Policy applications of environmental accounts

John Power
Australian Bureau of Statistics
Centre of Environment Statistics
John.power@abs.gov.au

Structure

- 1. Input-Output Analysis
  - What is it and what can it do?

- 2. Structural decomposition analysis
  - Dutch CO2 example

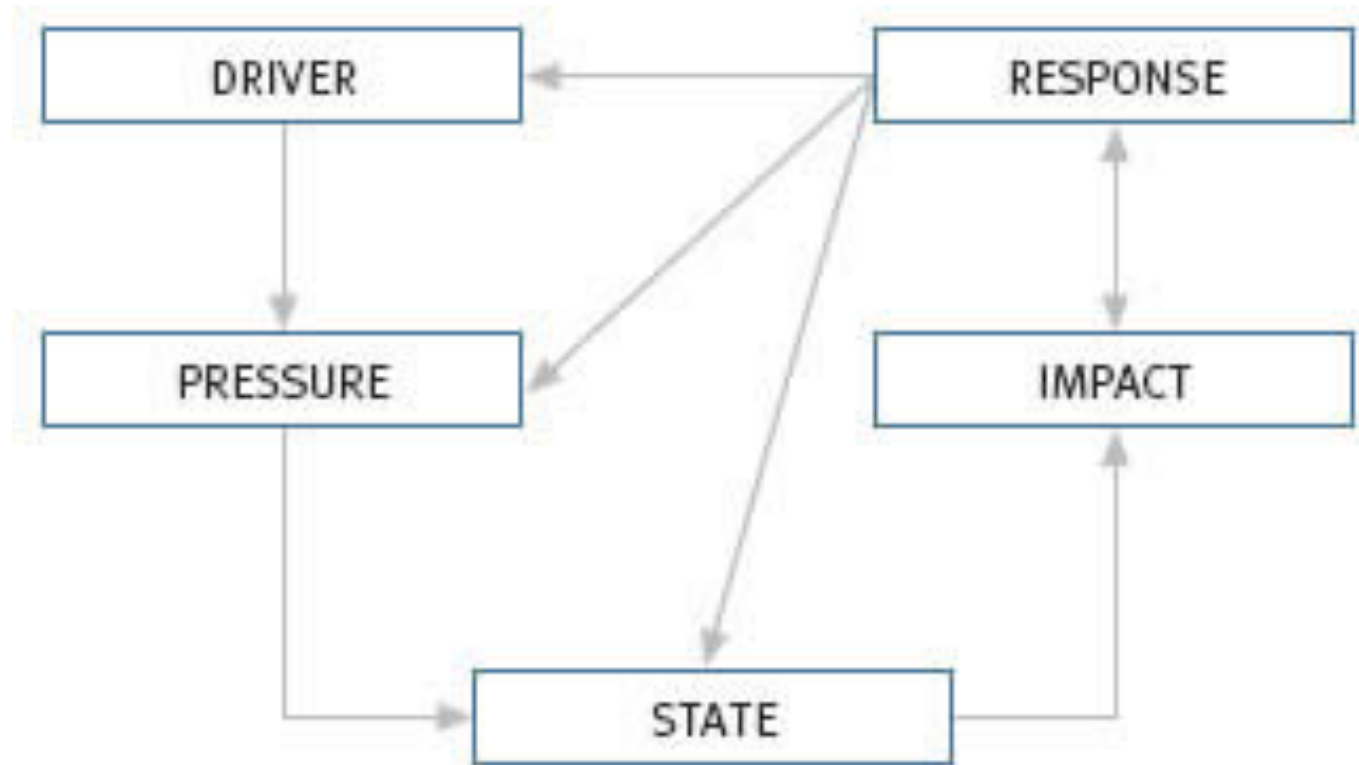- 3. What's happening now in Australia?

Uses

- "SEEA is intended to meet the needs of policy makers by
  - providing indicators and descriptive statistics
  - serving as a tool for strategic planning and policy analysis to identify more sustainable development paths"

Helps inform at all stages

Policy applications

- Further applications of environmental-economic accounting:

- I. Input-Output (and Supply-Use) analysis

- II. What causes indicators to change?

- III. Modelling change

What is Input-Output analysis?

- As an analytical tool, input-output data are integrated into macroeconomic models in order to analyse the link between final demand and industrial output levels.

- Important to know the driving forces and indirect effects of resource use and generation of pollutants

I. Input-output analysis

- Previously, described direct resource use and generation of pollutants associated with production

- Important to know the driving forces and indirect effects of resource use and generation of pollutants

- Also important to know consequences for economic growth and job numbers

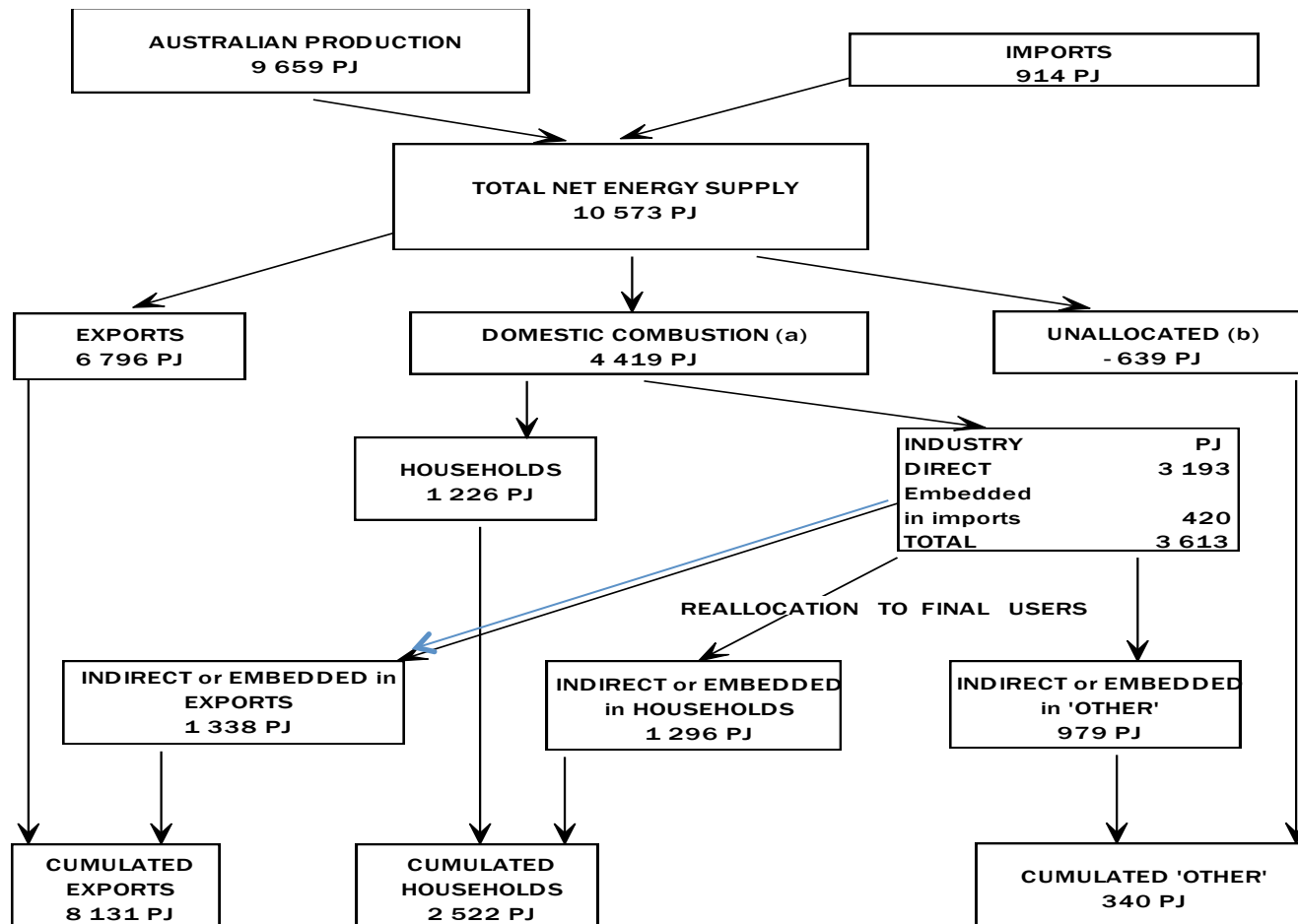- I-O analysis provides information on this

Input-output analysis: indirect effects

- Used to redistribute emissions (or resource use) from industry to the final user - i.e., where the demand is coming from

- Used to link economic activity with pollution emissions and energy use (physical)

- A common application is the calculation of the total energy requirements of final products

I-O analysis: Energy supply and use, allocated to final users

AUSTRALIAN PRODUCTION
9 659 PJ

IMPORTS
914 PJ

TOTAL NET ENERGY SUPPLY
10 573 PJ

EXPORTS
6 796 PJ

DOMESTIC COMBUSTION (a)
4 419 PJ

UNALLOCATED (b)
- 639 PJ

HOUSEHOLDS
1 226 PJ

INDUSTRY	PJ
DIRECT	3 193
Embedded in imports	420
TOTAL	3 613

REALLOCATION TO FINAL USERS

INDIRECT or EMBEDDED in EXPORTS
1 338 PJ

INDIRECT or EMBEDDED in HOUSEHOLDS
1 296 PJ

INDIRECT or EMBEDDED in 'OTHER'
979 PJ

CUMULATED EXPORTS
8 131 PJ

CUMULATED HOUSEHOLDS
2 522 PJ

CUMULATED 'OTHER'
340 PJ

(a) Use by industry and households
(b) Changes in stocks and statistical discrepancies
Note: Conversion loses have been allocated to the using sector

Structural decomposition

- Technique to distinguish different sources of change (overall or indicator) over time

- Environmental policy vs. other factors?

- Changes in composition of the economy?

Structural decomposition

- Netherlands GHG emissions:
- 20.3 % increase in CO_2 emissions (1987-98)
  - economic growth (production) + 35 %
  - improved efficiency -11.5 %
  - structural change -3.2 %

Other country uses...

- assess the indirect and direct pollution content of foreign trade for Netherlands

- environmental effects of Norway's long term economic plans

- material flow analysis for promoting Japanese recycling activities

- evaluate the reduction of emissions due to environmental protection expenditure in Japan

What's happening now in Australia?

- $10b National Water Management Plan
- Compare environmental & socio-economic performance of industries
- Potential for increasing effective water supply & improving water productivity
- Water pricing & incentives for water conservation
- economic models for forecasting water demand

Australian water accounts

- ABS Water Accounts relatively new tool for policy makers and researchers

- Potential in decision-making and analysis yet to be fully realised
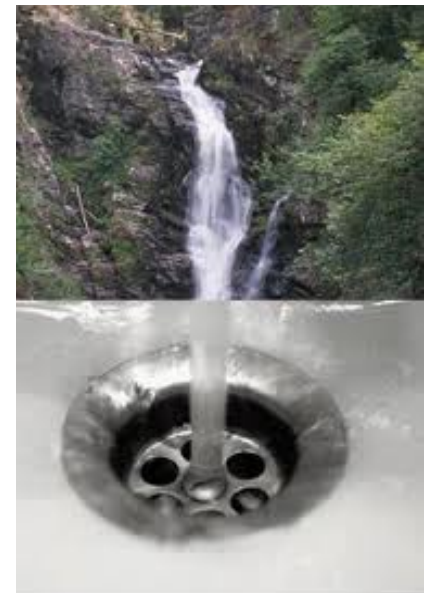
Australian water accounts - example

- Models developed to estimate the impact of increased water prices on water use in the southern MDB

- In short-term, demand for irrigation water unresponsive to water price

- In long term, respond by altering the crops they irrigate

- however, investment in on-farm water saving technology unlikely to be justified in terms of water saved.

Australian water accounts – forecasting demand

Water User - States
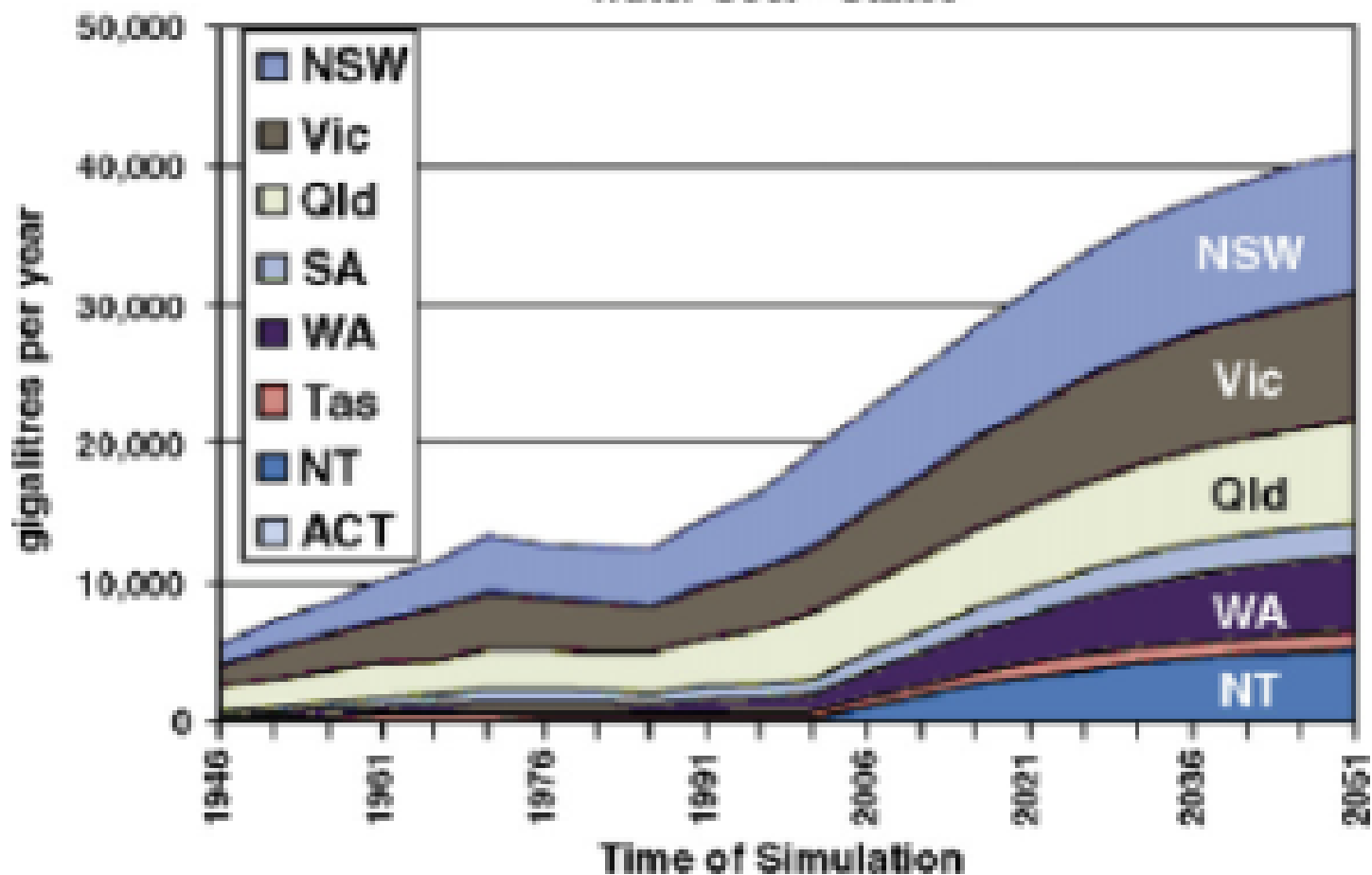
CO2 emissions embodied in the Australian international trade in goods

- Why is this important?
  - Carbon leakage through international trade has been identified as a limitation of global reduction in CO2 emissions.
  - The relocation of production activities from less carbon-intensive economies to more carbon intensive economies increases the global production of CO2.

GHG Emissions, and economic production and consumption

Two standard approaches:

Production Approach

- GHGs physically produced by industry households within an economic territory

Consumption Approach

- GHGs embedded in Final demand + imports - exports

Production vs. Consumption based measurement

IMPORTS

AUSTRALIAN PRODUCTION USED IN AUSTRALIA

EXPORTS

PRODCTION BASED EMISSIONS

CONSUPTION BASED EMISSIONS

Informing the debate

- International negotiations on climate change
- Consumers may lack constituency to alter production methods
- Producers lack incentives to improve methods
- Governments play a key role

PRODUCTION BASED RESULTS

- E&G industry highest emitter, followed by Agriculture and Manufacturing
- Combined they accounted for:
  - 74% of emissions
  - 15% GVA
  - 14% Employment
- Commercial and Services
  - 5% Emissions
  - 62% GVA
  - 70% Employment

ADJUSTING FOR SEEA

RESIDENCE vs. TERRITORY BASIS

- EMISSIONS OF TOURISTS

- BUNKERING

Applied input-output analysis to determine emissions induced by final demand

Production vs. Consumption based measurement

IMPORTS
174 Mt C02-e

AUSTRALIAN PRODUCTION USED IN AUSTRALIA
357 Mt C02-e

EXPORTS
228 Mt C02-e

PRODCTION BASED EMISSIONS

CONSUPTION BASED EMISSIONS

585 Mt C02-e

531 Mt C02-e

Australian Bureau of Statistics

Completing the Picture: Environmental Accounting in Practice
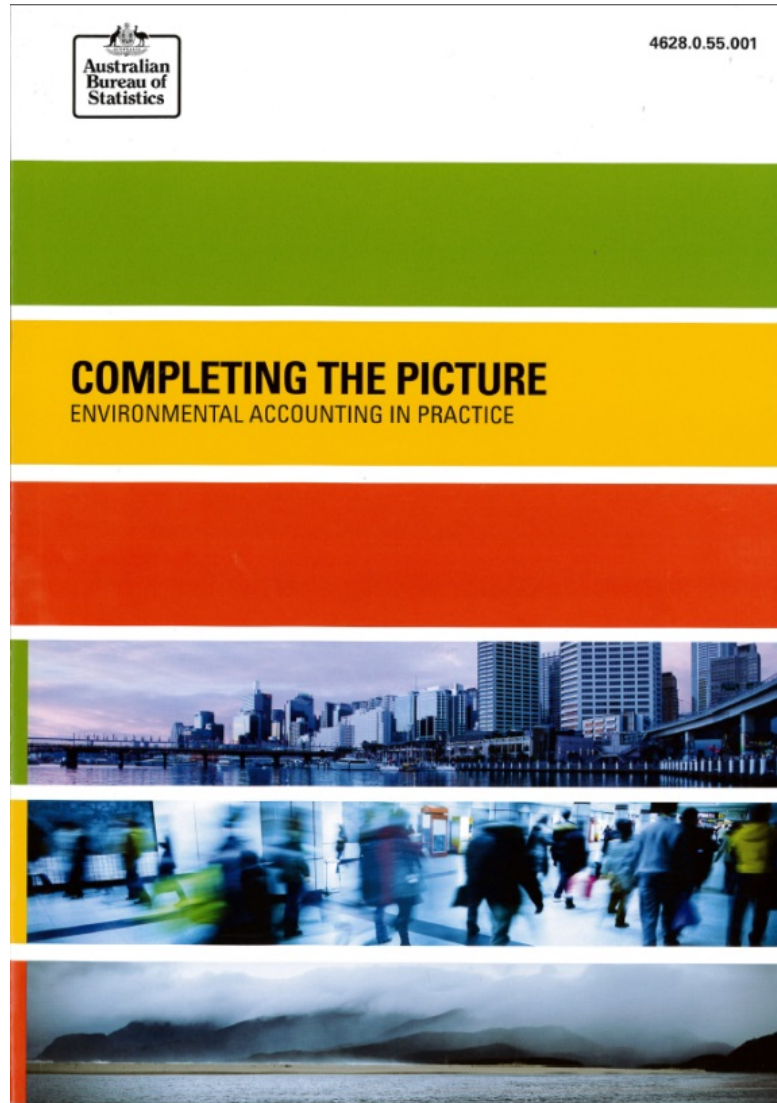
Summary

- score keeping and management
- learn how the environment and economy interactions work
- analysing the environmental and economic consequence of policy options
- framework for modelling and forecasting, environmental effects related to economic aggregates

Questions?