Use of environmental indicators

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Indicators

WAVES

Structure of session

- Introduction - accounts & indicators

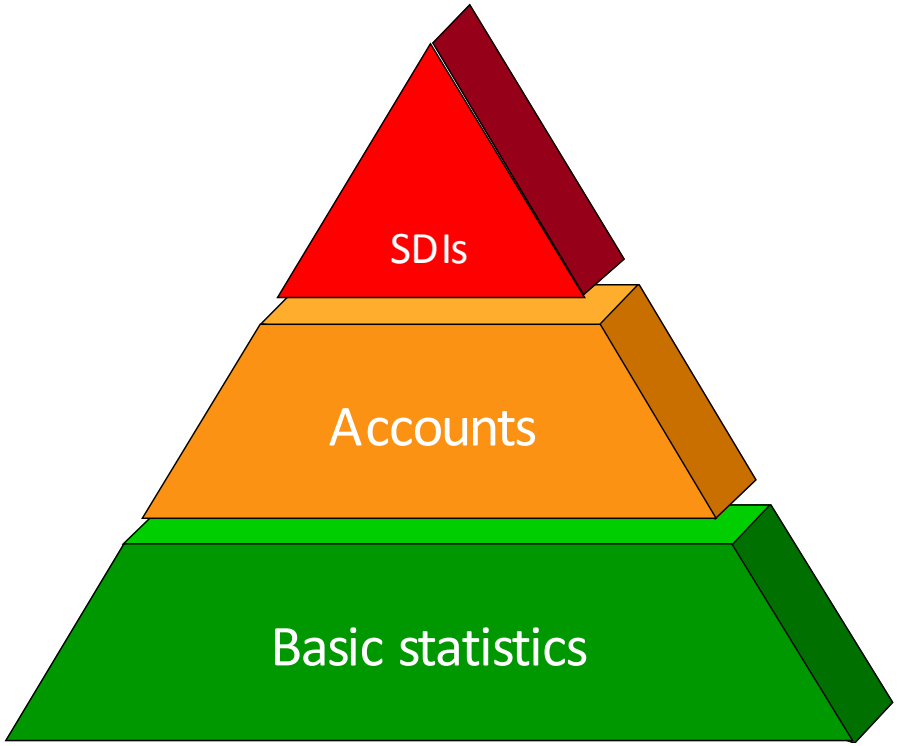
- Types of Indicators:
- 1. Environmental-economic profiles
- 2. Environmentally-modified macroeconomic indicators

Why indicators?

- Need for 'simple to understand' information
  ⇒ Restricting the wide range of data
  ⇒ Contributing to the provision of condensed and comprehensible information accessible to a wider audience
- Tools for target setting and score keeping
  ⇒ Comparisons over time and between countries
- ⇒ Balance between simplification and scientific accountability

Descriptive statistics & indicators

- Information pyramid



Accounts and indicators

- *Advantage of embedding indicators in an accounts framework?*
  - Consistency and comparability
  - Sound points of reference: GDP, Consumption, investment etc.,
  - Opportunities of analysing underlying relationships: modelling, productivity measurement

What do indicators do?

- Collecting information about the environment allows production of environmental indicators
- Indicators can identify, and highlight, in simple terms, key changes that are taking place
- Individual accounts provide more detailed information

Types of indicators

- 2 types of indicators:

- A. Environmental economic profile ("eco-efficiency") indicators

- B. Environmentally-modified macroeconomic indicators

A1. Environmental-Economic profiles – Water productivity

- Economic contributions vs. environmental burdens
- Example 1 - water productivity
- *Productivity measure: Water*

  = industry value added / water use

Example 1.1: Water productivity by industry, Australia

- Industry Gross Value Added for water using industries, Australia - 2011-12

	Industry GVA $m	Water consumption GL	IGVA $m per GL of water consumed
Ag, forestry and fishing	29,027	7,314	4
MinIng	114,766	506	227
Manufacturing	110,035	641	172
Electricity & Gas	18,331	325	56
Water Supply, etc.	9,213	2,318	377
Other	889,622	1,139	781
Total	**1,170,994**	**12,243**	**96**

Example 1.2: Volume of water applied and GVIAP, by agricultural commodity, 2011-12

	Water Applied ML	GVIAP $m	GVIAP/ML $
Cotton	2,223,445	2,155	969
Rice	1,275,842	248	194
Sugar Cane	668,252	646	967
Frunit and Nuts	740,009	2,429	3,282
Grapes	457,858	972	2,122
Vegetables	398,299	2,631	6,604
Dairy	1,224,888	2,055	1,678
Other Cattle and livestock	588,251	1,090	1,853

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A2. Environmental economic profiles – Energy intensity

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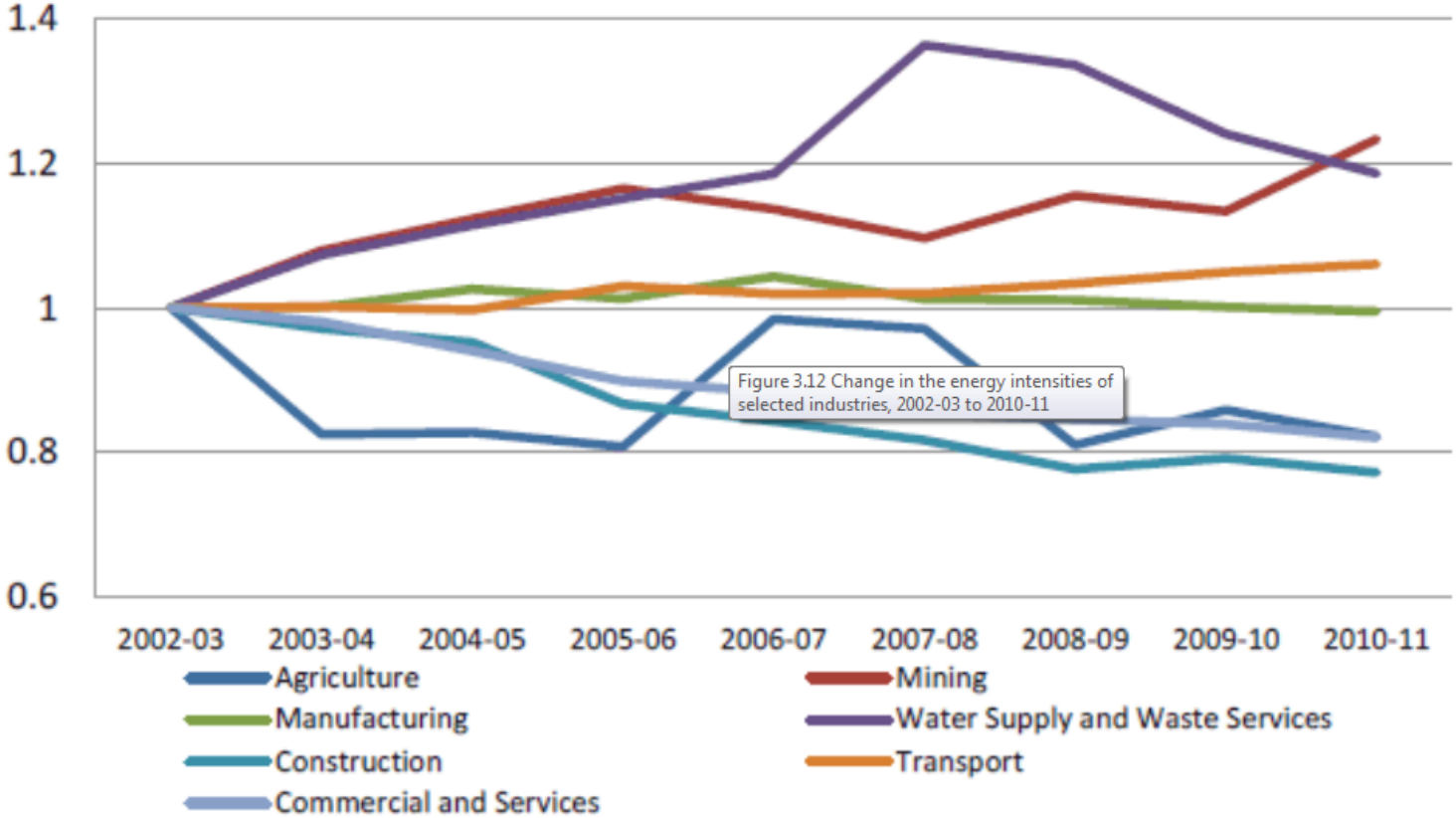
- Economic contributions vs. environmental burdens
- Example 2 – Energy Use
- *Intensity measure: Energy*

  = Energy Use / industry value added
- Can be applied to intensities of industry, sector or country

Example 2. Energy Intensity of industry, Australia

Figure 3.12 Change in the energy intensities of selected industries, 2002-03 to 2010-11



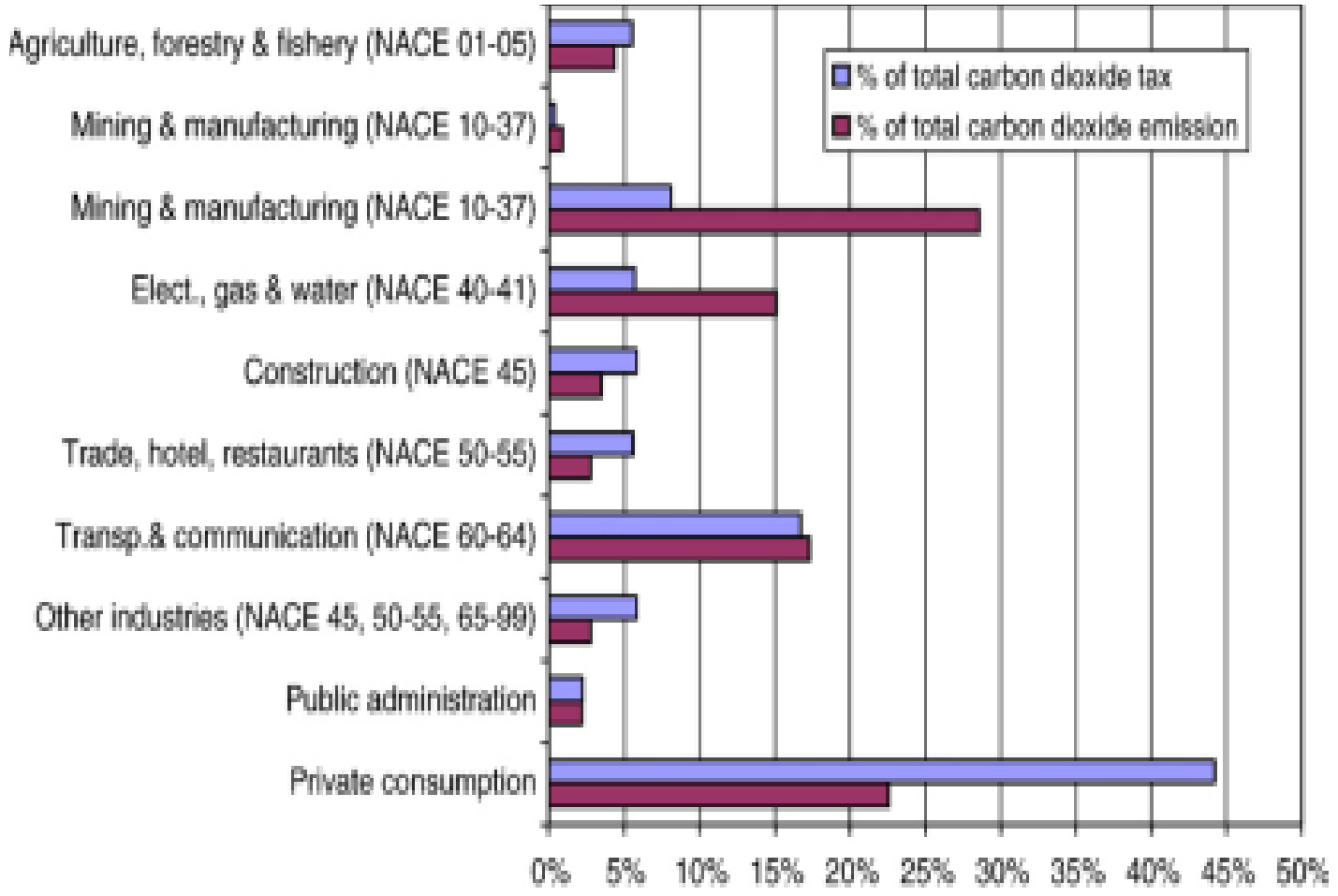
Note, Index: 2002-03 = 1

Source: Energy Account, Australia (ABS cat. no. 4604.0), *Australian System of National Accounts* (ABS cat.no. 5204.0)

A3. Environmental economic profiles – Environmental tax vs. GHG emissions

- Environmental tax vs. environmental burdens
- *A **tax** whose **tax** base is a physical unit (or a proxy of it) that has a proven specific negative impact on the **environment**.*
- Example 3 – CO2 emissions by industry

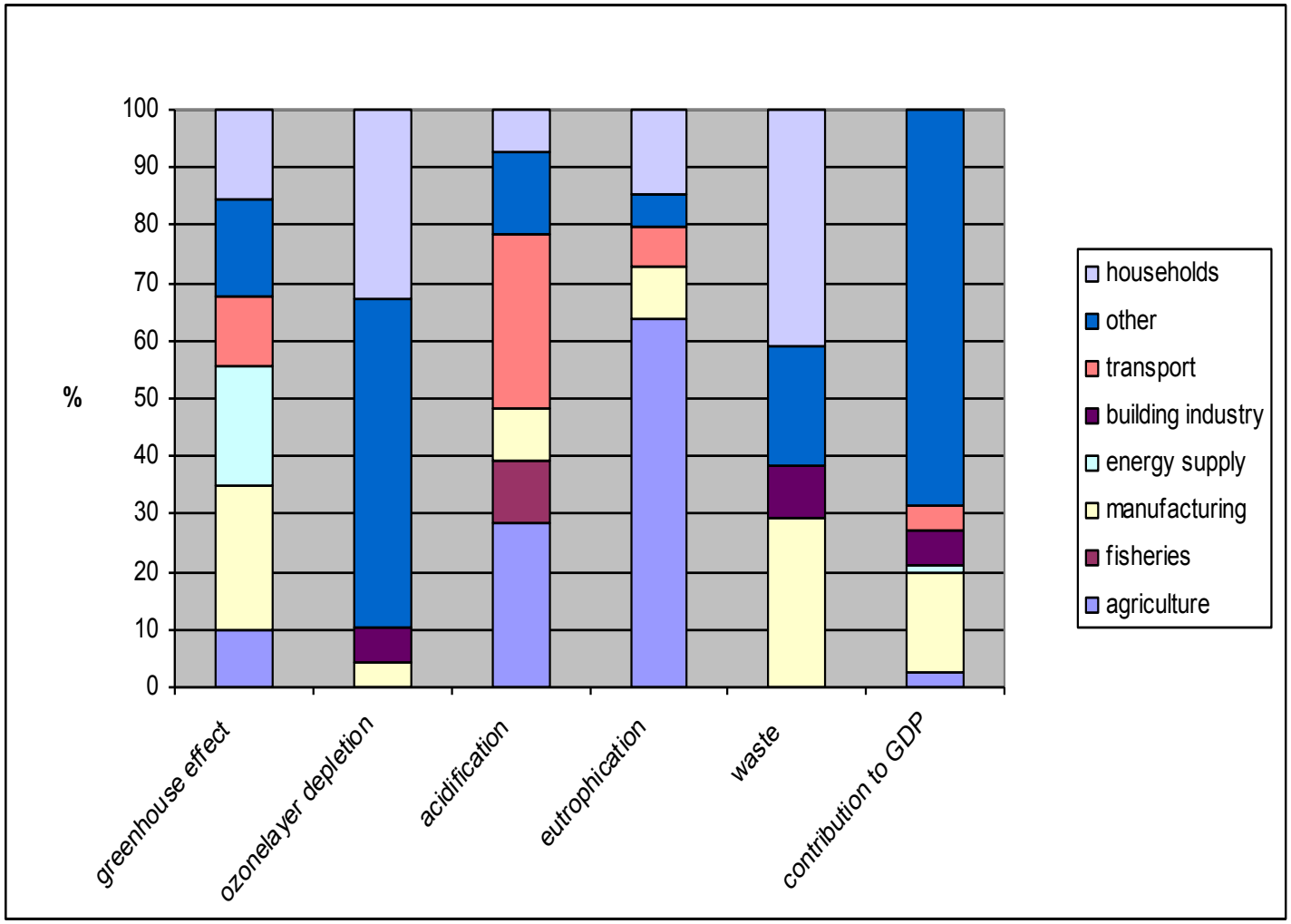
Example 3. CO2 taxes & emissions, Sweden, 2002



A3. Environmental economic profiles - Environmental tax vs. GHG emissions

- Mainly aimed at reducing fossil fuel use by the household and transport sectors
- Some industries are exempted due to concerns about international competition
- Results showed disparities between emissions and environmental taxes paid in Sweden

A4. Contribution to the environmental indicators



B1. Environmentally-modified macroeconomic indicators

- Some practitioners advocate measuring sustainability by:
  - revising conventional macroeconomic indicators; or
  - producing alternative macro indicators

B1. Environmentally-modified macroeconomic indicators

- Questions over how do we calculate a measure of GDP that accounts for demands on environment?
- No consensus on how "green GDP" calculated
- not even consensus on whether to attempt at all

B1. Environmentally-modified macroeconomic indicators

Various approaches

- for depletion (SEEA-2012)
- for defensive expenditure (EPE)
- for degradation

- Environmentally-adjusted Net Domestic Product (eaNDP) the most commonly used indicator
- Focuses attention on depletion and degradation of natural capital

eaNDP for 5 countries

Country and time period	Affect on macroeconomic aggregates	Coverage	Valuation method
Japan, 1990	NDP reduced 2.4%	Depletion of minerals	Net price method
		Degradation of land, air, water, including CO2 and CFCs	Maintenance cost
Korea, 1985-1992	NDP reduced 4.1-2.6%	Depletion of minerals	Net price method
		Degradation of land, air, water	Maintenance cost
Philippines, 1988 to 1996		Depletion of forests, fish, minerals	Net price method
		Degradation of land, air, water	Maintenance cost
Germany	NDP reduced 3%	Depletion of minerals	Net price method
		Degradation of land, air, water including CO2	Maintenance cost
Sweden, 1993 and 1997	NDP reduced 0.6%	Depletion of minerals	Economic depreciation
		Environmental damage due to SOX, NOX only	Damage cost
		Environmental protection expenditures	Market cost

Note: See text for a more detailed description of coverage and valuation methods.

Key Concepts:
Descriptive statistics and indicators

- 1. Environmental-economic (eco-efficiency) profiles can provide important information for policy makers
- Economic contributions are assessed in conjunction with environmental burdens
- e.g., water use, carbon emissions




Key Concepts:
Descriptive statistics and indicators

- 2. Environmentally modified macroeconomic indicators can provide measures of sustainability
- e.g., eaNDP,
- But, there is no consensus on how to develop environmentally modified macro-aggregates

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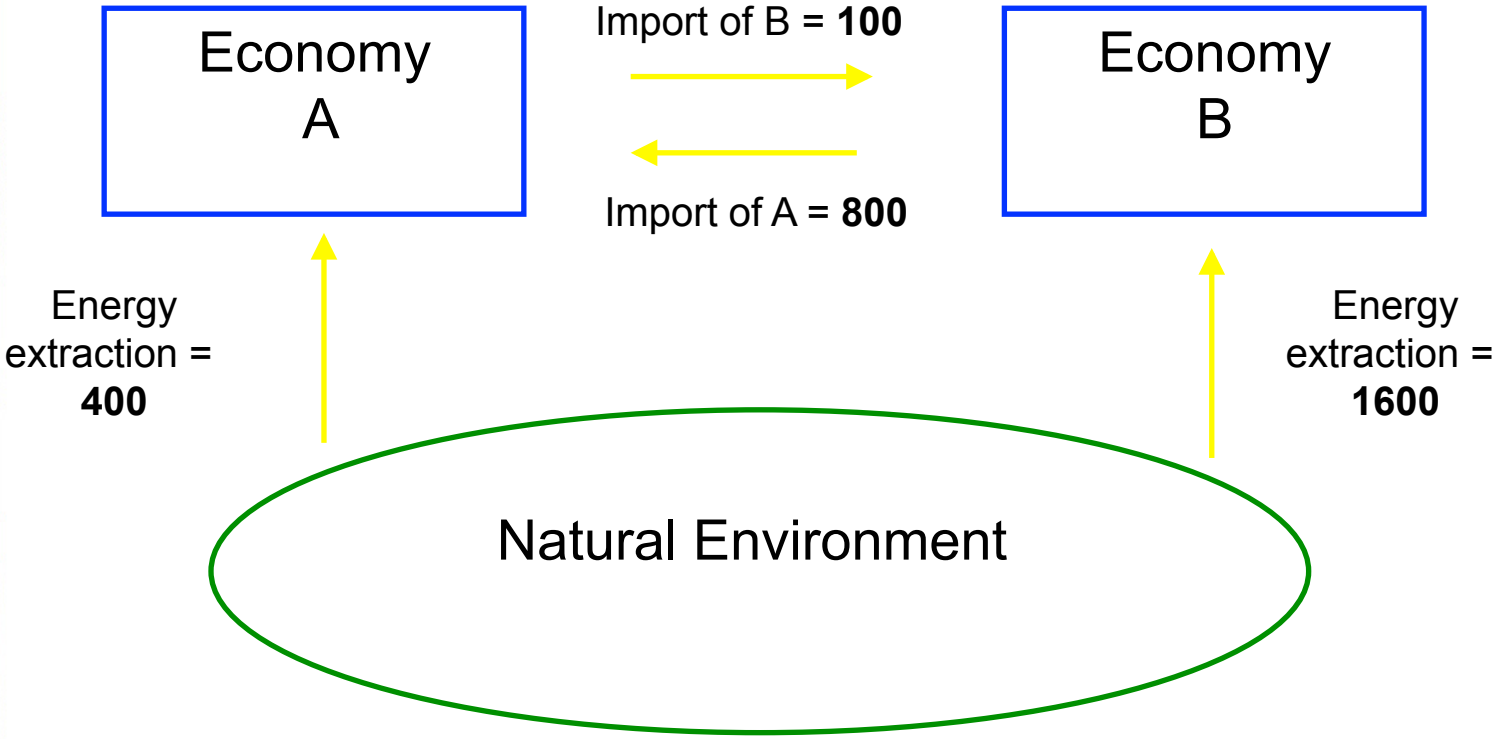
Questions?

Indicators Workshop Exercise



Indicators Workshop Exercise

Calculate:

- The Direct Material Input of both countries
- The Environmental Consumption of energy of both countries
- Please give your comments on both indicators?

Definitions

-***Direct Material Input:*** Gross amount of material inputs into an economy

-***Environmental Energy Consumption:*** Percentage of total energy extracted from the environment consumed by an economy

Additional information:

- Consumption in real terms is 3 times higher in country A. The product composition of consumption in both countries is equal

- Countries A and B have equal production technologies

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- ***Energy Trade Balance:*** Energy imported – Energy Exported

- **Environmental balance of trade (for energy):**