ICCA comments on the IEA draft on industrial energy efficiency

IEA Conference
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Introduction

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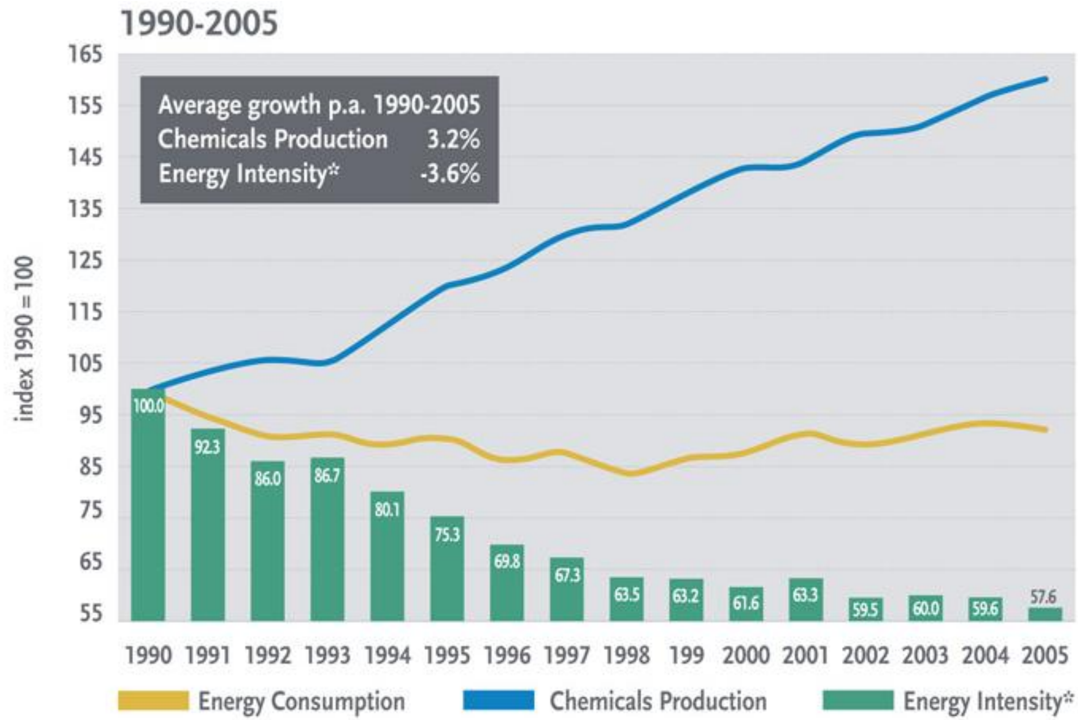
- **Energy efficiency is crucial for the chemical industry, being a large energy consumer**
- **ICCA appreciates the work of IEA in important area of industrial energy efficiency.**
- **ICCA welcomes the opportunity to comment on data and methodology**

An example: Energy intensity* in the EU chemical** industry



Sources: Cefic and Eurostat
*Energy intensity is measured by energy input per unit of chemicals production
** Including pharmaceuticals

Comments on the methodology (1)

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- Process energy versus feedstock
  - Process energy needs to be separated from feedstock
  - Energy efficiency potential needs to be calculated on process energy only
    - A 50% saving potential in the global chemical industry in relation to process energy indicates a methodology and calculation problem

Saving Potential 10.5-12.9 EJ/Y versus Process Energy 14.9 EJ/Y

Comments on the methodology (2)

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- Perimeter
  - Definition of perimeter is crucial for the BAP results, eg Chlorine
    - The energy for liquefaction/evaporation of chlorine and for the concentration of caustic soda represents about 13 % of the energy used in an electrolysis based on membrane technology
    - See section on PETROCHEMICALS PERIMETER
  - ICCA recommends working on a uniform methodology to define perimeters in our industry

Comments on the methodology (3)

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- Definitions
  - A high quality benchmark definition should include all energy carriers, (fuel, steam and electricity) due to the interchangeability of the different energy sources
  - Define clearly relevant definitions, sources, standard values and perimeters

- BAT versus BAP
  - Best practice values need to come from the best performing running installations
  - BAT is a specific wording used in European legislation
  - IEA should use the term Best Available Practice (BAP) and strengthen efforts to gather real industry data

Data quality and interpretation of results (1)

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- Changing BAP values over time
  - Styrene: 3.6 (2004) versus 7.7 (draft)
  - Toluene diisocyanate: 46.5 (2007) versus 21.7 (draft)
- Limited product coverage
  - Energy consumption of 45 products compared to total energy consumption
  - Standard correction factor of 95% not sufficient, as Japanese calculation shows

Comparison of energy and feedstock (2006)

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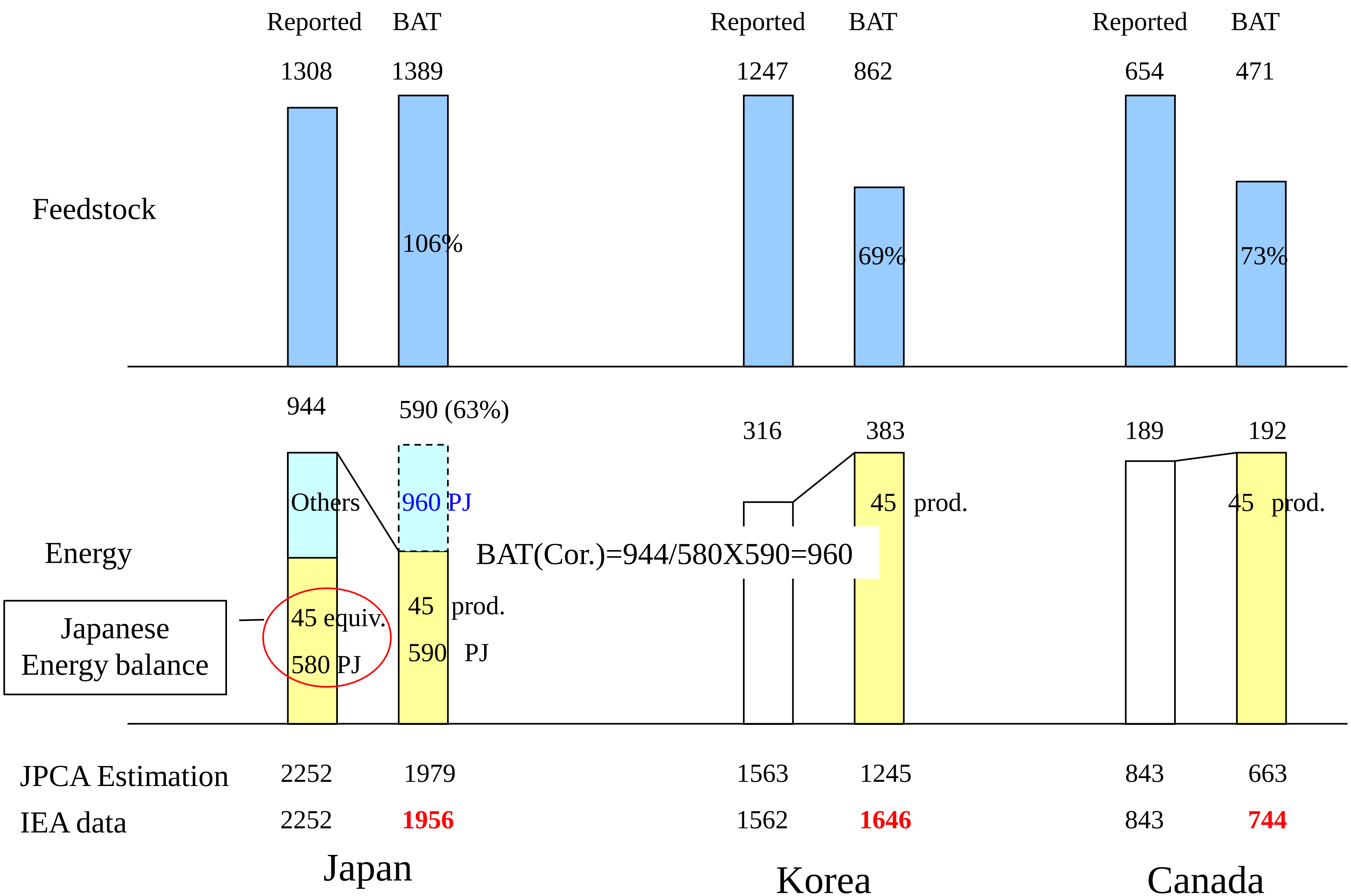

Data quality and interpretation of results (2)

- Improvement potential by country
  - Negative values for Korea and Benelux/ Very low values for India and China seem to be unrealistic
  - Most probable reason are data quality and methodological issues
- Interpretation of results
  - “additional analysis and data collection is needed before the indicators can be used to inform policy”
  - For example: CHP in the USA is hindered by the regulation of the electricity market; the improvement potential does not take such factors into account
  - The text needs to point out clearly the limitations in the methodology and in the results

The way forward

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Energy efficiency is crucial for the chemical industry

- **Solutions are needed to overcome methodological and data related limitations, in order to use data for comparison over time and across countries**
- **Improved data is key to success, at the aggregated and product level**

- **ICCA suggests to deepen collaboration on methodology and data**
- **Japan and Europe are currently involved in major data collection activities on energy and CO2, gathering useful expertise**

BACK-UP

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Petrochemical sector

- **Methodology & Perimeter Issues**

Cefic contribution for IEA-ICCA meeting

9/02/2009

Comparative analysis of IEA energy efficiency methodology & data (**petrochemicals / crackers**)

cefic

Petrochemicals

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- **Methodology comparison**
- **IEA energy values for petrochemicals**
- **Perimeter impact on benchmark**
- **Next steps for cooperation**

Steam crackers: IEA vs Cefic

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	IEA	Cefic
Denominator	2004: separate components 2005 onwards: HVC	Tons HVC (tons feed)
Energy	feedstock / heat / steam Excl/incl electricity Primary energy ?	Fuels fired / steam / electricity Primary energy basis
CO_2	Conversion factors ?	x ton CO_2/ GJ steam y ton CO_2 / MWh electricity Careful attention for CHP
Reference	Best practice technology: definition ? Data source(s) ?	Best performer value to be derived from benchmark with real plant data
Reference value	'06: 57,33 GJ/ton HVC (incl electricity) -45 GJ/ton feedstock => 12,33 GJ/ton heat *0,06 ton CO_2/GJ => ~ 0,74 ton CO_2 / ton HVC (0,06 ton CO2/GJ as average CO2 factor of natural gas (0,0561) and propane (0,0631))	tbd
Scope	?	European wide

IEA Energy values

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Why feedstock GJ/ton ?

BPT improved

excluding electricity:

GJ/ton	electricity	feedstock	fuel	steam	'06 total	*'06*	*04*
benzene (steam cr.)	0,75	45	13,1	-1,52	57,33	*56,58*	*69,68*
benzene (naphtha extr.)	0,2	45	0	5	50,2	*50*	*50*
ethylene from naphta*	0,75	45	13,1	-1,52	57,33	*56,58*	*60*
propylene	0,75	45	13,1	-1,52	57,33	*56,58*	*60*
propylene (FCC)	0,2	45	0	5	50,2	*50*	*51,5*
toluene (steam cr.)	0,75	45	13,1	-1,52	57,33	*56,58*	*67*
toluene (naphtha extr.)	0,2	45	0	5	50,2	*50*	*55*
xylene (steam cr.)	0,75	45	13,1	-1,52	57,33	*56,58*	*67*
xylene (naphtha extr.)	0,2	45	0	5	50,2	*50*	*55*
*(ethylene from ethane or propane is 5 GJ/ton higher)							
p-xylene	0,2		6,3	0,8	7,3	*7,1*	*7,1*
Ethylene oxide	1,02		3,09		4,11	*3,09*	*3,09*
Vinyl chloride monomer	0,4		2,7		3,1	*2,7*	*2,7*
cumene	0		2,05	-2,8	-0,75	*-0,75*	*-0,75*
melamine	4,5		7,9	4,3	16,7	*12,2*	*2*
polystyrene	0,4		0,5	0	0,9	*0,5*	*0,5*
phenol	0,6			9,1	9,7	*9,1*	*9,1*
polyethylene, high dens.	2,04			1,1	3,14	*1,1*	*1,4*
polyethylene, low dens.	8,43			-2,38	6,05	*-2,38*	*0*
polypropylene	2,16			0,11	2,27	*0,11*	*1,4*

Significant changes

Refinery/Petrochemicals integration

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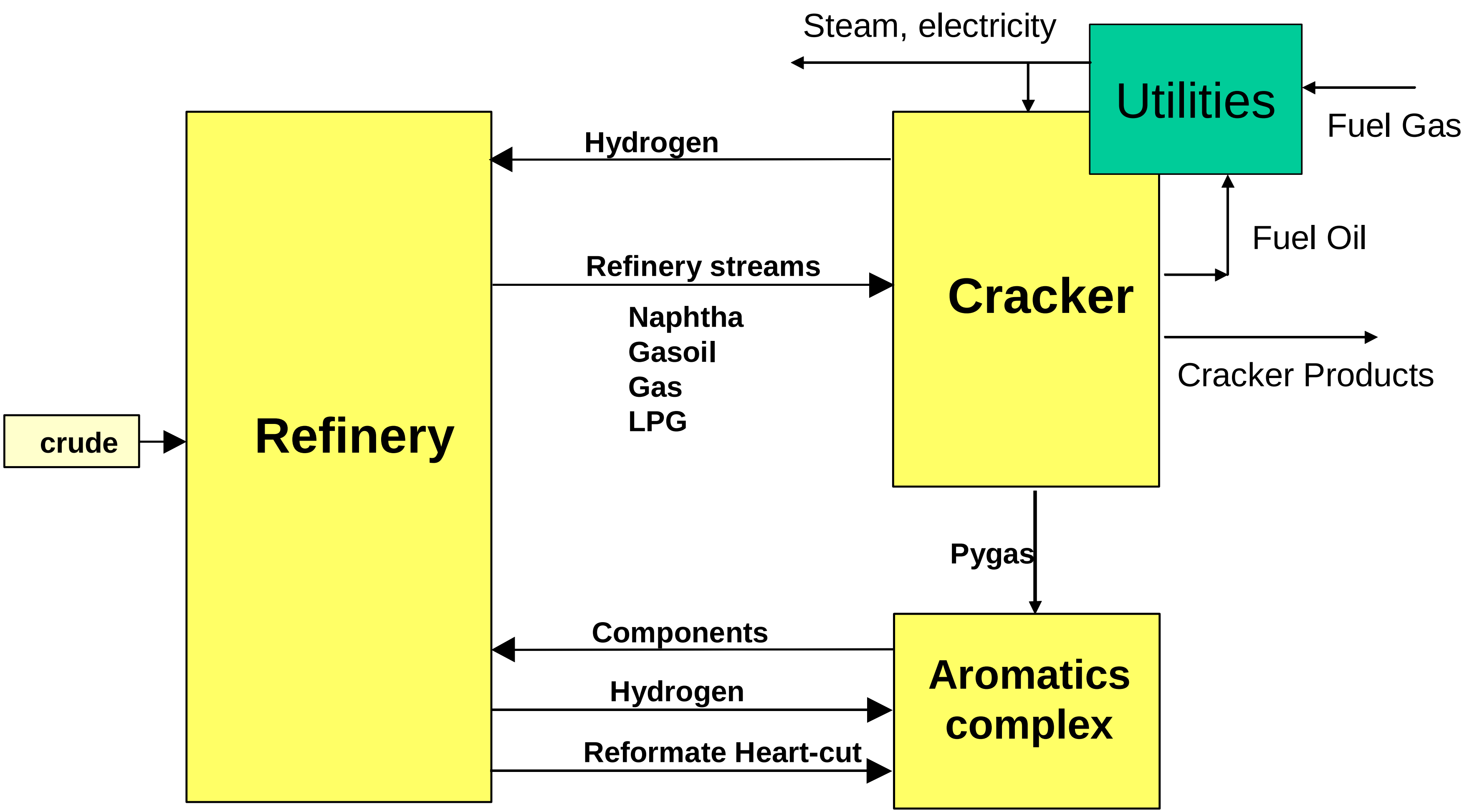

Perimeter impact on benchmark

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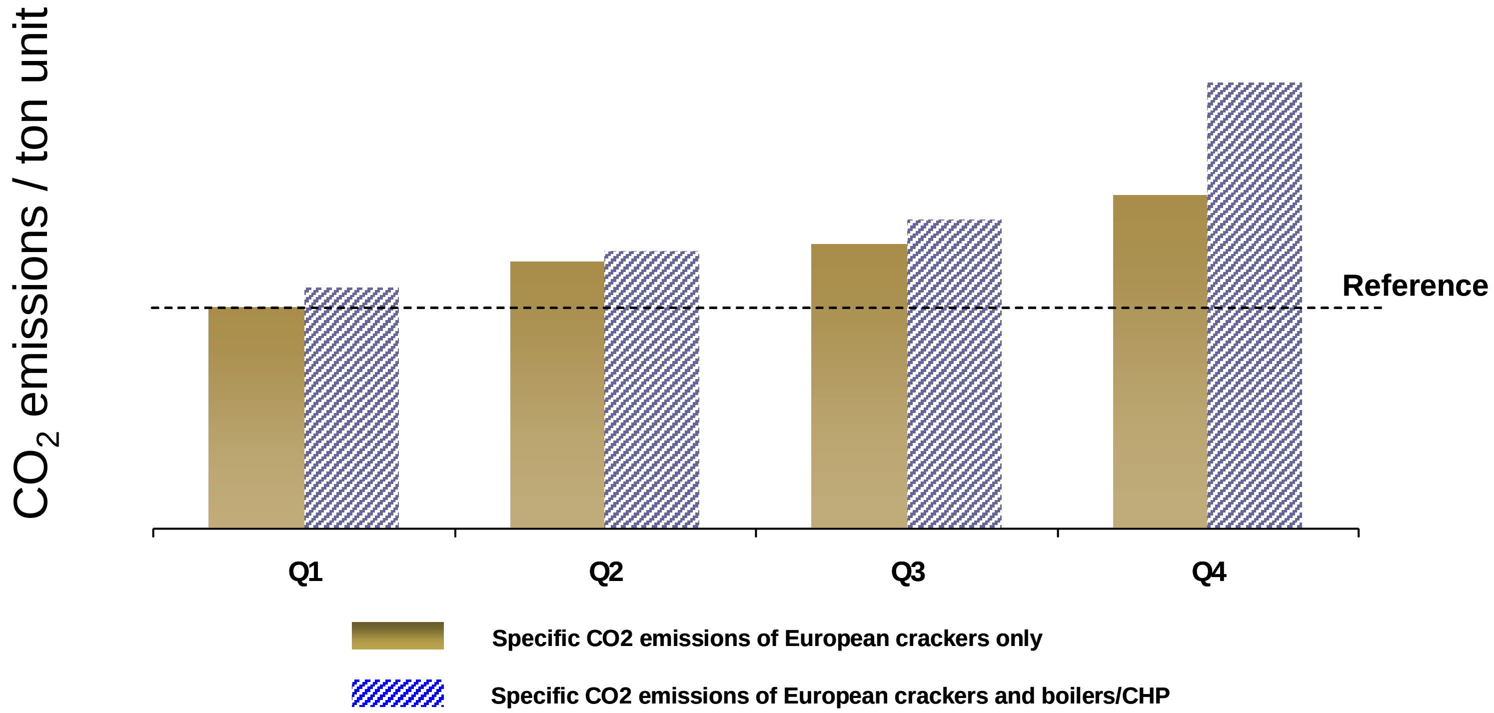
Perimeter issue: which parts of installations are considered



EU steam crackers

Perimeter impact on benchmark

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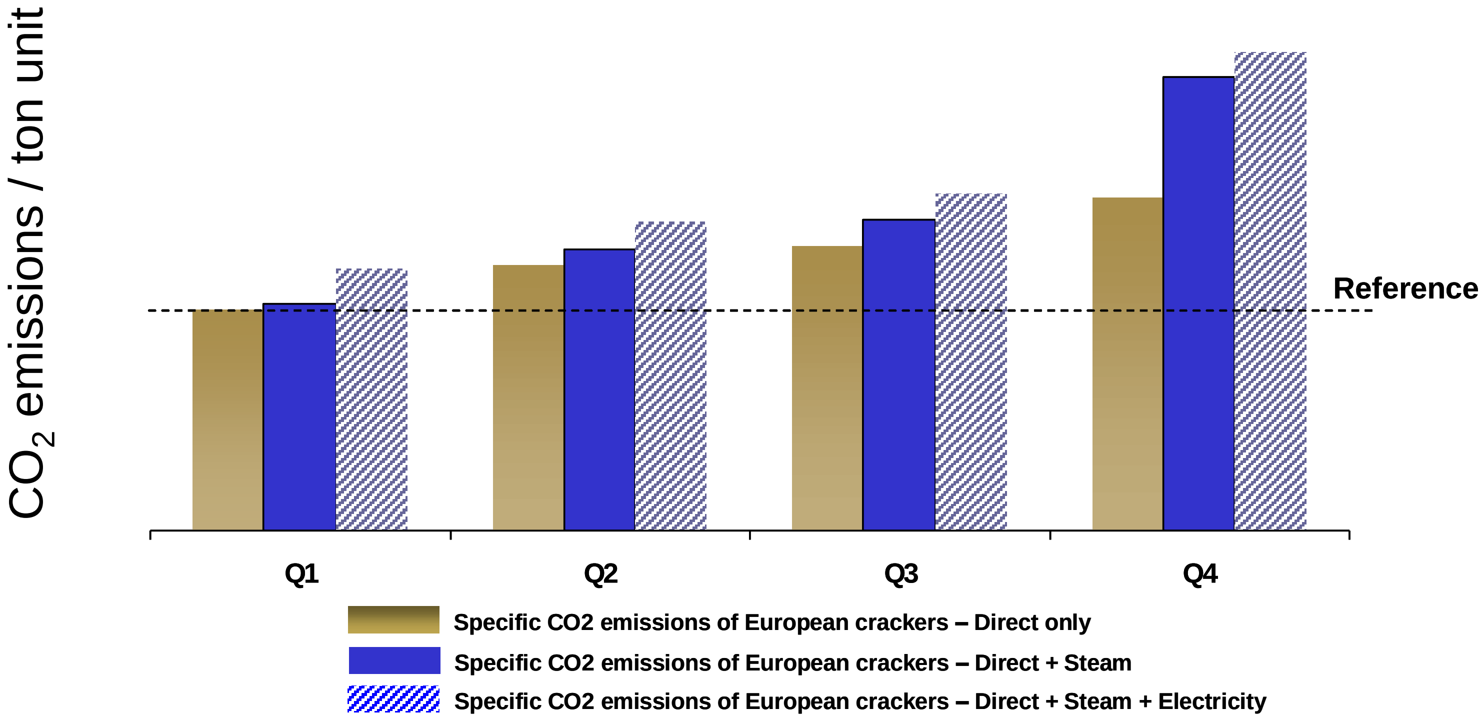
Perimeter/methodology issue: which energy components are considered



EU steam crackers

Next steps for cooperation

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- ✓ Further alignment of methodologies and perimeter
- ✓ Comparison with results of EU-wide cracker benchmark (2007-2008) during 2009/2010
- ✓ Energy and CO_2 reference values for a ‘shortlist’ of petrochemicals
- ✓ Degree of differentiation within product groups (e.g. co-polymers)