Comparison of "CO_2 Efficiency" between Company and Industry

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AIST

Introduction

Eco-Efficiency

Economic

Ecological (Environment)

An important tool to achieve sustainable development

$$\text{Eco-Efficiency} = \frac{\text{Product or Service value}}{\text{Environmental influence}}$$

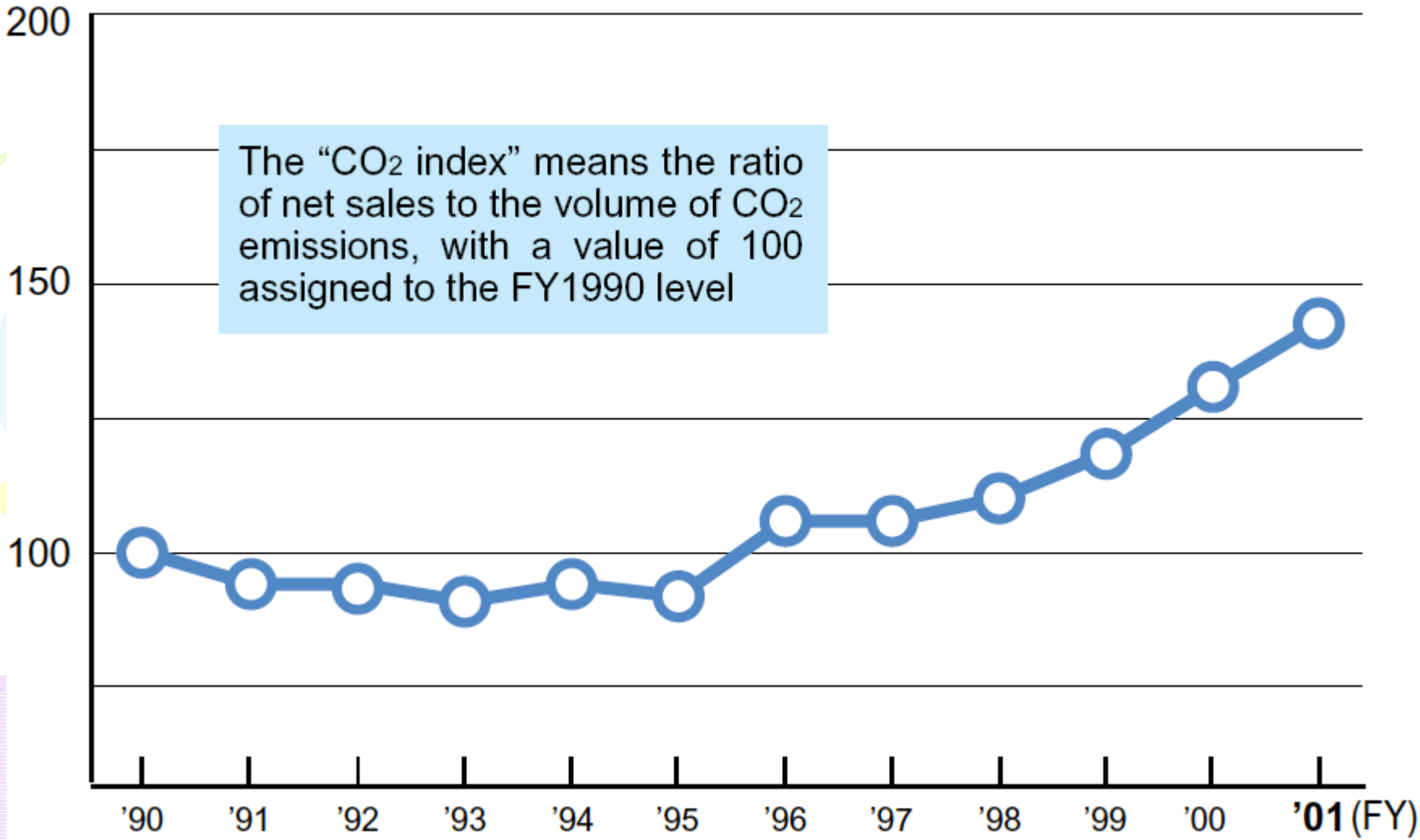
Quantity of goods or services produced or provided to customers
Net sales

Energy consumption
Materials consumption
Water consumption
Greenhouse gas emissions (CO2…)
Ozone depletion substance emissions
……

WBSCD, 1992

<CO₂ Index due to Automobile Production>

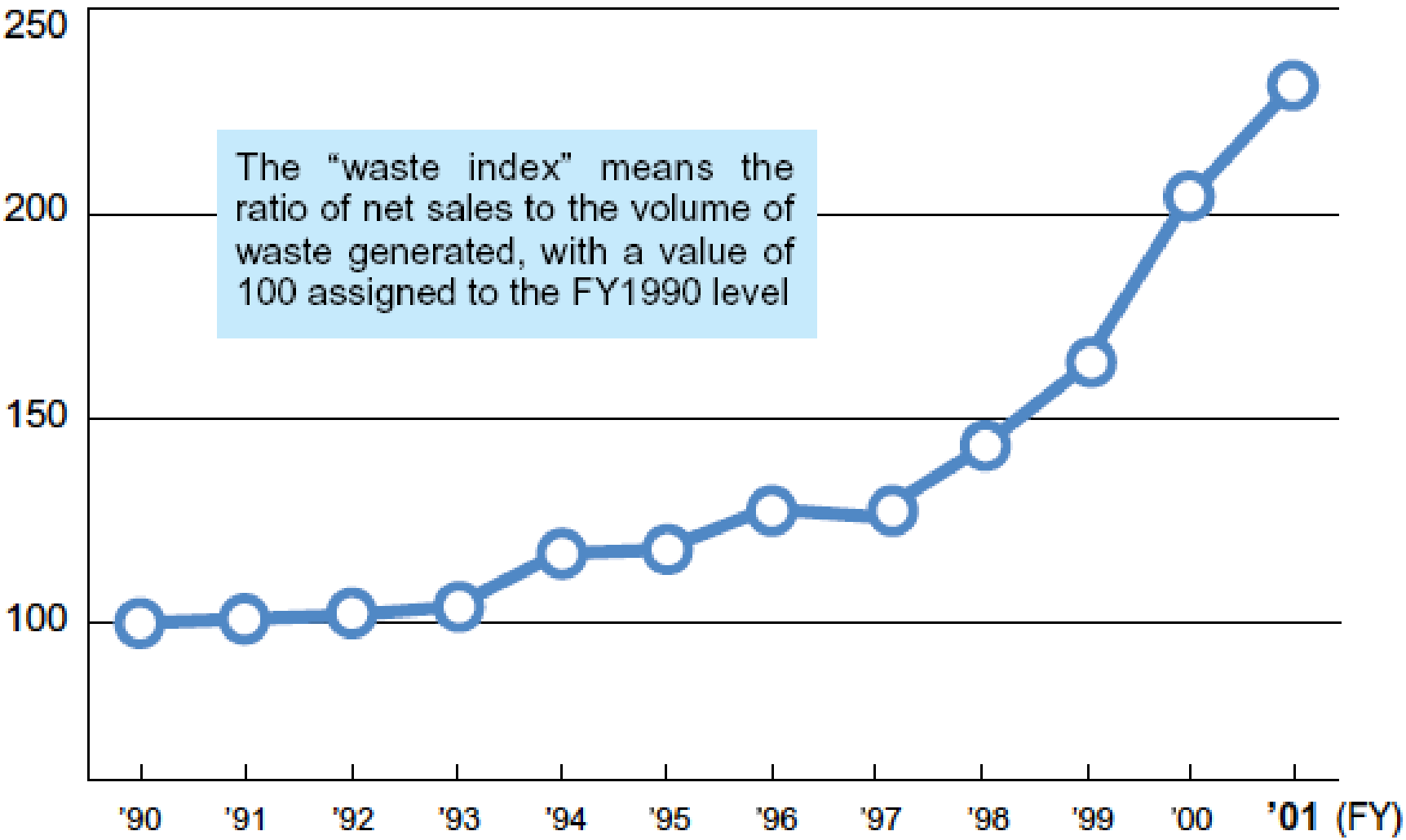
Eco-efficiency = Net sales / Environmental impact



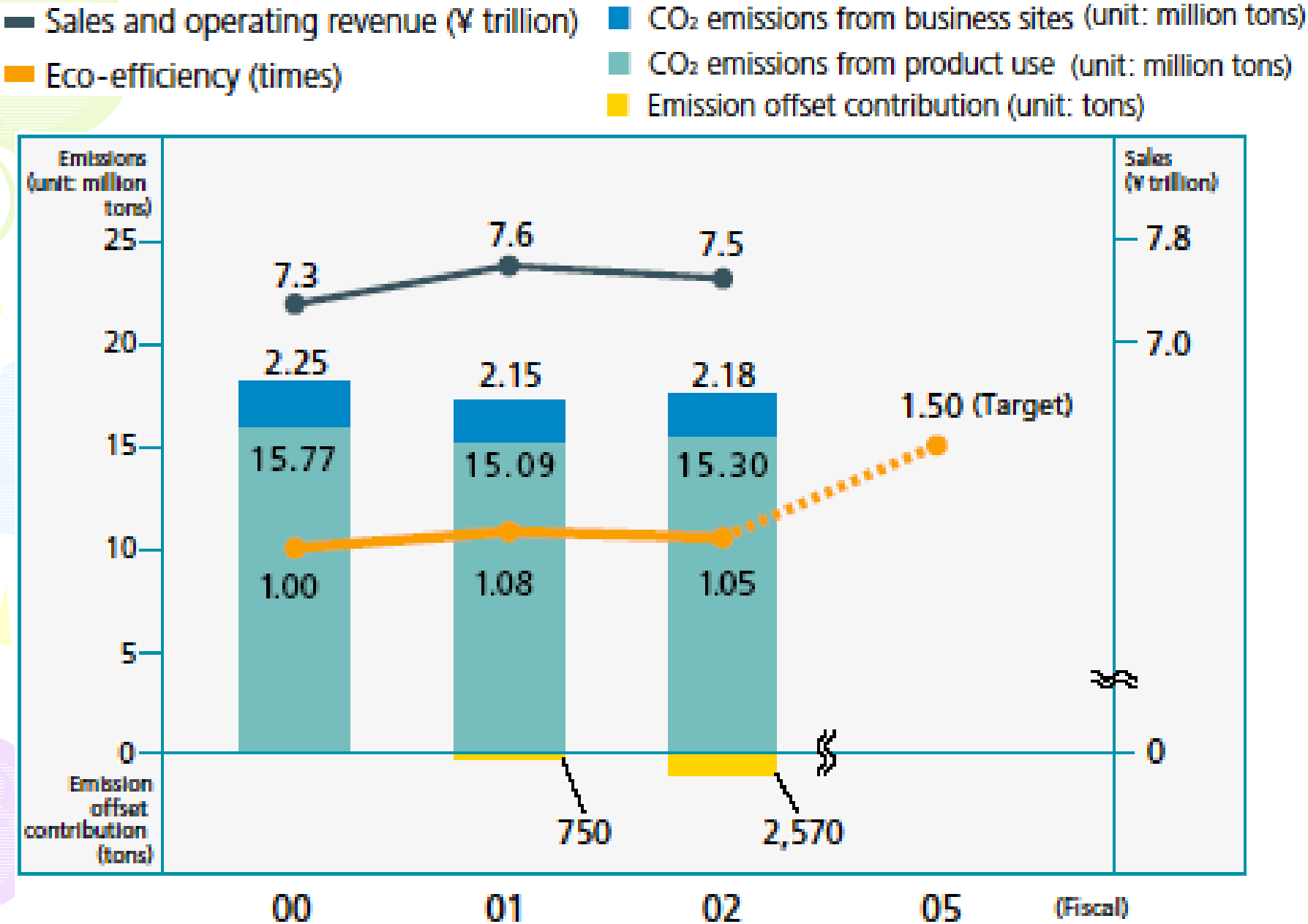
Source : TOYOTA Environmental Report 2002

Eco-efficiency = Net sales / Environmental impact

<Waste Index due to Automobile Production>



Source : TOYOTA Environmental Report 2002



Source: Sony Environmental Report 2002

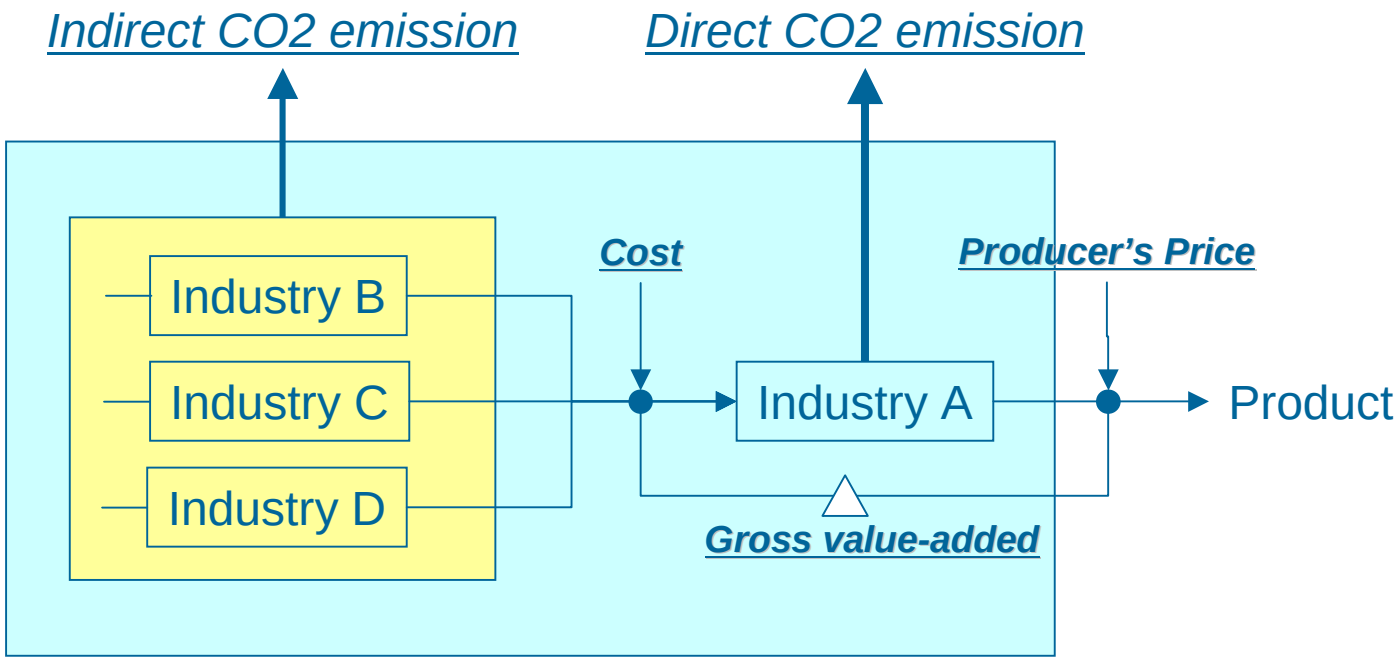
$$\text{Eco-Efficiency} = \frac{\text{Product or Service value}}{\text{Environmental influence}}$$

This study

- Price
- Gross value-added
- Gross income
- Cost

$$\text{CO2 Efficiency} = \frac{\textbf{Economic index}}{\textbf{CO2 emission}}$$

- I-O table data
- LCI data
- Environmental report of company
- Investor relation information



$$\text{Total CO2 efficiency} = \frac{\text{Producer's Price}}{\text{Total CO2 emissions}}$$

$$\text{Direct CO2 efficiency} = \frac{\text{Gross value-added}}{\text{Direct CO2 emissions}}$$

$$\text{Indirect CO2 efficiency} = \frac{\text{Cost}}{\text{Indirect CO2 emissions}}$$

Fig.1-1 Concept of CO2 efficiency

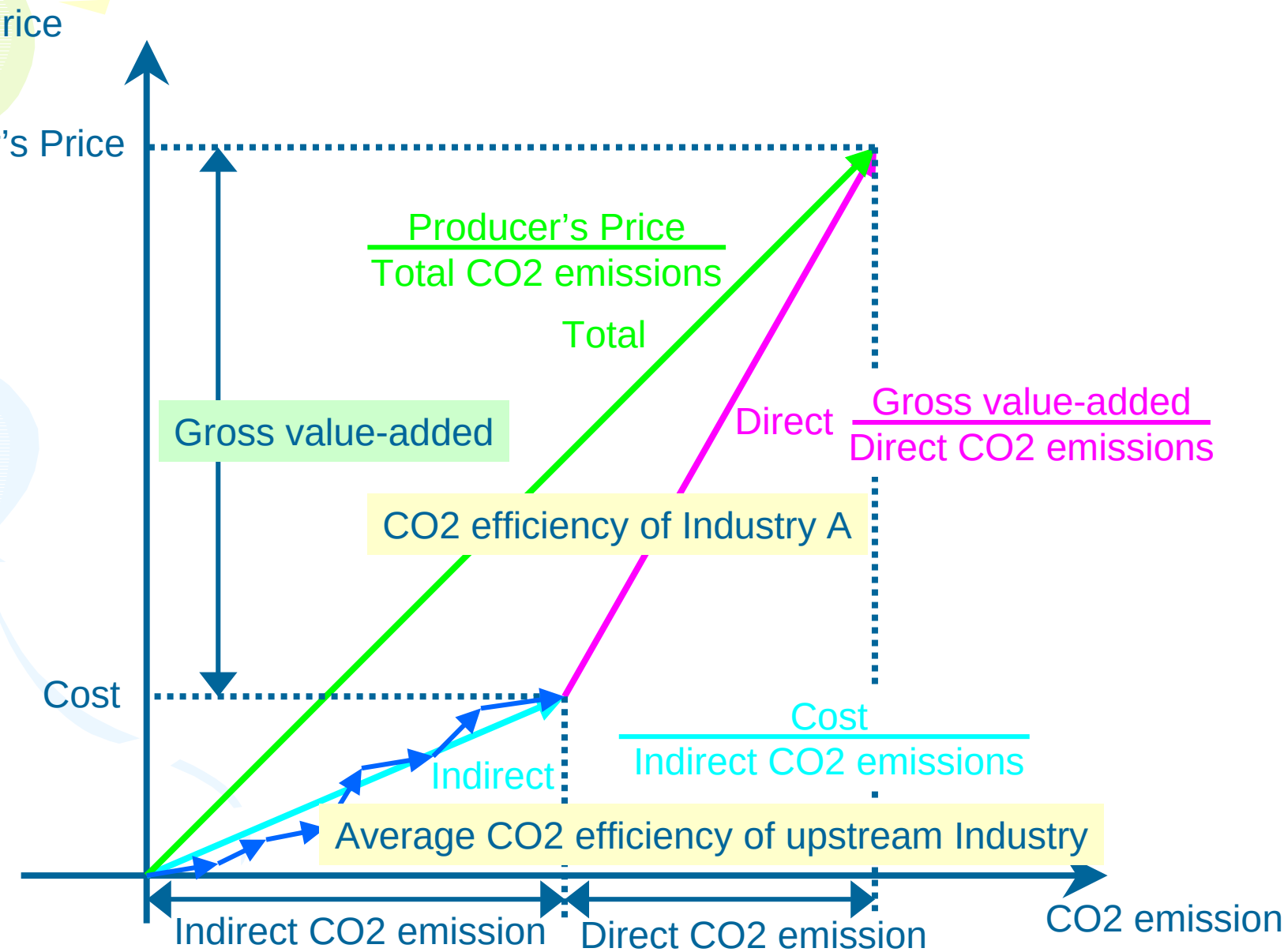


Fig.1-2 Concept of CO2 efficiency

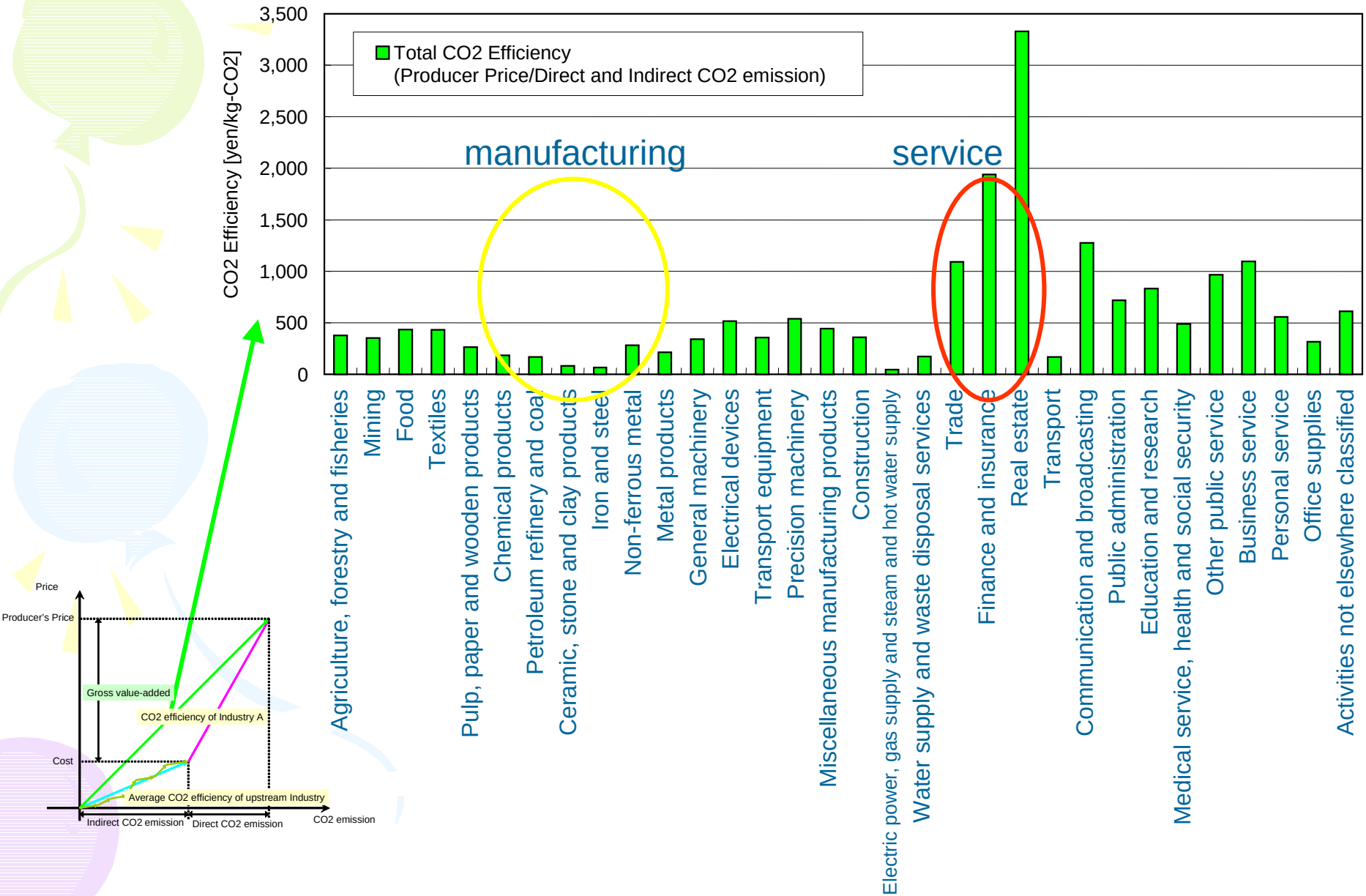


Fig.2 The Total CO2 Efficiency (Producer Price / Direct and Indirect CO2 emission) for each Industrial Sector

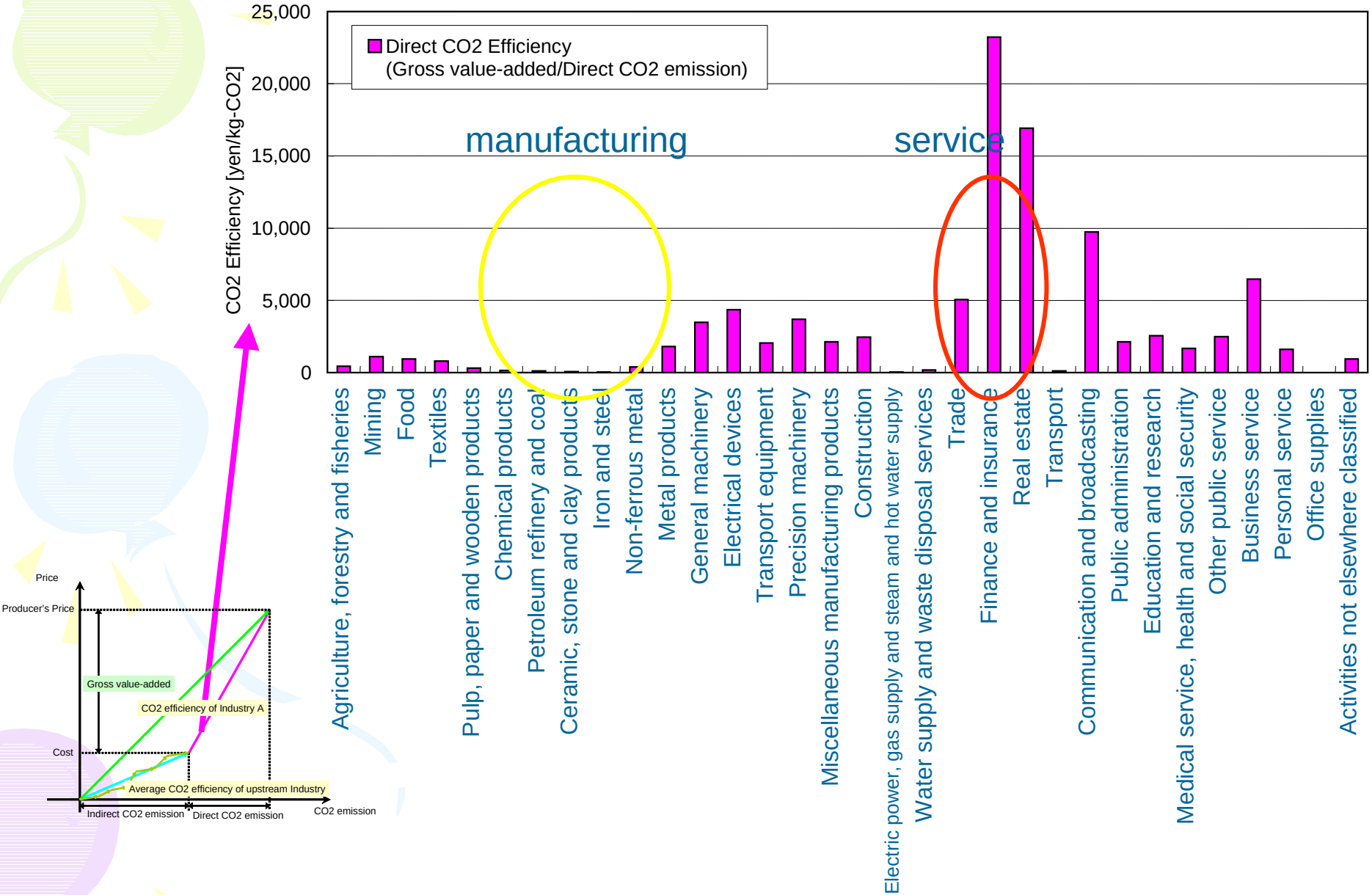


Fig.3 The direct CO2 Efficiency (Gross value-added / Direct CO2 emission) for each Industrial Sector

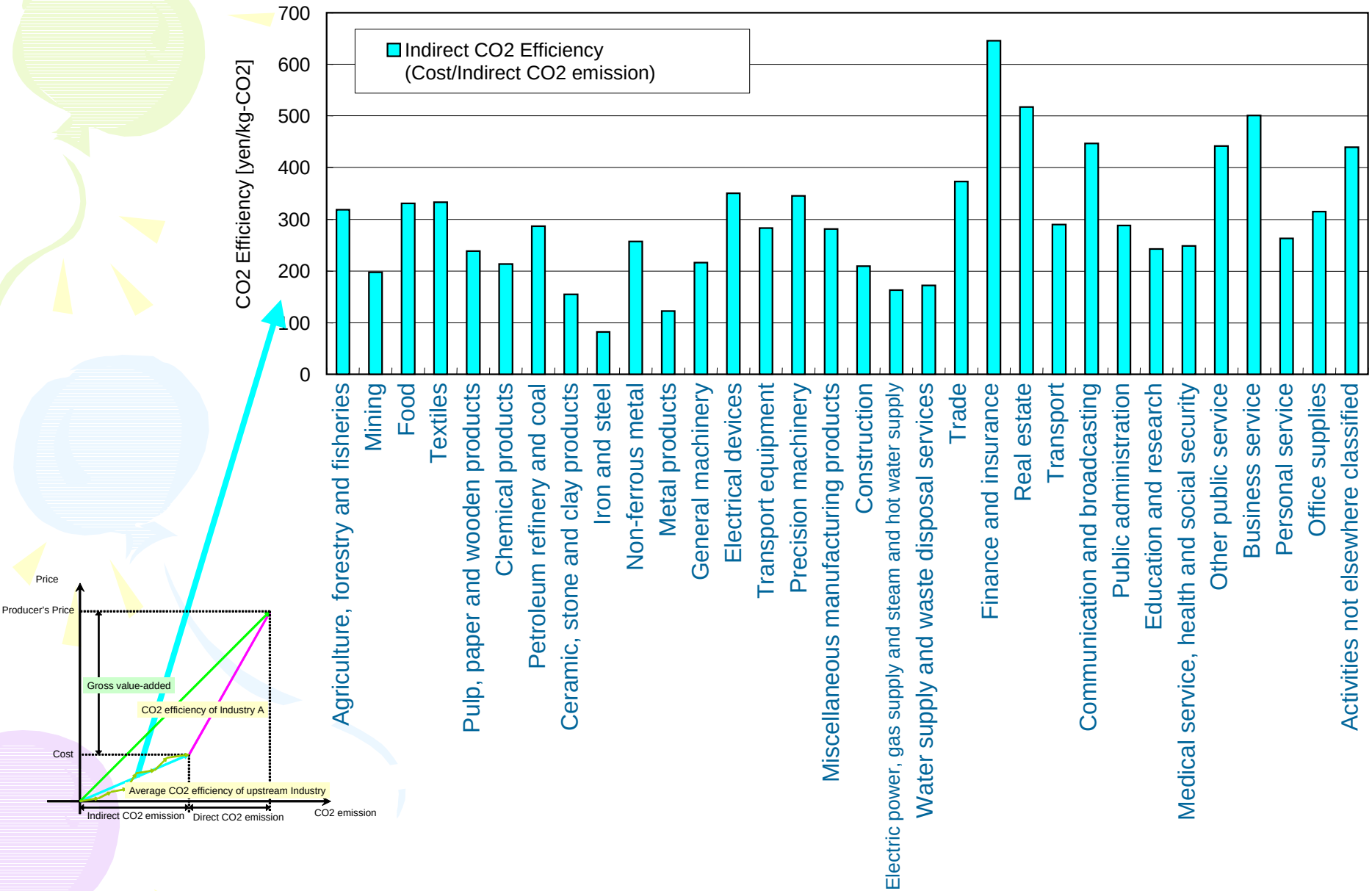


Fig.4 The indirect CO2 Efficiency (Cost / Indirect CO2 emission) for each Industrial Sector

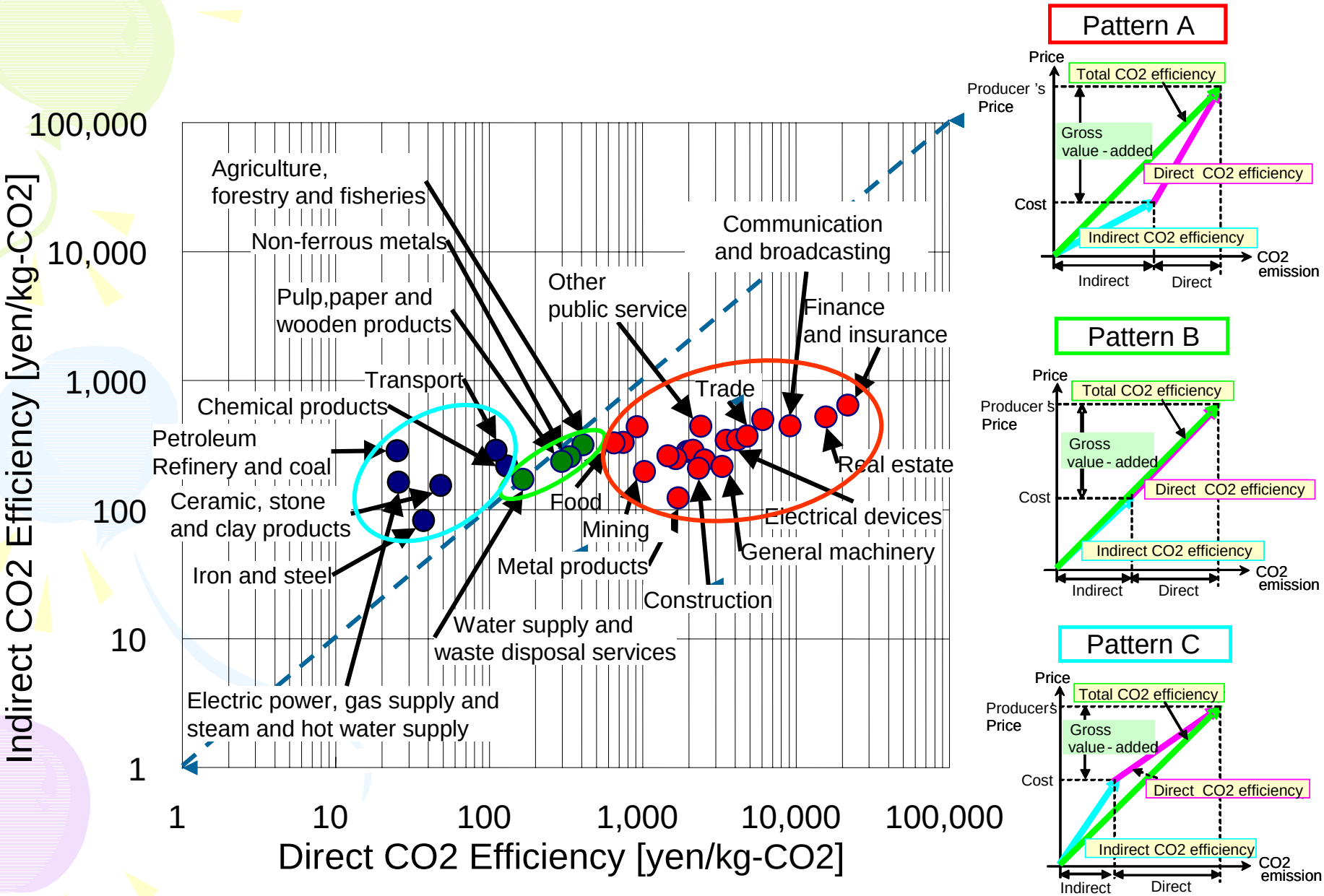


Fig.5 CO2 efficiency pattern for each Industrial Sector

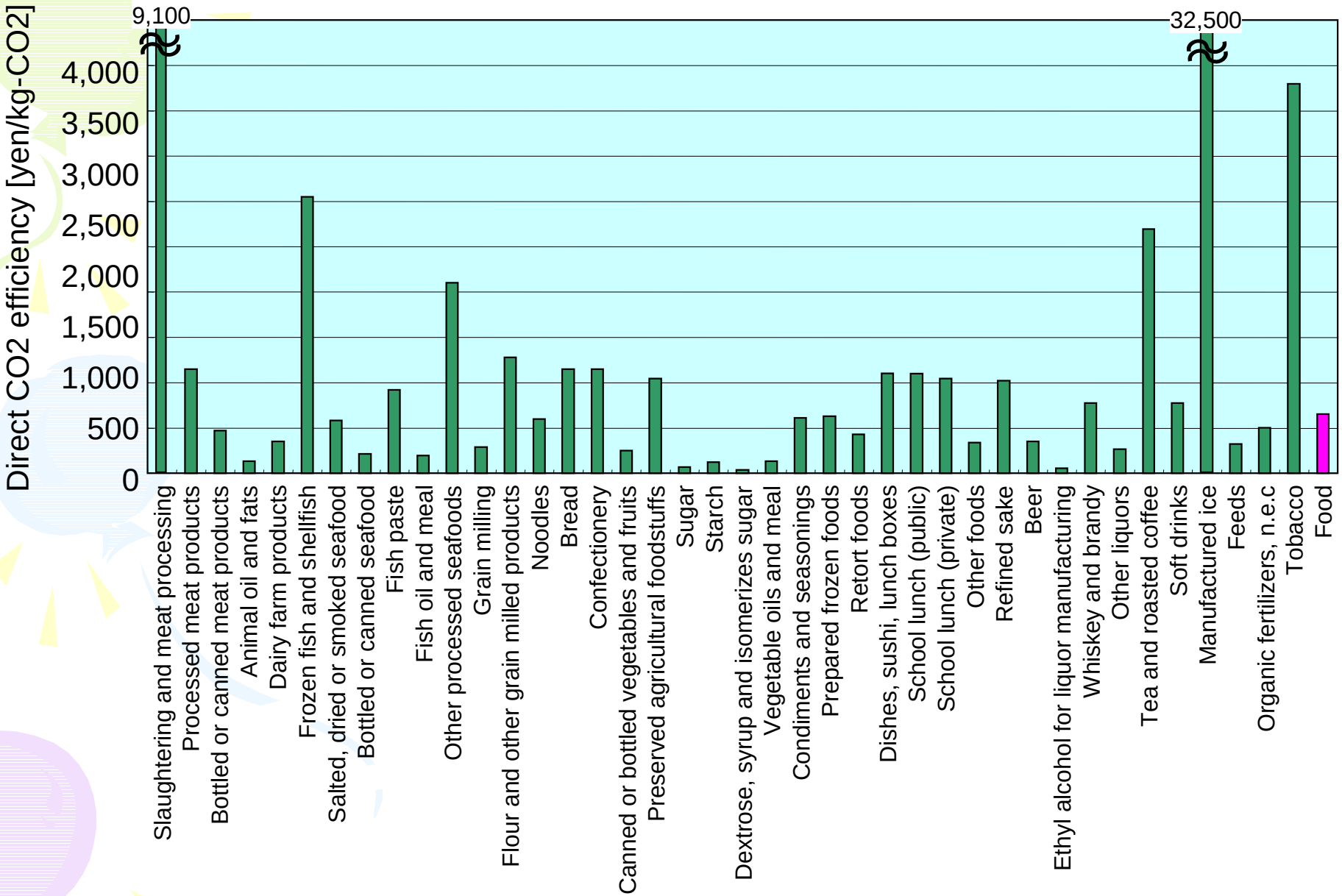


Fig.6 The direct CO2 Efficiency of Food Industrial Sector

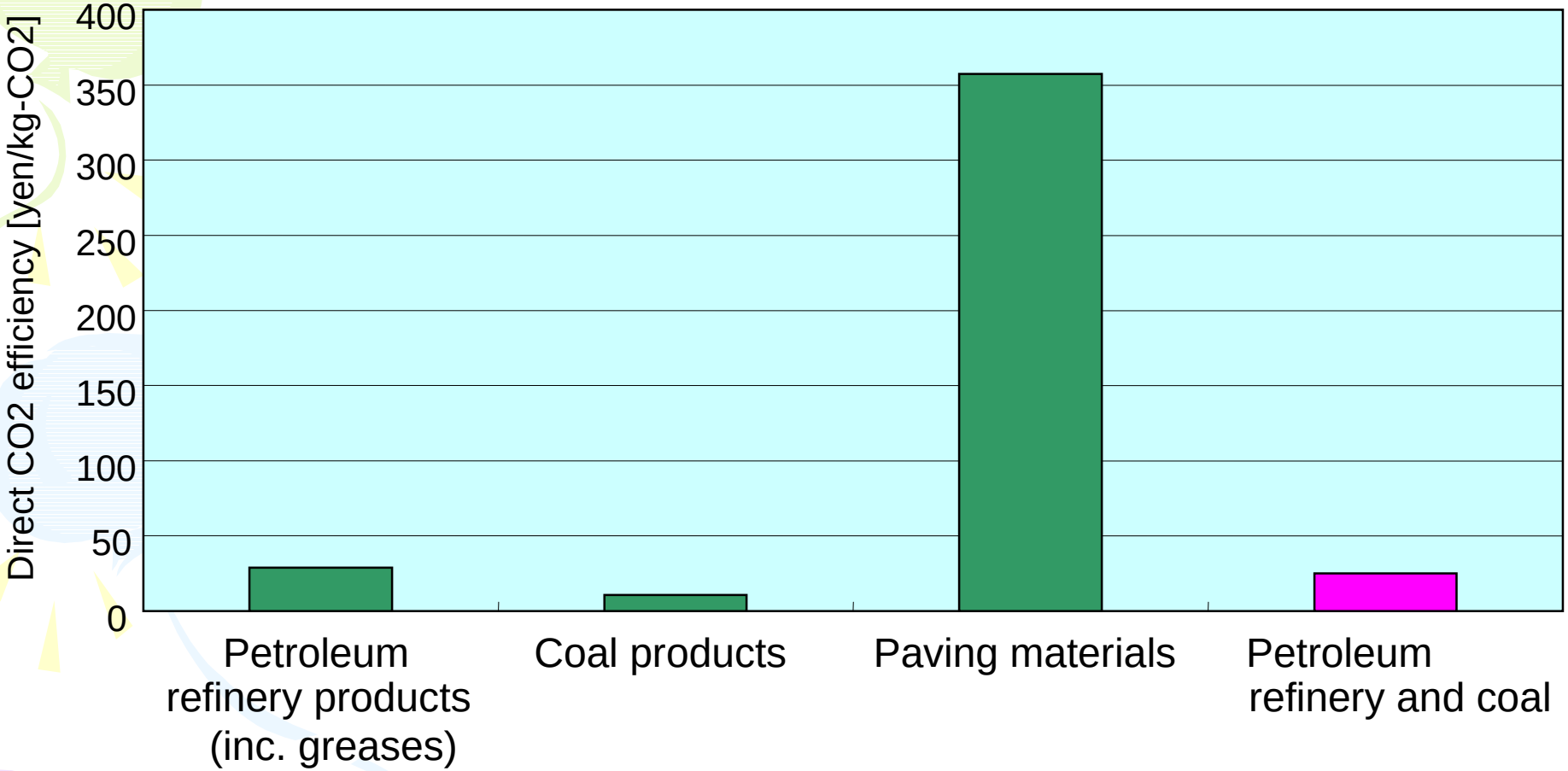
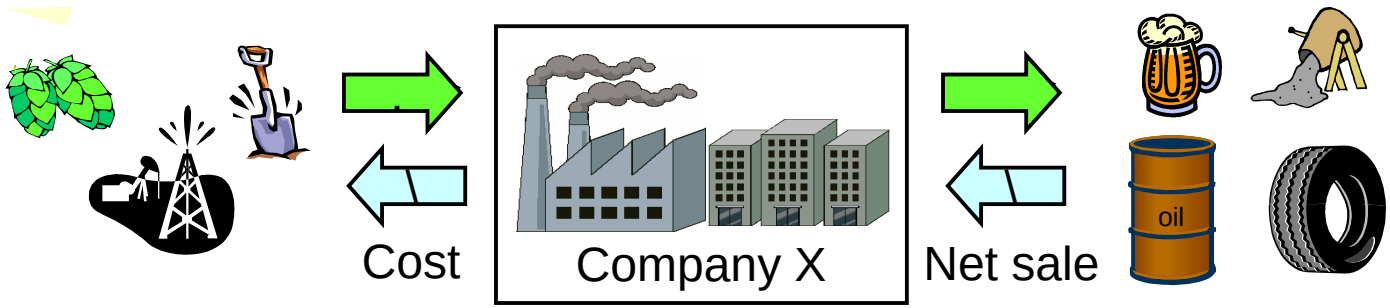


Fig.7 The direct CO2 Efficiency of Petroleum refinery and coal Industrial Sector



Net sale – Cost = Gross Income

$$\text{Direct CO2 efficiency} = \frac{\text{Gross Income}}{\text{Most of Direct CO2 emissions}}$$

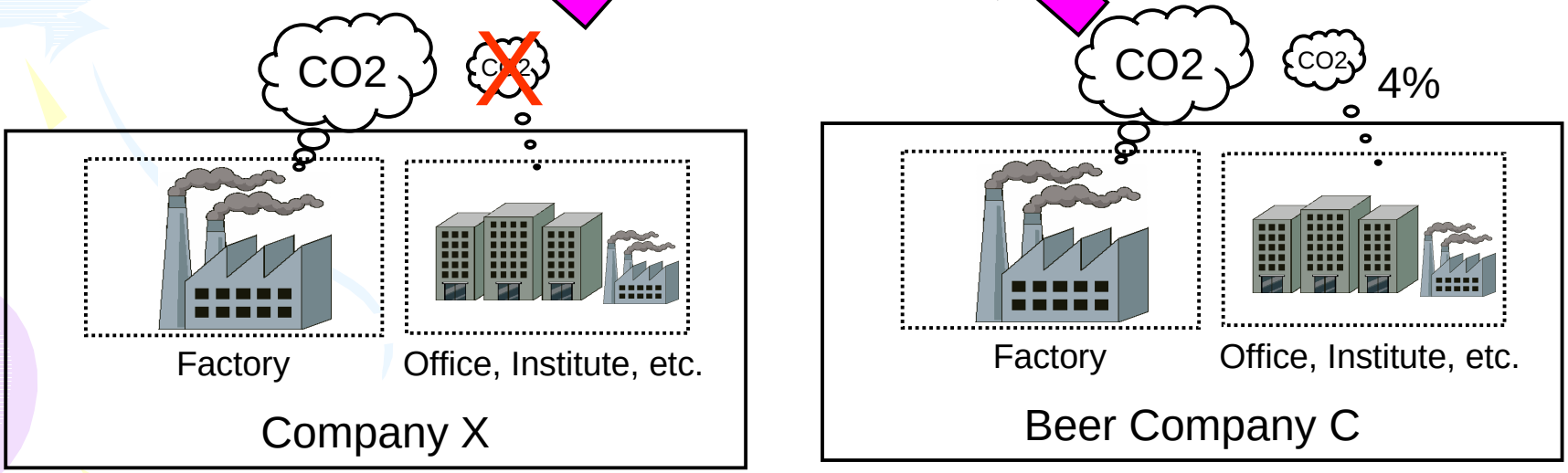
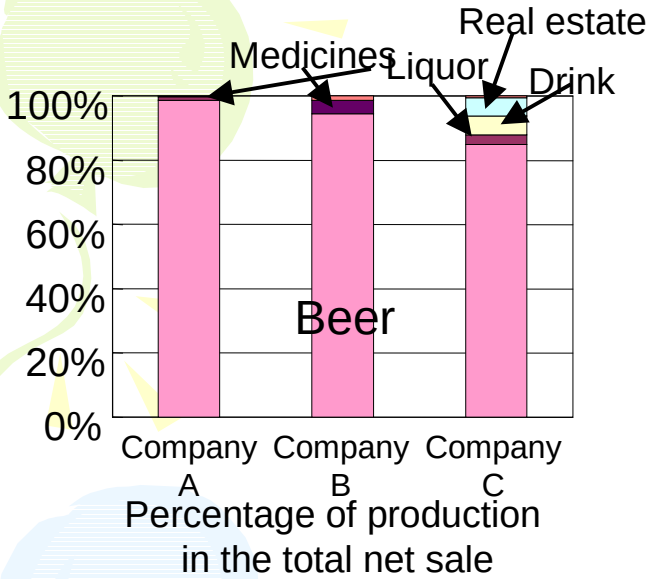


Fig. 8 Concept of Direct CO2 efficiency for companies

Beer



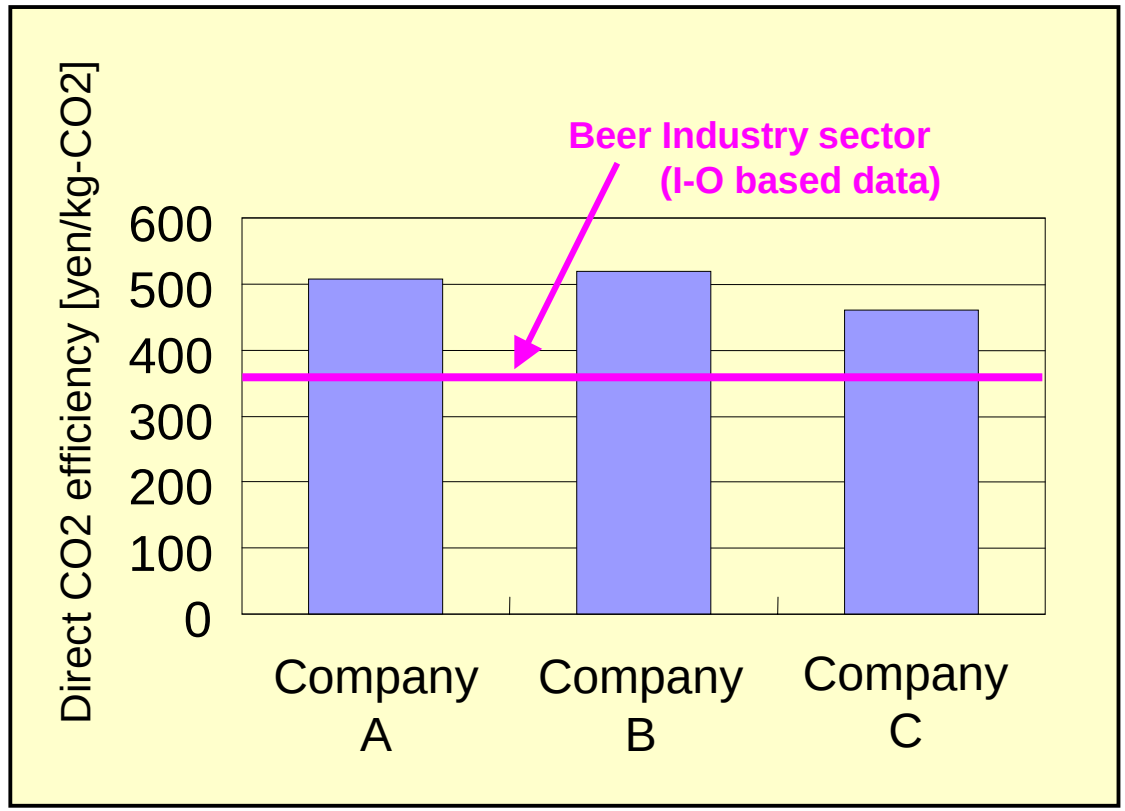
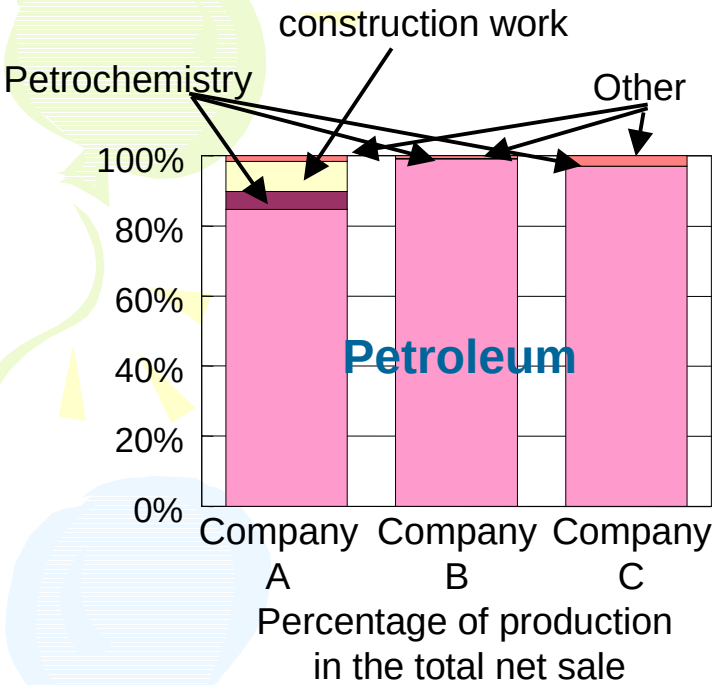


Fig.9 Direct CO2 Efficiency in the beer industry sector:
3 Companies' data from environmental reports against I-O based data

Petroleum



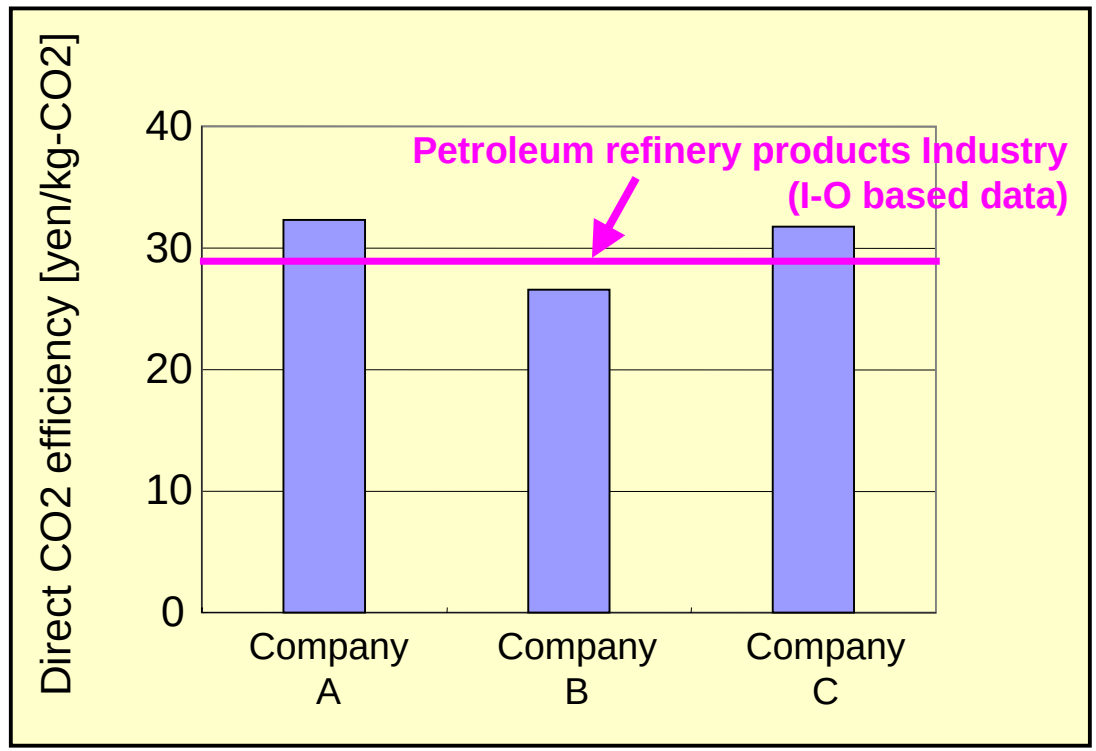
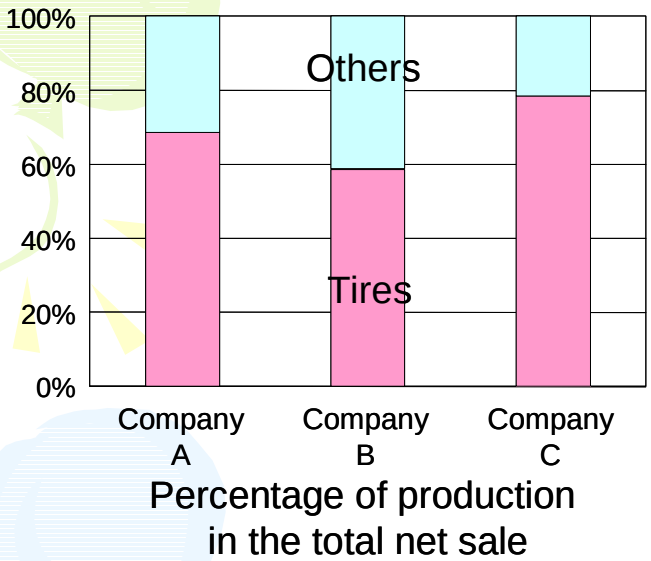


Fig.10 Direct CO2 Efficiency in the petroleum industry sector:
3 Companies' data from environment reports against I-O based data

Tire



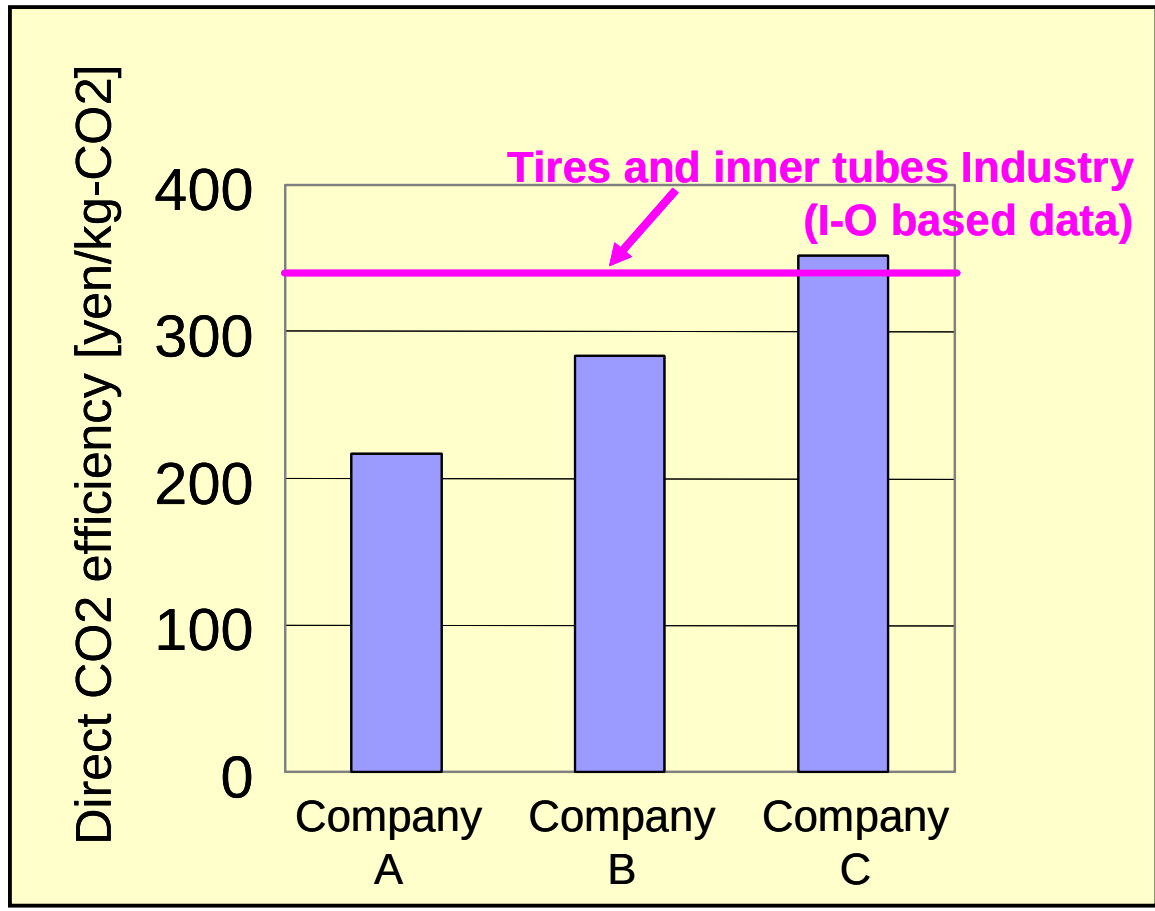
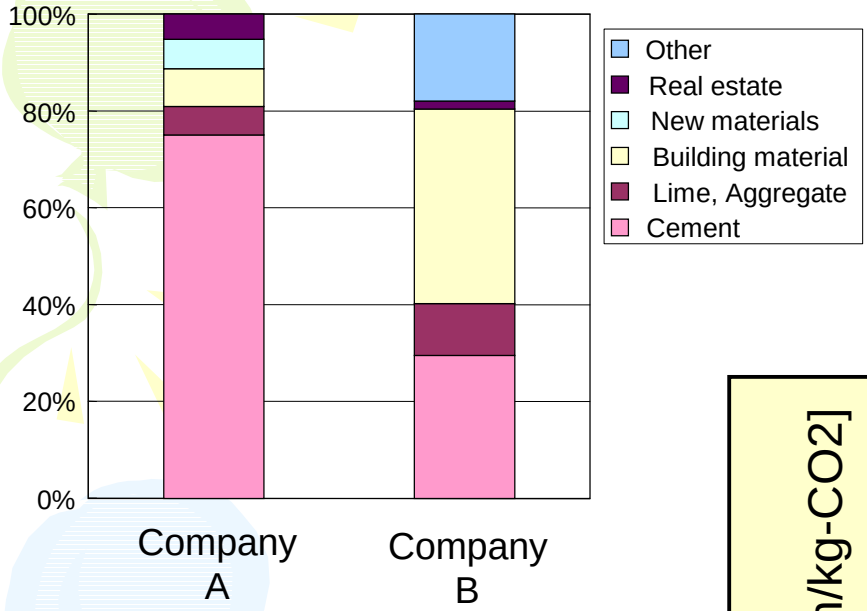


Fig.11 Direct CO2 Efficiency in the tire industry sector:
3 Companies' data from environment reports against I-O based data

Cement



Percentage of production in the total net sale

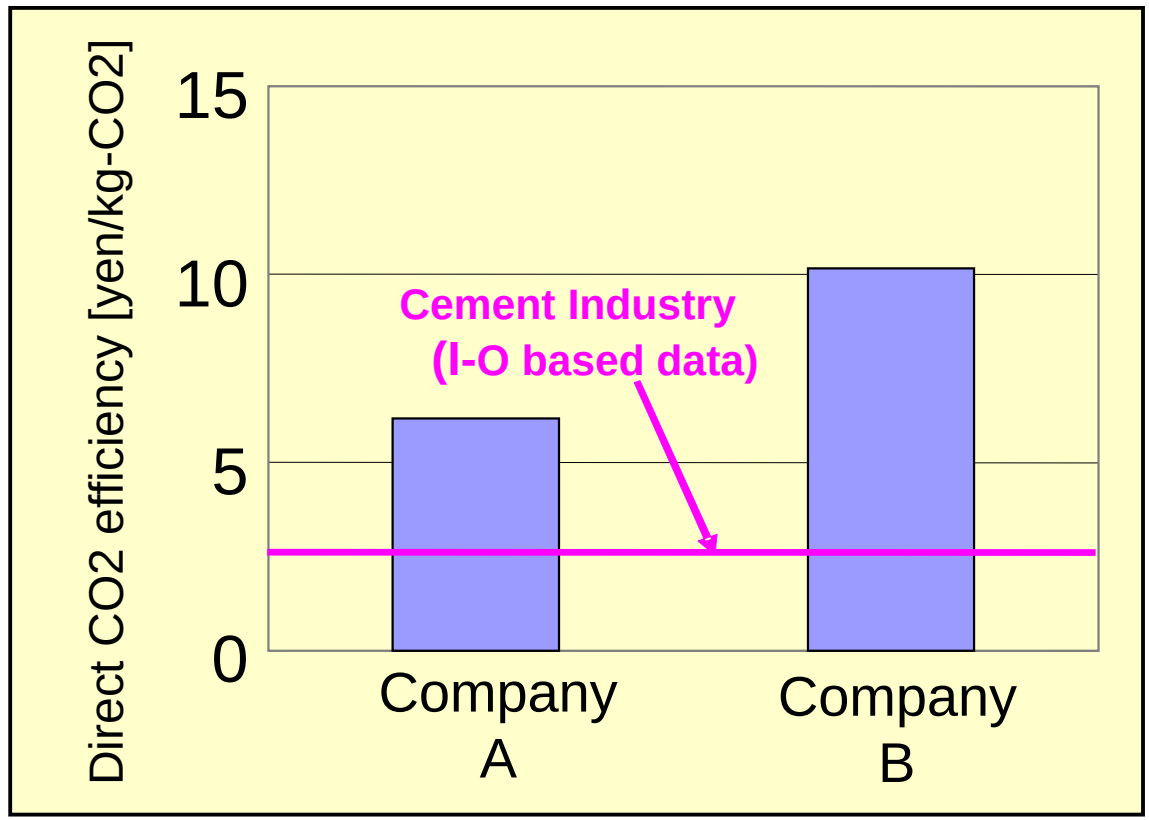


Fig.12 Direct CO2 Efficiency in the cement industry sector:
2 Companies' data from environment reports against I-O based data

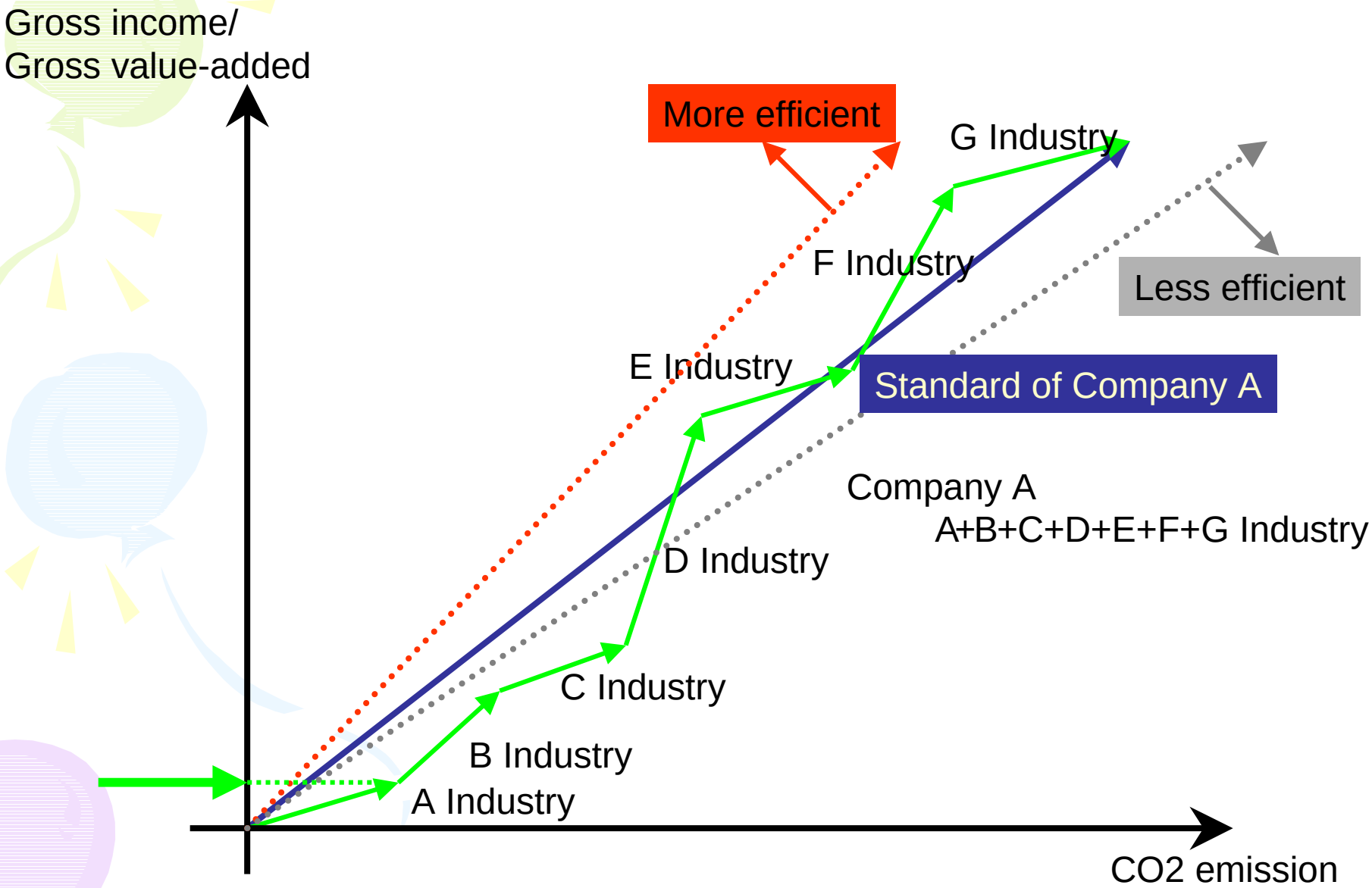


Fig.13 Concept of company evaluation

Conclusion

- CO2 efficiency index was developed from I-O table data for the evaluation of industry sectors.
- The CO2 efficiency varies by industry sector.
- The conparison of companys' CO2 efficiency against I-O based industry sector CO2 efficiency is possible.
- A clear difinition of system boundary will be necessary for better resolution of company's CO2 efficiency.
- Further examination and comparison of company's "eco-efficiency" and its detailed investigation in relation to economic value index should be explored.