

# THE ROLE OF PROCESS INTEGRATION FOR GREENHOUSE GAS MITIGATION IN INDUSTRY

## Reference

International Energy Agency (IEA) Expert Workshop in Berlin on April 4 – 5, 2017. The full report is available from the IETS website.

Topic sheet prepared by Per-Åke Franck, IETS TCP Secretariat.

## Introduction

There is an urgent need for global greenhouse gas (GHG) mitigation. Process integration in industry will most probably play an increasingly important role in the areas of industrial GHG mitigation, energy efficiency, industrial clustering and system aspects of innovative technologies. To increase the awareness of new developments in this key methodology, a two-day IEA workshop was arranged in Berlin, April 4-5 2017. The workshop was attended by a majority of the world's leading experts in this area.

## Background and aims

Process integration became a concept in the scientific literature and in industry research and development in the late 70's.

Process integration (PI) deals with system and interaction aspects of industrial technologies as well as process and energy streams for identifying more energy efficient, economically and environmentally more sustainable industrial systems.

Its ability to identify more economic and sustainable system solutions than traditionally has made it an important tool in both research communities and in industry.

In IEA, there is now a strong emphasis on identifying gaps, barriers, opportunities and possible potentials for energy efficiency and GHG mitigation in different sectors. The industry has been identified as a key sector that needs more attention than it has previously received.

There is an urgent need for drastic reductions of GHG emissions globally. Within 25 years or probably less, the world must reach zero net emissions. This means an enormous challenge also for the industrial sector. Process integration will have a key role in identifying changes towards a more sustainable industry sector.

Around 20 internationally high-level experts were invited to the workshop. In addition, country experts, IETS delegates and IEA representatives participated.

The main aims of the workshop were:

- To give an overview of recent developments,
- to present success stories.
- to show how PI could be used to identify new future technical and system solutions,
- to discuss the role of PI for industrial GHG mitigation.

## Main messages

- Due to the imminent need for radical reduction of GHG emissions in industry, novel technologies, systems, feed-stocks, products, as well as circular economy and cooperation solutions must be introduced in a size- and time-scale hitherto never experienced in industry and in industry-society cooperation.
- Process integration methods and tools are crucial in identifying sustainable and economically viable new process and system solutions.

## Major conclusions

- Process integration is a major strategic design and planning technology which enables considerable improvements in energy efficiency and investment costs to be achieved. Also, new processes and systems can be optimally designed in terms of efficiency, economy and environmental aspects.
- There is an imminent need for radical reduction of GHG emissions in industry. The global emissions must be reduced to zero net emissions in a very short time period, say 6-25 years.
- This means that novel technologies, systems, feedstocks, products, and cooperation solutions must be

introduced in a size- and time-scale hitherto never experienced.

- Due to the need for a radical transition of industrial systems, process integration will play a more important role than it traditionally has towards GHG mitigation measures.
- Potentials for energy efficiency and GHG mitigation in industry through process integration are partly included in large-scale modelling of future industry developments within e. g. IEA. However, methods for transferring R&D and case-study results from researchers and industry to modellers should be developed.
- There is a great need for improved education and training in academia as well as in industry about opportunities for designing significantly more sustainable industrial processes and energy systems. Case studies highlighting the use of the concepts and PI methods and tools need to be collected and distributed for educational purposes.
- The international RD&D cooperation in process integration should be strengthened in order to develop and disseminate knowledge about opportunities for i.e. GHG mitigation in industry.

## CONTACT IETS

Thore Berntsson, Chair of IEA, IETS  
Email: [thore.berntsson@chalmers.se](mailto:thore.berntsson@chalmers.se)

## Disclaimer

Information or material of the IETS TCP (formally organised under the Implementing Agreement on Industrial Energy-Related Technologies and Systems) do not necessarily represent the views or policies of the IEA Secretariat or of the IEA's individual Member countries. The IEA does not make any representation or warranty (express or implied) in respect of such information (including as to its completeness, accuracy or non-infringement) and shall not be held liable for any use of, or reliance on, such information.