Feedstock Substitutes, Energy Efficient Technology and CO_2 Reduction for Petrochemical Products

- A Workshop in the Framework of the G8 Dialogue on Climate Change, Clean Energy and Sustainable Development

In collaboration with CEFIC

IEA Headquarters
9 Rue de la Fédération, 75015 Paris
Métro Bir-Hakeim (Line 6), RER C - Champ de Mars – Tour Eiffel

The chemical industry is one of the most energy-intensive industries (accounting for 30% of total industrial final energy use), but it is not merely an energy consumer. More than half of the energy used by the chemical industry is processed as feedstock.

The petrochemical industry uses about 8% of oil production to convert it into raw materials which are indispensable to most our everyday life products (packaging, clothes, medicines, computers, furniture, etc.).In many cases, no substitutes exist and often these products generate energy savings which by far outweigh the energy used to produce them. This is the case with insulating materials and with materials for lightweight cars, for instance. Many daily life products are also recycled several times – without losing much of their energetic value. Optimising recycling of materials and recovering of the contained energy at the end of the product life should be a corner stone of sustainable policy.

Energy costs represent a significant portion of the production costs (from 10 to 60%) of the chemical sector in Europe. In an effort to reduce these costs, energy use per unit of product has been substantially reduced. Greenhouse gas emissions have thus been cut by more than 20% since 1990, although overall chemicals production in Europe has increased by more than 50%. The industry calls on policy makers to encourage such efforts and provide incentives for R&D in order to offer the best possible conditions for the development and deployment of technologies which mitigate global warming by reducing energy use and environmental impacts to achieve a more sustainable development.

The workshop will focus on energy efficiency for the petrochemical industry. Goal of this workshop is to explore possibilities to enhance and facilitate energy efficiency, such as through the development of technologies, the use of biomass feedstocks and recycling of waste materials. Maximising energy efficiency could help enhance the long-term business perspectives in a world with a challenging prospect of high price levels and increased price volatility. Moreover, with the move towards a carbon constraint economy, emissions may have to be reduced significantly in the coming decades. A fundamental change of the production structure is a slow process that may require decades, which would favour timely action.

Questions to be addressed:

What are the trends in energy use and CO2 emissions in the petrochemical industry (by sector and region)?

What is the production, energy use and emission trends in a business-as-usual scenario until 2050?

What are the technological options for improved energy efficiency and what are their estimated costs?

What are the limits to reducing oil and gas dependence? (e.g. availability of alternative feedstocks)

What technical and policy options can play a key role in closing the carbon cycle in the petrochemical industry?

Process emissions vs. life cycle emissions: responsibilities and liabilities?

What policy approaches could be applied?

What should the G8 countries and the IEA do to facilitate emissions reduction in the petrochemical life cycle?

Tuesday 12 December

9:00 **Welcome address and the G8 Programme of Action**
Rick Bradley, IEA

9:05 **G8 Industry Task**
Dolf Gielen, IEA

9:15 ***Session 1:*** **Status and global trends**
Chair: Peter Botschek, CEFIC
Oil & gas price projections: IEA insights (WEO)
Olivier Rech, IEA
Benchmarking of energy efficiency and CO2 emissions in the Petrochemicals sector
Mr. Hans Keuken, Process Design Center
IEA petrochemical scenarios for 2030-2050: Energy Technology Perspectives
Kamel Bennaceur, IEA
Worldwide energy and carbon efficiency potentials for the Petrochemical industry
Maarten Neelis, Ecofys
Discussion

10:45 **Coffee break**

11:15 ***Session 2:*** **Energy Efficiency Indicators**
Chair: Martin Patel, Utrecht University
Methodological insights from the Flemish Benchmarking program
Hubert Van den Bergh, Flemish Verification Bureau for Benchmarking
From energy-efficiency to CO_2 Benchmarking
Jan Janssen, VBE, Verificatiebureau Benchmarking Energie-efficiency
Greenhouse Gas Emission Estimation & Inventories
Brigitte Poot, IPIECA / TOTAL
Greenhouse Gases Handbook
Eric Johnson, SRI Consulting
Discussion

12:45 **Lunch**

14:15 ***Session 3:*** **Technologies to improve energy efficiency and reduce CO_2 emissions**
Chair: Kamel Bennaceur, IEA
Development trends for ethylene crackers: existing technologies and RD&D
Colin P. Bowen, Stone & Webster
CHP
Rick Meidel, ExxonMobil
New trends in process integration for better energy management considering the environment
Toshko Zhelev, University of Limerick
Discussion

15:45 **Coffee break**

16:15 ***Session 4:*** **Alternative feedstocks**
Chair: Johan Breukelaar, Shell Chemicals
Biobased chemicals production and its competition from coal
Martin Patel, Utrecht University
Current Status of Plastics Recycling in Japan
Hisao Ida, Plastic Waste Management Institute
Plastics recovery
Aafko Schanssema, Plastics Europe
Discussion

18:00 **Cocktail**

Wednesday 13 December

9:00 ***Session 5: Energy in petrochemicals: situation and perspective***
Chair: Giuseppe Astarita, Federchimica

DOW Chemicals–Russel Mills, Director Technology and Innovation

Shell Chemicals – Johan Breukelaar, Global Sustainable Development Manager

TOTAL – Daniel Leuckx

SABIC – Vianney Schyns

10:30 Coffee break

ExxonMobil - Rick Meidel

BASF – Wolfgang Weber

Innovation, Research and Development
Marian Mours, CEFIC

Discussion

12:30 Lunch break

14:00 ***Session 6:*** **The legislative context: opportunities and challenges**
Chair: Brigitte Poot, IPIECA / TOTAL
Opportunities and challenges in the regulatory environment in Europe
Peter Botschek, Director Energy Policy, CEFIC
Sectoral approaches
Richard Baron, IEA
7th Framework Programme
Pierre Dechamps, European Commission, DG Research

Discussion

15:15 Coffee break

Roundtable
Chair: Dolf Gielen, IEA

Energy and CO_2 Indicators for the Petrochemical Sector
Cecilia Tam, IEA

15:45 Recommendations for G8 activities: what are future policies which facilitate energy efficiency improvement and CO_2 reduction in the petrochemical life cycle? What can be done on a global scale?

- RD&D needs and framework for cooperation (Cross industry and sector)
- Technology/environment standards (related to energy efficiency)
- Voluntary agreements and benchmarking
- Energy efficiency indicators
- Towards an international dialogue: which platform?
- Involvement of producers from developing countries

17:15 Closing remarks
Dolf Gielen