EMISSION REDUCTIONS ENABLED BY PRODUCTS OF THE CHEMICAL INDUSTRY

PRESENTATION AT THE SEMINAR OF THE INSTITUTE OF LIFE CYCLE ASSESSMENT JAPAN

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Global consulting company founded in 1984 with the mission to enable sustainable energy for everyone – since 2016, Ecofys has been part of Navigant’s global Energy practice

Ecofys has five offices in four countries: Utrecht, the Netherlands; Cologne & Berlin, Germany; Brussels, Belgium; London, United Kingdom – as part of Navigant, our experts are based in more than 20 offices in the US and Canada, Hong Kong, and the Middle East

We have over 600 experts skilled in energy, climate, environment, economy, communication, law, and psychology – in 2007, 11 of our experts supporting the Intergovernmental Panel on Climate Change were awarded the Nobel Prize together with Al Gore

More than 30 years of experience in developing and evaluating policies, sustainability strategies, and scenarios for companies and sectors provides us with deep knowledge of markets and consumer behaviour

Our strength lies in our strategic understanding of complex energy and climate transition issues: Ecofys connects the dots within the triangle between governments, energy players, and energy-intensive end-users
CONTENT

1. Introduction
2. Chemical sector guidelines
3. Roadmap towards 2030
4. Conclusions
1. INTRODUCTION
CHEMICAL INDUSTRY AS A SOLUTION PROVIDER

Insulation materials

Packaging materials

Light-weight materials for cars

Materials for renewable energy
1. INTRODUCTION
ECOFYS SUPPORTED ICCA ON AVOIDED EMISSIONS TOPIC

2013
Development of guidelines

2015
Case examples of avoided emissions

2017
Avoided emissions roadmap
2. CHEMICAL SECTOR GUIDELINES

NEED FOR CREDIBILITY

- Need for guidelines
  - Inconsistencies in avoided emissions calculation and reporting within the chemical industry
  - Certain issues were not fully addressed by existing standards
- **Guidelines aim to improve comparability and credibility** of avoided emissions enabled by chemical products
- Guidelines were developed in 2013 under leadership of **ICCA & WBCSD**, and updated in 2017
2. CHEMICAL SECTOR GUIDELINES

CONTEXT AND SCOPE

- Build on internationally accepted requirements and guidelines, but go beyond existing standards
- Focus on greenhouse gas emissions
- Address key areas of inconsistency in current practice:
  - Selection of the baseline
  - Level in the value chain (replaced by categories of comparison in 2017)
  - Attribution of avoided emissions along the value chain
Avoided emissions are the **difference between the life cycle GHG emissions from two alternative solutions** for achieving the same user benefit.

Solution to compare:

- Raw material supplier
- Chemical company
- Material processor
- Assembler of parts
- Technology user
- Disposal company

GHG emissions: 140

Solution of reporting company:

- 100

Emission reduction: 40
2. CHEMICAL SECTOR GUIDELINES
SELECTING THE BASELINE

The solution to compare (baseline) shall:

• Deliver the same function to the user as the solution of the reporting company
• Be distributed/used on the market, in the reference time period and geographic region of the solution of the reporting company
  - When the solution being replaced or the solution that would have been existed if the studied solution has not been introduced (e.g. in a growing market) cannot be exactly identified, a fair proxy for what is replaced shall be chosen.
• Be exchangeable with the solution of the reporting company for the typical customer in the selected market in terms of quality criteria
• Be as consistent as possible with the solution of the reporting company in terms of data quality, methodology, assumptions etc.
2. CHEMICAL SECTOR GUIDELINES
SELECTING THE BASELINE

First identify the list of products/technologies being replaced:

What does your solution substitute in the market? (note that it could be also in a growing market)?

- One specific solution (the “absence” of a product solution is one specific solution too)
  - Y: Use this specific solution

- A few specific solutions
  - Y: Do you know all these specific solutions?
    - Y: Use the market mix of these specific products
    - N: Use the dominant solutions of those specific solutions

- Average market mix (i.e. the entire market mix)
  - Y: Do you know the average market mix?
    - Y: Use the average market mix
    - N: Use the dominant(s) products of the average market mix
Different types of comparisons reflected in three categories:

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product/technology vs. non-use of product/technology</td>
<td>Chemical product* vs. non-chemical product/technology</td>
<td>Chemical product* vs. chemical product/technology</td>
</tr>
<tr>
<td>e.g. • Insulation vs. no insulation. • Packaging of food vs. no packaging. • Wind electricity vs. no-electricity for rural homes in developing countries. • Fuel additives for vehicle efficiency vs. non-use of fuel additives.</td>
<td>e.g. • EPS vs. mineral wool. • Plastic packaging vs. tinplate. • Wind electricity vs. grid electricity. • Electric mobility vs. conventional mobility.</td>
<td>e.g. • Best-in-class insulation vs. chemical average insulation. • HPDE foam bottle vs. standard HDPE bottle. • Bio-based vs. fossil-based chemical product. • Best-in-class wind turbines vs. industry average wind turbines. • Best-in-class fuel additives for vehicle efficiency vs. standard fuel additives.</td>
</tr>
</tbody>
</table>

* Definition of product also includes services and low-carbon technologies that make use of a chemical product such as wind electricity or electric mobility.
## 2. CHEMICAL SECTOR GUIDELINES

### ATTRIBUTION OF AVOIDED EMISSIONS ALONG THE VALUE CHAIN

The reporting company shall always report **total emissions** avoided along the **complete value chain**. It shall report on the **significance of the contribution** of its product to the end-use technology.

<table>
<thead>
<tr>
<th>Significance of contribution</th>
<th>Relationship between chemical product and end-use solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fundamental</td>
<td>The chemical product is the key component that enables the GHG emission avoiding effect of the solution.</td>
</tr>
<tr>
<td>Extensive</td>
<td>The chemical product is part of the key component and its properties and functions are essential for enabling the GHG emission avoiding effect of the solution.</td>
</tr>
<tr>
<td>Substantial</td>
<td>The chemical product does not contribute directly to the avoided GHG emissions, but it cannot be substituted easily without changing the GHG emission avoiding effect of the solution.</td>
</tr>
<tr>
<td>Minor</td>
<td>The chemical product does not contribute directly to the avoided GHG emissions, but it is used in the manufacturing process of a fundamentally or extensively contributing product.</td>
</tr>
<tr>
<td>Too small to communicate</td>
<td>The chemical product can be substituted without changing the GHG avoiding effect of the solution.</td>
</tr>
</tbody>
</table>
2. CHEMICAL SECTOR GUIDELINES

CASE STUDIES

• The chemical sector guidelines on avoided emissions were tested in 2015 & 2016
  - Showcase the chemical industry’s solutions for a low-carbon society
  - Illustrate the application of the guidelines
  - Motivate chemical companies and companies from other sectors to use the guidelines

• The case studies were provided by 10 companies and 2 industry associations
  - Examples of products addressed in the case studies: insulation materials, lightweight materials for road transport and aviation, fuel efficient tires, packaging materials, feed additives
3. ROADMAP TOWARDS 2030
STUDY OVERVIEW

• The Paris Agreement confirmed the need for keeping global warming to “well below 2 degrees Celsius” by the end of the century

• The International Council of Chemical Associations (ICCA) wants to demonstrate the essential role of the chemical industry to contribute to GHG emission reductions

• ICCA commissioned Ecofys to develop an avoided emissions roadmap towards 2030 taking six solutions of the chemical industry into account.

• Ecofys calculated the avoided emissions through two distinct approaches
  - **Approach 1. Full potential right now** Estimated annual emission reductions if the solutions were used to their full potential right now
  - **Approach 2. Potential in a 2 degrees Celsius pathway** Contribution of the solutions to the GHG emission reductions in 2030 in a 2 degrees Celsius mitigation scenario as compared to a reference scenario

• The study also reports on the enabling conditions (business and policies related) needed to realise this potential along the value chains
Global emissions would be over 9 GtCO$_2$e per year lower if the selected six solutions were used to their full potential right now; this exceeds the annual emissions of the United States.
3. ROADMAP TOWARDS 2030
CONTRIBUTION OF CHEMICAL SECTOR TOWARDS 2 DEGREES PATHWAY

Selected solutions reduce emissions by **2.5 GtCO₂e in 2030 in a 2 degrees Celsius** mitigation scenario as compared to a reference scenario. This is equivalent to the annual emissions of France, Germany, Italy and the United Kingdom together.

**Approach 2: Avoided emissions in the mitigation scenario compared to the reference scenario**

- **Tires**
- **Plastics**
- **Landing**
- **Opetes**
- **Htting**
- **Cars**
- **ower**

[Graph showing annual avoided emissions (MtCO₂)]
4. CONCLUDING REMARKS
SOLUTIONS FROM THE CHEMICAL INDUSTRY PLAY AN ESSENTIAL ROLE IN THE ENERGY TRANSITION

- In the past decade, companies in the chemical sector have been calculating their avoided emissions potential.
- In the period 2013-2017, ICCA developed and tested avoided emissions guidelines with the aim to improve the credibility and comparability of avoided emissions. The chemical industry hopes that other industries facing similar challenges may also benefit from these guidelines.
- The recently published ICCA roadmap (2017) shows the emission reduction potential of solutions from the chemical industry in two ways
  - **Full potential right now:** Global emissions would be over \(9 \text{ GtCO}_2\text{e per year lower}\) if the selected six solutions were used to their full potential right now; this exceeds the annual emissions of the United States.
  - **Potential in a 2 degrees Celsius pathway:** Selected solutions reduce emissions by \(2.5 \text{ GtCO}_2\text{e in 2030 in a 2 degrees Celsius}\) mitigation scenario as compared to a reference scenario. This is equivalent to the annual emissions of France, Germany, Italy and the United Kingdom together.
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