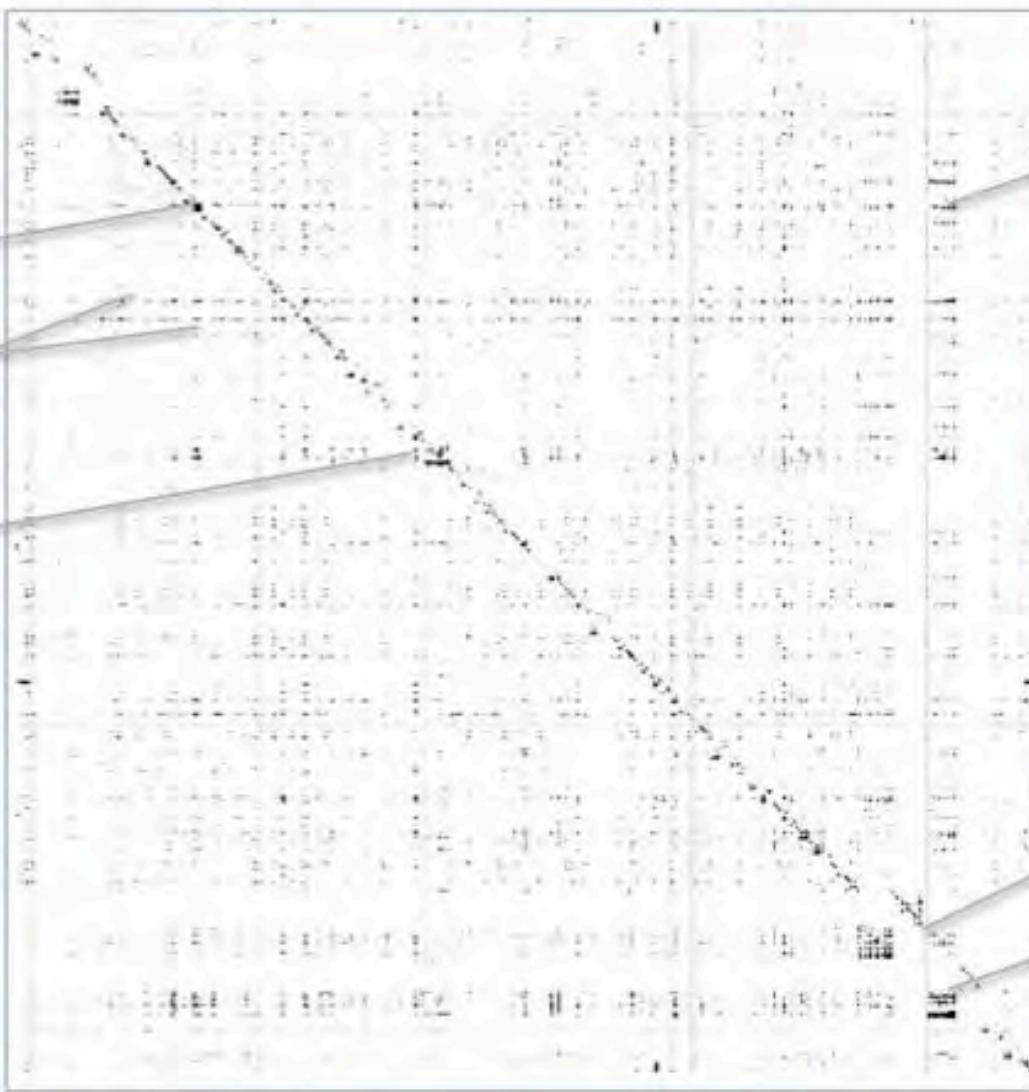
5 valuations, 20 years

= 3 Terabytes of information



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Website www.worldmrio.com

World MRIO

Use the high resolution MRIO table visualization, download an aggregate summary world MRIO table, check sector classifications for all countries

Detailed country tables

Download IO tables and Footprint results for individual countries and between trading partners

MRIO Analysis

View national, regional, and global summary tables. Get structural path, Footprint, and tradeflow analyses

Data quality

View size distributions of MRIO elements, reports on adherence to published data sources, and data quality assessments

The Eora MRIO Database

The Eora multi-region IO database provides a time series of high resolution input-output (IO) tables with matching environmental and social satellite accounts for 187 countries. The Eora MRIO features:

- 187 individual countries represented by a total of 15,909 sectors
- continuous coverage for the period 1990-2009
- 35 types of environmental indicators covering air pollution, greenhouse gas emissions, water use, Ecological Footprint, and Human Appropriation of Net Primary Productivity
- high-resolution heterogeneous classification, or 25-sector harmonized classification
- raw data drawn from the UN's System of National Accounts and COMTRADE databases, Eurostat, IDE/JETRO, and numerous national agencies
- distinction between basic prices and purchasers' prices through 5 mark-ups, and
- reliability statistics (estimate of standard deviation) for all results

The Eora database is under continuing development. Please contact us with your requests, comments, and questions: isa@physics.usyd.edu.au

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Learning about Multi-Regional Input Output Tables

If you're new to the field of MRIO these resources may be of help:

[Video lectures introducing MRIO by Prof. Manfred Lenzen](#)

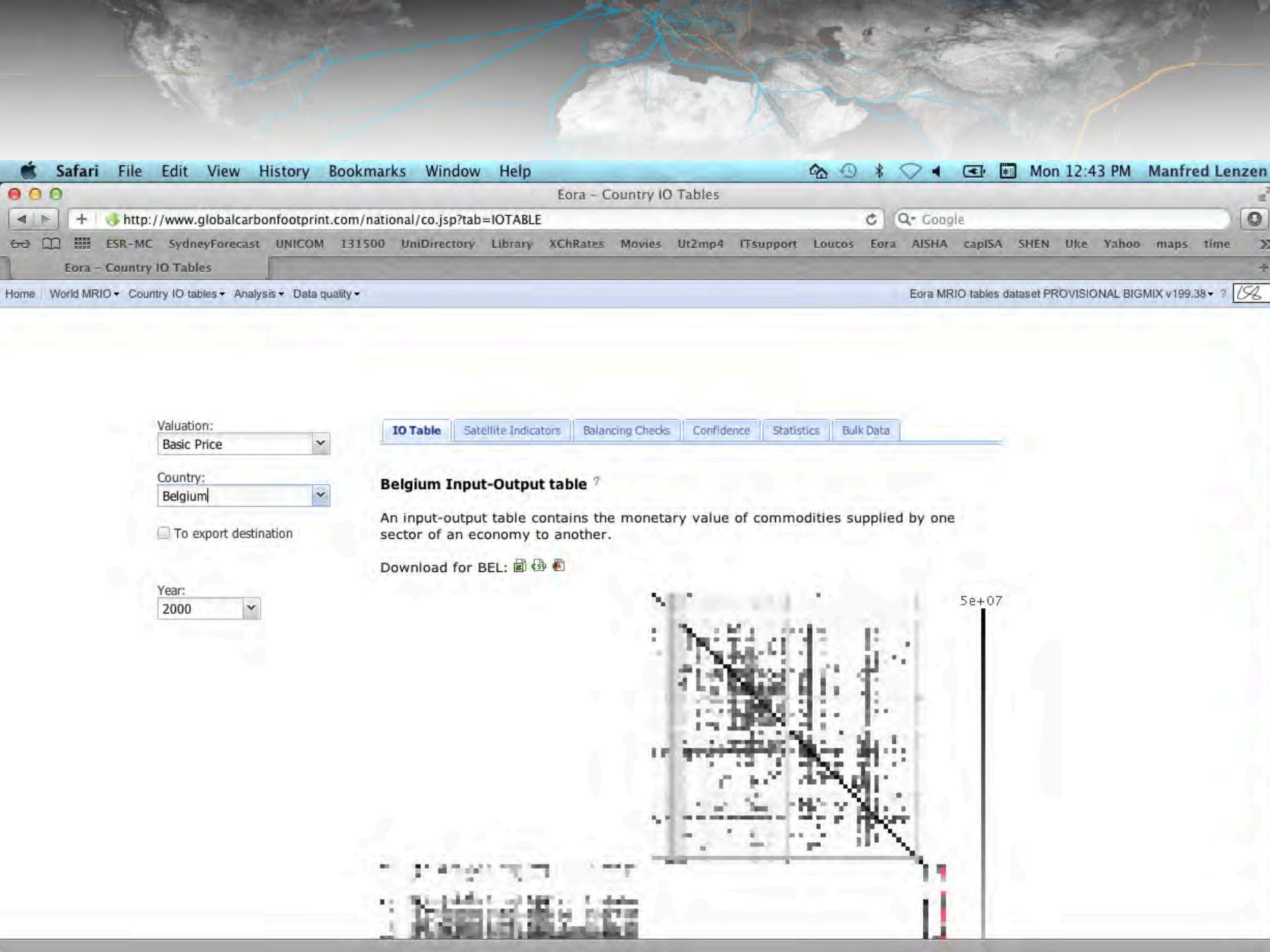
 [Eora For Dummies](#)

 [Uncertainty and Reliability in the Eora MRIO tables](#)



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Safari File Edit View History Bookmarks Window Help

Eora - Country IO Tables

http://www.globalcarbonfootprint.com/national/co.jsp?tab=IOTABLE

ESR-MC SydneyForecast UNICOM 131500 UniDirectory Library XChRates Movies Ut2mp4 ITsupport Loucos Eora AISHA capISA SHEN Uke Yahoo maps time

Eora - Country IO Tables

Home World MRIO Country IO tables Analysis Data quality

Eora MRIO tables dataset PROVISIONAL BIGMIX v199.3B

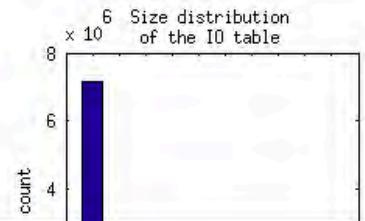
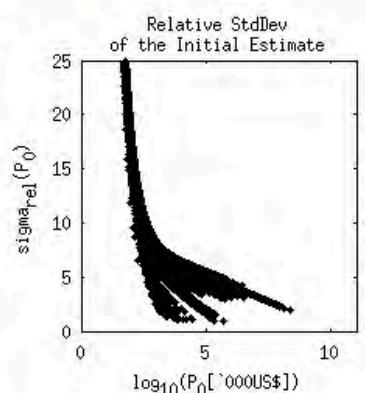
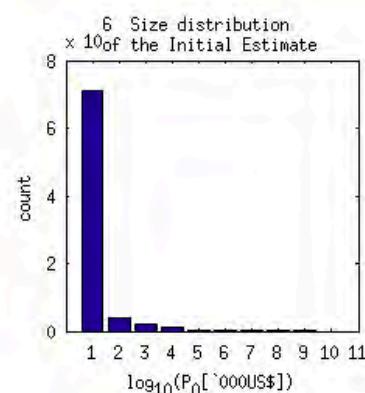
Valuation:
Basic Price

IO Table Satellite Indicators Balancing Checks Confidence Statistics Bulk Data

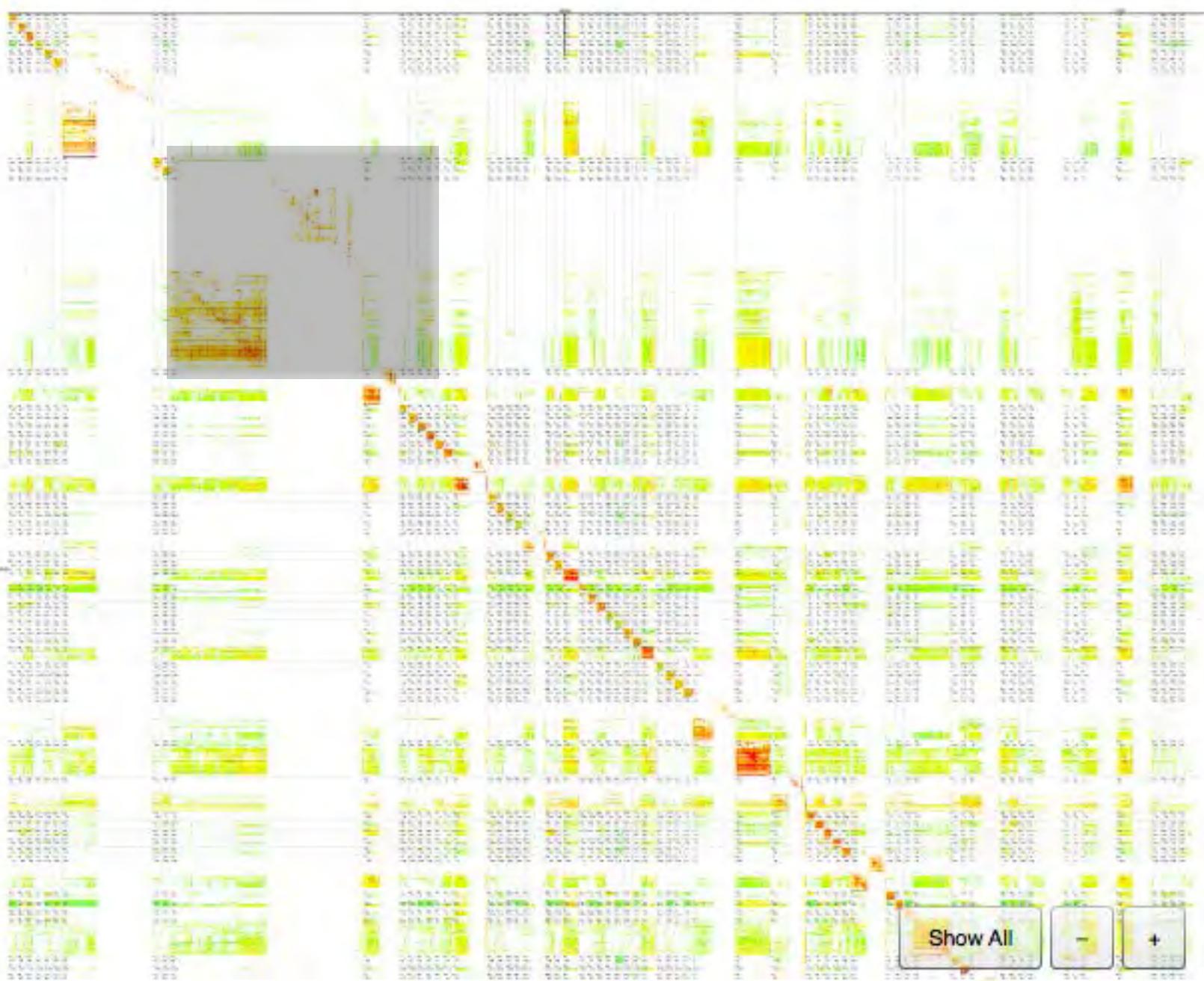
Country:
Germany

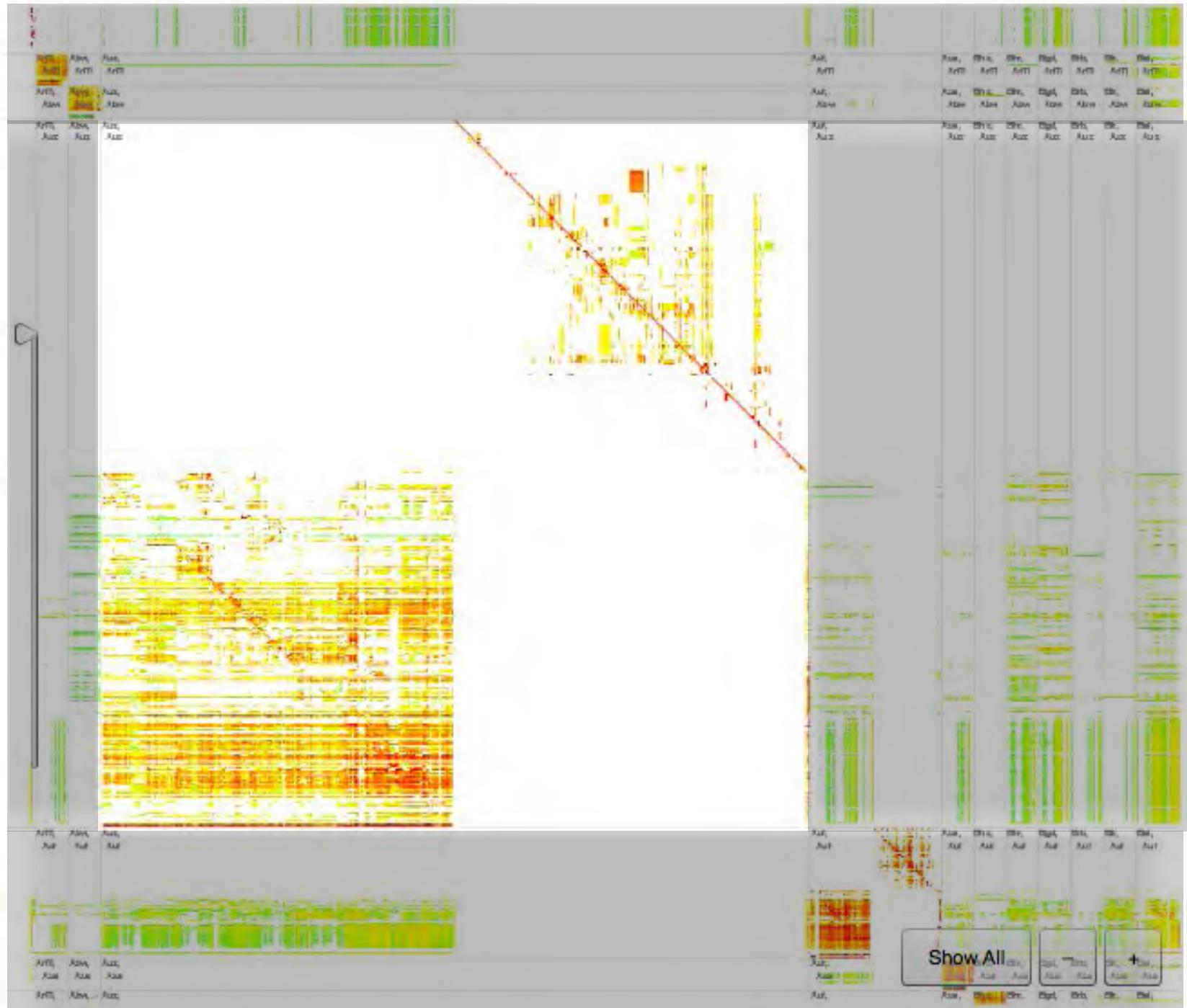
To export destination

Year:
2000

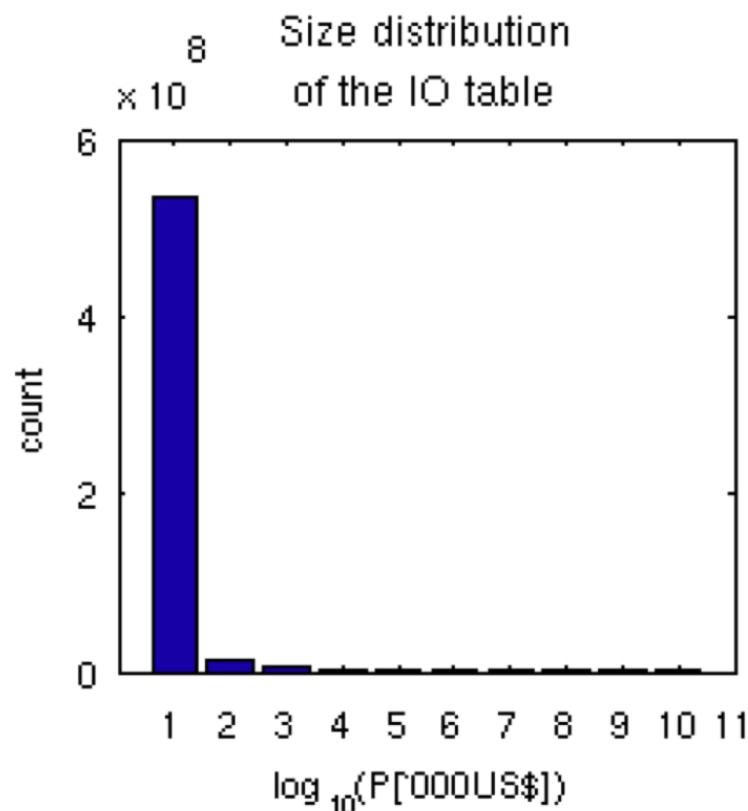
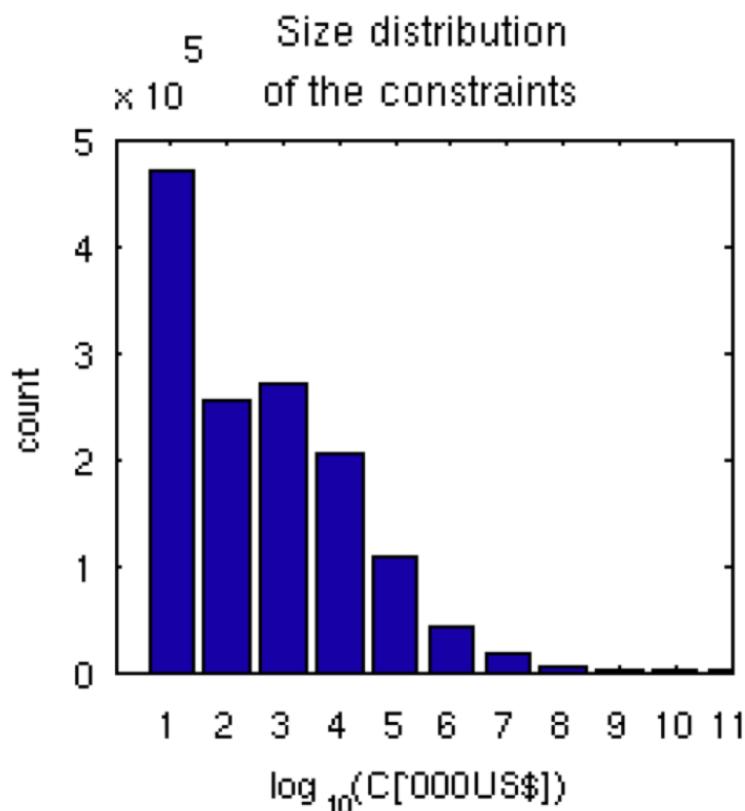


序号	项目名称	建设地点	建设性质	建设规模	主要建设内容	投资估算(万元)	资金来源	建设周期	预期效益
1	XX市XX区XX镇XX村XX组XX户危房改造	XX市XX区XX镇XX村XX组	新建	10户	新建砖混结构房屋，每户约100平方米。	100	政府补贴、群众自筹	1年	改善居住条件，提高生活质量。
2	XX市XX区XX镇XX村XX组XX户危房改造	XX市XX区XX镇XX村XX组	新建	10户	新建砖混结构房屋，每户约100平方米。	100	政府补贴、群众自筹	1年	改善居住条件，提高生活质量。
3	XX市XX区XX镇XX村XX组XX户危房改造	XX市XX区XX镇XX村XX组	新建	10户	新建砖混结构房屋，每户约100平方米。	100	政府补贴、群众自筹	1年	改善居住条件，提高生活质量。
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6	XX市XX区XX镇XX村XX组XX户危房改造	XX市XX区XX镇XX村XX组	新建	10户	新建砖混结构房屋，每户约100平方米。	100	政府补贴、群众自筹	1年	改善居住条件，提高生活质量。
7	XX市XX区XX镇XX村XX组XX户危房改造	XX市XX区XX镇XX村XX组	新建	10户	新建砖混结构房屋，每户约100平方米。	100	政府补贴、群众自筹	1年	改善居住条件，提高生活质量。
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10	XX市XX区XX镇XX村XX组XX户危房改造	XX市XX区XX镇XX村XX组	新建	10户	新建砖混结构房屋，每户约100平方米。	100	政府补贴、群众自筹	1年	改善居住条件，提高生活质量。

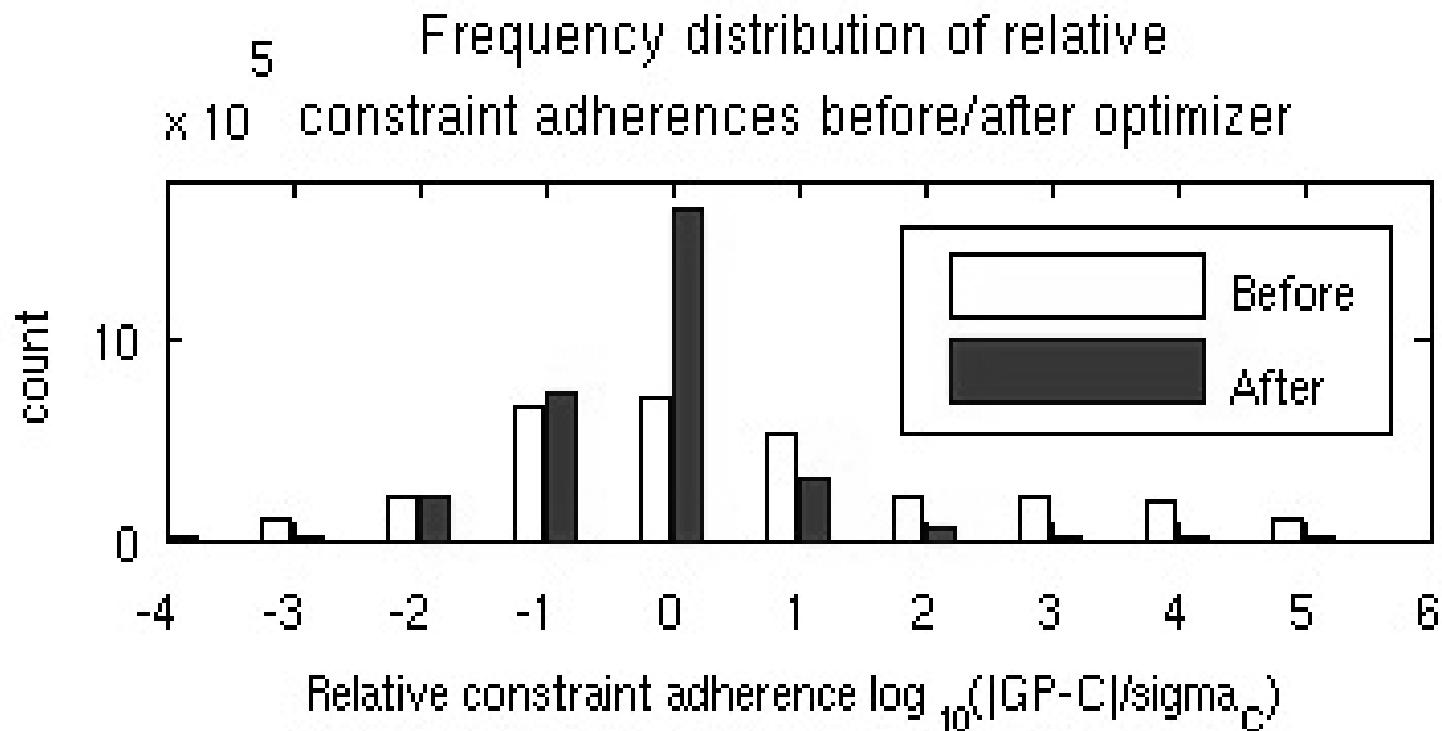




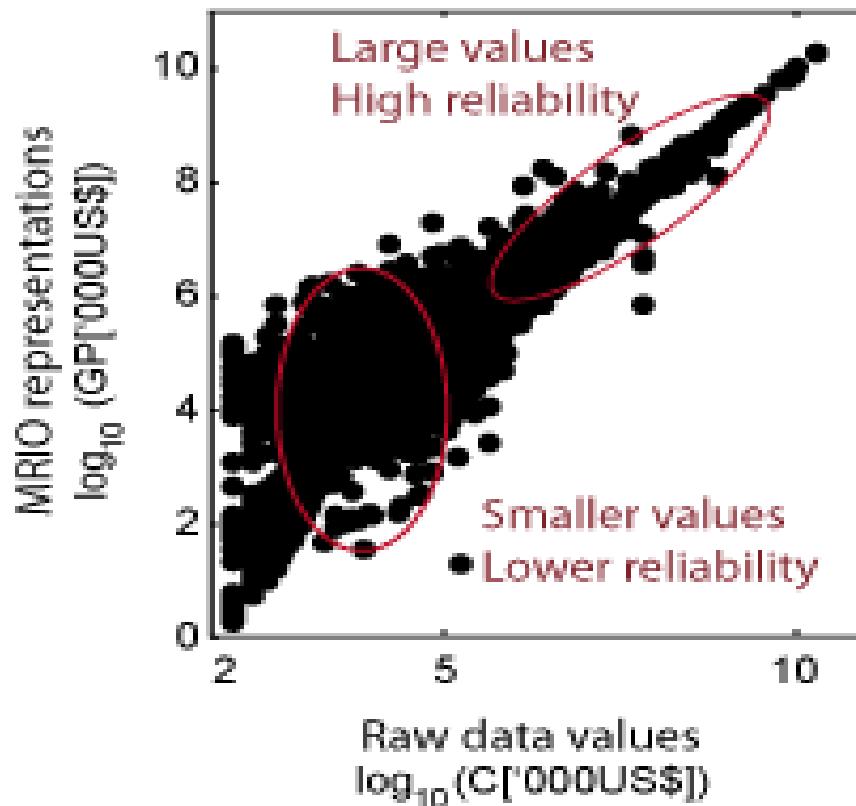
Data profile



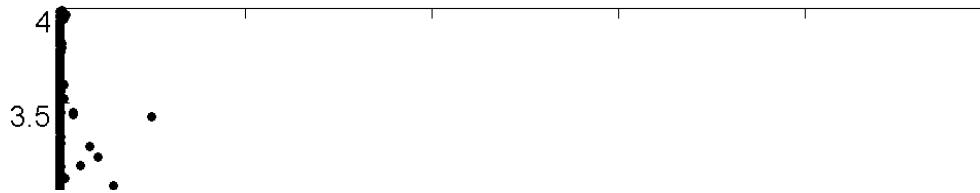
Optimisation run diagnostics



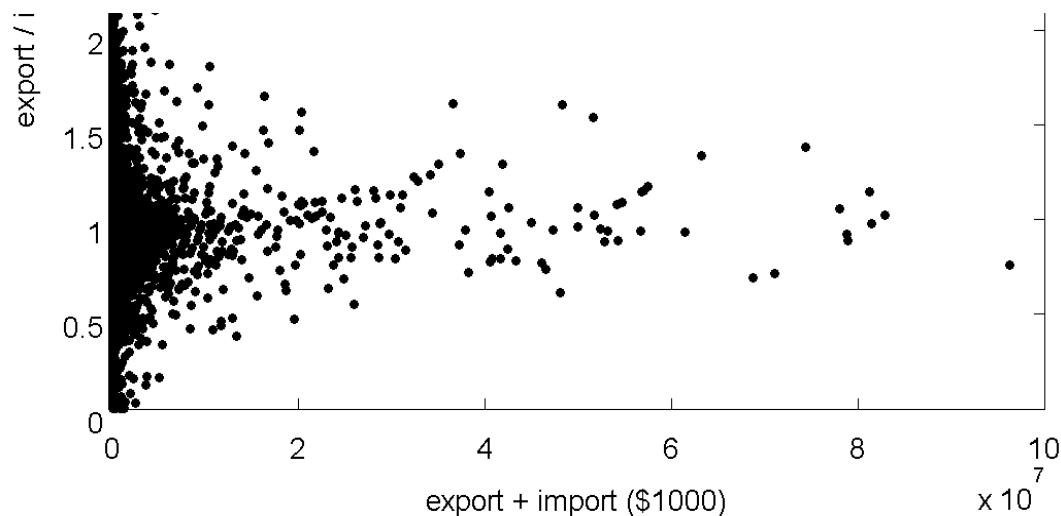
Uncertainty



Data conflict



All global trade exports \$100 & import trade





Thank you !

www.isa.org.usyd.edu.au

www.worldmrio.com



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The use of MRIO tables for global environmental policy



THE UNIVERSITY OF
SYDNEY



funded by the Australian Research Council





Li Gao, Director of the Department of Climate Change in
China's National Development and Reform Commission





"We produce products and these products are consumed by other countries, especially the developed countries. This share of emissions should be taken by the consumers but not the producers"





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UK in 'delusion' over emissions



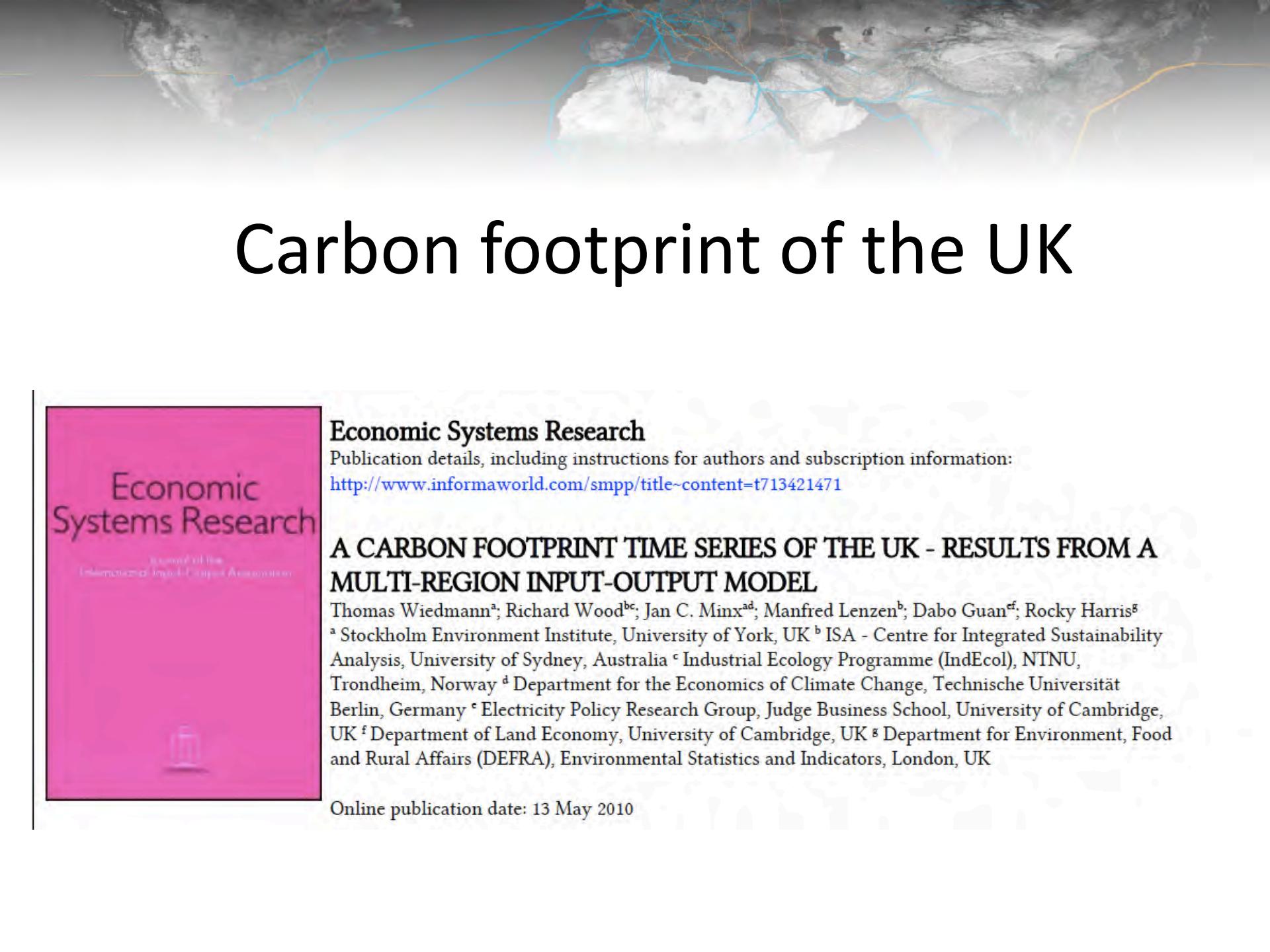
Is the UK deluded over its claim to be cutting greenhouse gases?



02.26

05.30

The UK has been deluded over its claim to be cutting greenhouse gases, according to two reports that will shake the climate change debate. Dr John Barrett, from the Stockholm Environment Institute at the University of York who wrote the report, and environment minister Phil Woolas discuss the report.



Carbon footprint of the UK

Economic
Systems Research

A Journal of the
International Institute of Applied Systems Analysis

Economic Systems Research

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t713421471>

A CARBON FOOTPRINT TIME SERIES OF THE UK - RESULTS FROM A MULTI-REGION INPUT-OUTPUT MODEL

Thomas Wiedmann^a; Richard Wood^{bc}; Jan C. Minx^{ad}; Manfred Lenzen^b; Dabo Guan^{ef}; Rocky Harris^g

^a Stockholm Environment Institute, University of York, UK ^b ISA - Centre for Integrated Sustainability Analysis, University of Sydney, Australia ^c Industrial Ecology Programme (IndEcol), NTNU, Trondheim, Norway ^d Department for the Economics of Climate Change, Technische Universität Berlin, Germany ^e Electricity Policy Research Group, Judge Business School, University of Cambridge, UK ^f Department of Land Economy, University of Cambridge, UK ^g Department for Environment, Food and Rural Affairs (DEFRA), Environmental Statistics and Indicators, London, UK

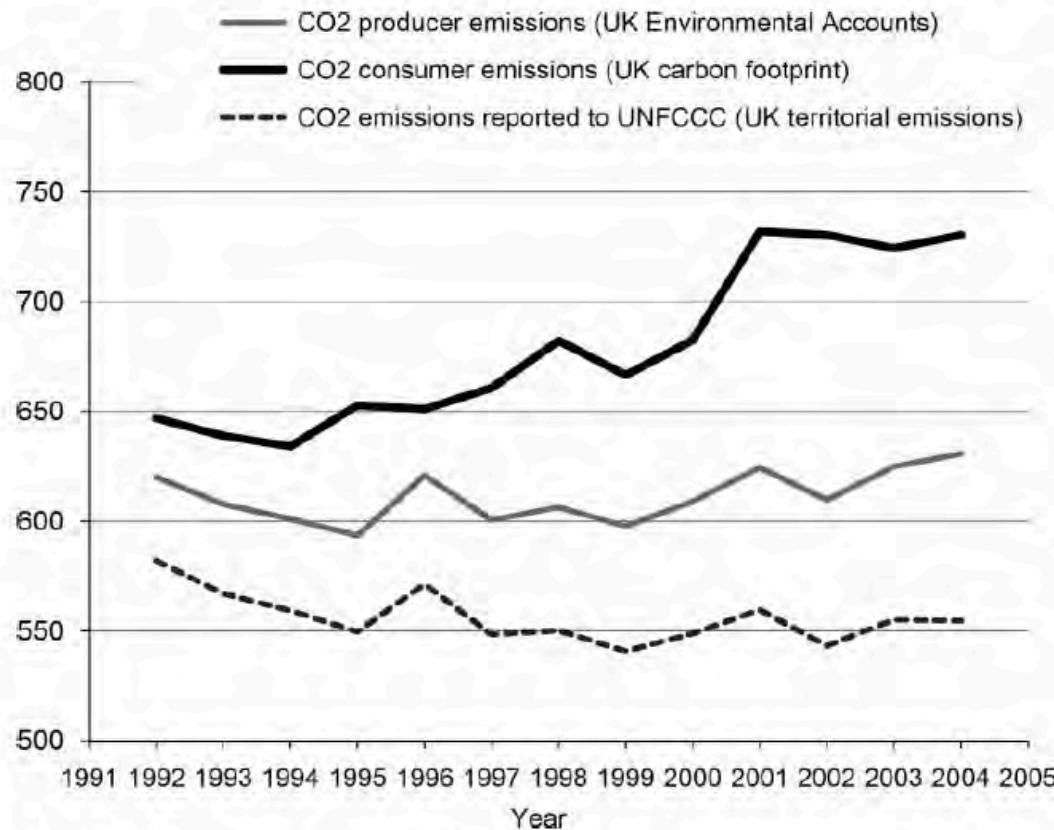
Online publication date: 13 May 2010

Trend analysis



Trend analysis: UK carbon footprint

FIGURE 2. Total UK CO₂ emissions from 1992 to 2004 according to different accounting principles.



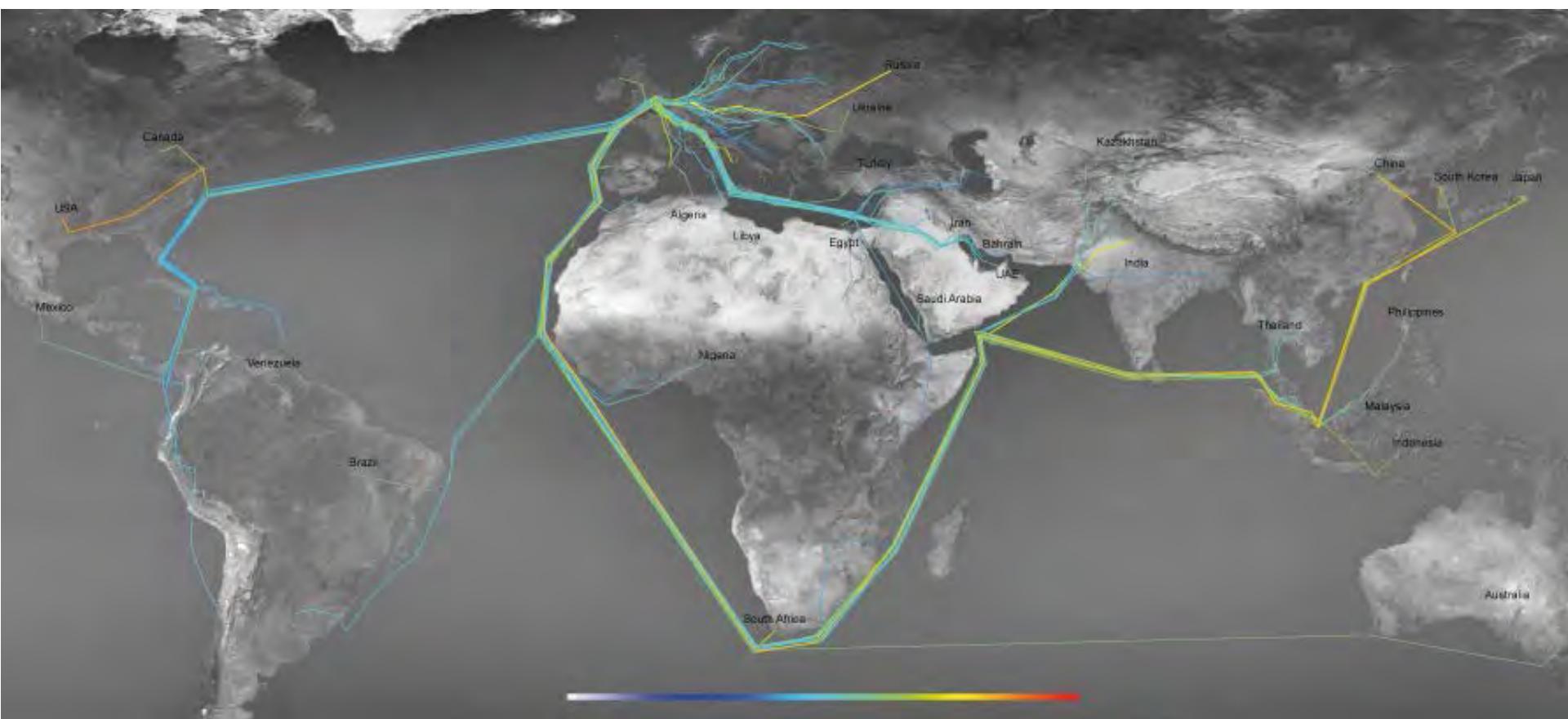
Note: the vertical scale does not start at zero.



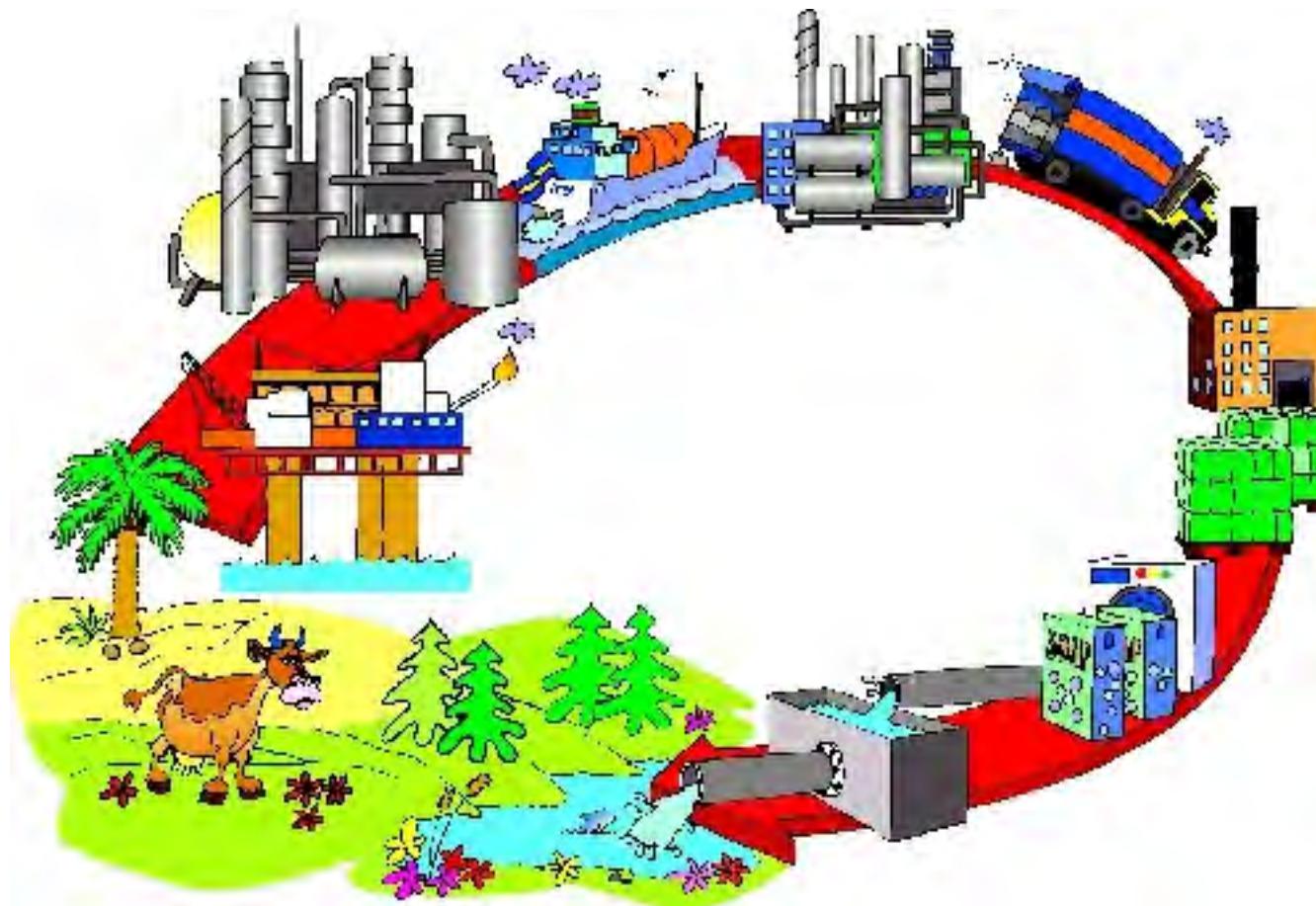
Supply-chain analysis



Supply-chain analysis: UK Carbon footprint

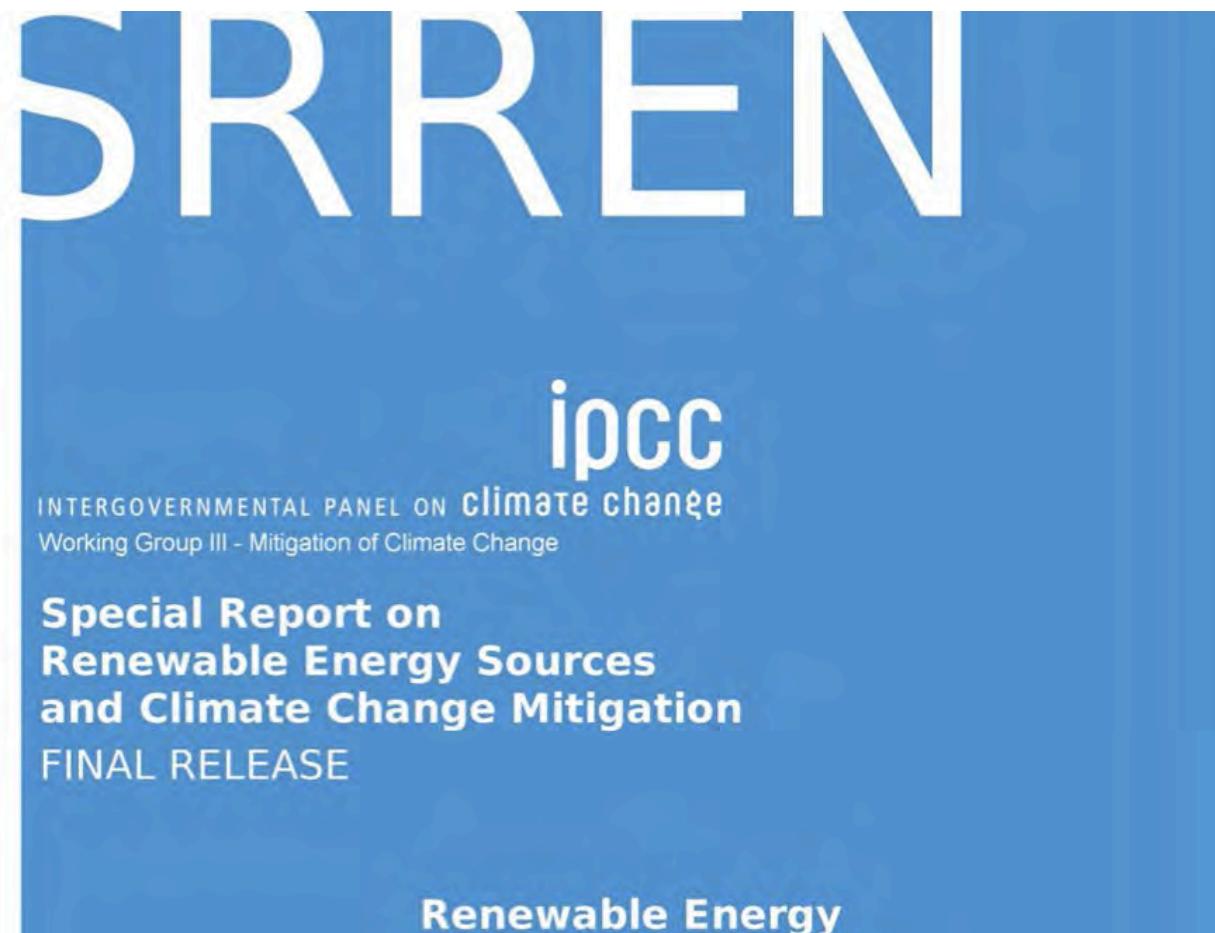


Life-Cycle Assessment





Life-Cycle Assessment: Renewable power



Product carbon labelling

