



**iets**

# **Industrial Energy-Related Technologies and Systems**

*An Implementing Agreement established under the  
auspices of the International Energy Agency*

# The IETS Implementing Agreement

The logo for IETS, consisting of the lowercase letters 'iets' in a bold, black, sans-serif font. The text is positioned on a yellow horizontal bar that has a green brushstroke effect behind it.

The IETS is an Implementing Agreement under the IEA, focusing on **energy efficient industrial technologies and systems**.

IETS was established in 2005 as the result of merging, revamping and extending activities formerly carried out by separate industrial IEA Programs.

IETS currently has 9 member countries:

Belgium, Denmark, Germany, Korea, the Netherlands, Norway, Portugal, Sweden and USA.



For more information about IETS: <http://www.iea-industry.org/>

# IETS Mission and strategic objectives

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*“To foster international co-operation among OECD and non-OECD countries for accelerated research and technology development of industrial energy-related technologies and systems”*

- To strengthen international cooperation on energy saving and GHG mitigation in industry
- To include all industrial sectors and technologies/systems in the IETS area
- To facilitate cooperation between different industrial R&D disciplines
- To improve knowledge transfer and information between countries, researchers, and industries
- To develop international networks within an industry sector or within cross-cutting technology or system areas

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# The IETS Annexes

The IETS logo consists of the lowercase letters "iets" in a bold, black, sans-serif font. The letters are positioned on a yellow rectangular background that has a green, brush-like stroke effect behind it, extending to the right.

The core of the IETS activities is carried out in so called Annexes.

Current on-going Annexes include:

- Annex IX - *Energy Efficient Separation Technologies Systems*
- Annex XI - *Industry-based Biorefineries*
- Annex XIII - *Industrial Heat Pumps*
- Annex XIV - *Process integration in the iron and steel industry*
- Annex XV - *Industrial Excess Heat Recovery*
- Annex XVI - *Energy Efficiency in SME's*
- Annex XVII - *Membrane filtration for energy-efficient separation of lignocellulosic biomass components*

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# Ideas and proposals for new Annexes or activities

The logo for ETS (Energy Technology Showcase) features the letters 'ets' in a bold, black, sans-serif font. The text is positioned on a yellow horizontal bar that spans across the top of the slide. To the right of the yellow bar, there is a stylized graphic of a green leaf or feather with a yellow outline, partially overlapping the yellow bar.

- Process Integration
- Control Systems and Methodologies for improved energy efficiency
- Multiple Benefits of Energy Efficiency Measures (jointly with the Demand Side Management Implementing Agreement)
- System Aspects of Motors in Industry

# Workshops and Conferences-Examples



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- Joint workshop on System Aspects of Biomass Based Gasification, with Bioenergy Implementing Agreement, Task 33, Gothenburg November 2013
- International Jubilee Process Integration Conference, Gothenburg March 2013
- Joint workshop on Industrial Carbon Capture and Storage, CCS, with IEA Greenhouse Gas (IEAGHG) Implementing Agreement, Lisbon March 2015

# Benefits for participants

The logo for IETS (International Energy Technology System) features the word "iets" in a lowercase, sans-serif font. The letters are black, and the "i" has a small dot. The logo is positioned on a yellow horizontal bar that spans the width of the slide. To the right of the text, there is a stylized graphic of a green leaf or feather with a yellow outline, pointing towards the right.

There are numerous advantages to international energy technology RD&D collaboration through the IETS, some of them are

- Synergy effects - reduced costs and avoidance of duplication of work
- Access to synthesis and analysis reports
- Networking and direct communication with leading research groups
- Strengthened national RD&D capabilities
- Accelerated development and deployment
- Knowledge transfer between countries and industries

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# General Experience

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- Lack of industry participation on ExCo level an obstacle for country participation in some cases
- Very high industry participation on the annex level
- A “young” Implementing Agreement, has developed well
- Very high interest and participation from industry/R&D organisations from non-IETS countries on the Annex level. e. g. Finland, Italy, Spain, Japan, Switzerland
- Small annual fee ( 2015 10000 \$ ), which covers secretariat activities. Most activities are task-shared.

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# **IETS Annex XIV**

## **Development and use of Process Integration in the iron and steel industry**

**Lawrence Hooley**  
Swerea MEFOS  
Annex Manager

# IEA-IETS Annex XIV objectives

The objective of the IETS Annex is to reduce the use of energy and greenhouse gas emissions in the iron and steel industry by:

- Creation of a network of experts involved in projects with the iron and steel industry and the use of Process Integration methods as a common denominator,
- Bringing together and sharing information on the present state of the art of methods as well as practical tools for systems optimisation with regard to energy and GHG emissions, and
- Creation of guidelines for the application of Process Integration methods in the industry.

# Creation of Network

## Sweden

Swerea MEFOS (research)  
Luleå Univ Technology (academia)  
SSAB (industry)

## Finland

Ruukki [now SSAB] (industry)  
Åbo Akademi (research)

## Korea

Posco (industry)  
RIST (research)

## Australia

BlueScope Steel (industry)  
CSIRO (research)

## France

ArcelorMittal R&D (industry)

## Italy

Scuola Superiore Sant'Anna (research)

## Japan

Tohoku University (academia)  
JFE (industry)  
NSSMC (industry)

2011  
Dusseldorf



2012  
Luleå



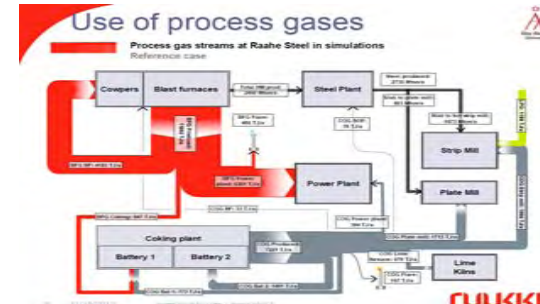
2013  
Tokyo

*Desire from participants to organize similar workshops, webinars, etc...*

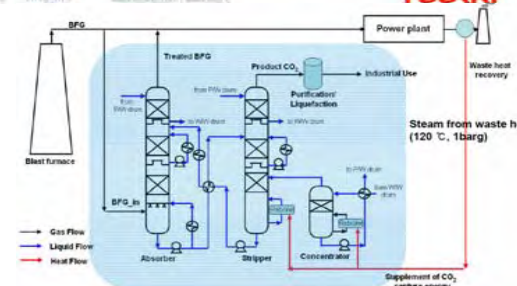
# Guidelines:

To be Published by IEA - IETS

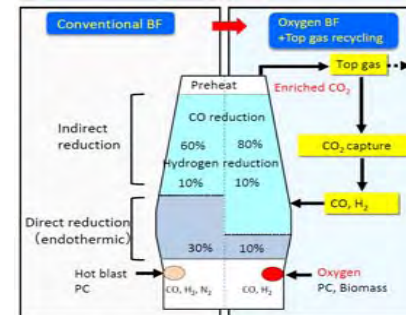
- Technical report of the Annex
- Not prescriptive
- Background to PI
- Case studies from workshops
- 2 Case studies from Annex cooperation
  - Biomass integration
  - Optimization of process gas use (reduction in flaring)
- Emphasis on identifying opportunities for developing PI methods and applications



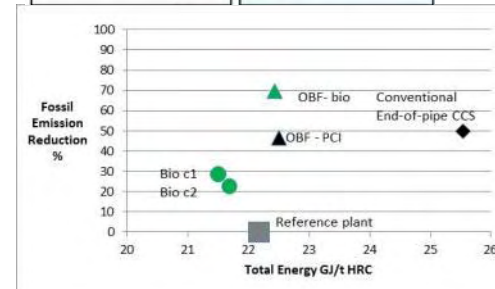
Process gas optimization



Waste energy for CO<sub>2</sub> separation (RIST, Korea)



Oxygen blast furnace & CO<sub>2</sub> Separation (Tohoku U, Japan)



Biomass Integration (CSIRO & Bluescope steel Australia, Swerea MEFOS, Sweden)





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## **IETS Annex 15 – Industrial Excess Heat Recovery Technologies and Applications**

**Participating Countries: Denmark, Germany,  
Norway, Portugal, Sweden and USA**

Annex Manager: Sweden

Thore Berntsson and Anders Åsblad

Chalmers Industry Technology, Industriell Energi

End of Phase 1: February 2015

# Four Main Topics



1. Determine potential of excess heat recovery in participating countries
2. Document development of existing and emerging technologies/systems
3. Determine and use effective modes of information dissemination
4. Understand government policy and regulations

# Excess heat amounts and levels



A compilation of existing studies on:

- Excess Heat Amounts
  - Excess Heat Temperature Levels
  - Excess Heat Aggregation State (steam, water, air, gases)
- in 8 different countries

Industry types included:

- Food
- Pulp and paper
- Chemical
- Iron and steel
- Cement
- Oil refineries
- Aluminium

# Carbon Footprint for CHP or Excess Heat

The logo for 'iets' (Industrial Energy-related Technologies and Systems) is positioned on the right side of a light green horizontal bar. The word 'iets' is written in a bold, lowercase, sans-serif font. To the right of the text is a stylized graphic consisting of several overlapping, curved lines in shades of green and yellow, suggesting energy or a dynamic process.

IEA Industrial Energy-related Technologies and Systems

A comparison between GHG emissions from natural gas- or biomass based- CHP and Excess Heat shows:

--Excess Heat cannot compete if the marginal power production technology in the grid is coal condensing plants

--If the marginal power production technology is natural gas combined cycle (NGCC) or a system with even lower emissions, excess heat is always more advantageous than CHP



# Suggestion for a Second Task

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## **IEA, IETS, Annex 15, Task 2 – Opportunities for Industrial Excess Heat: Available Resources and Possible Future Economy**

**Subtask 1: In-depth evaluation and inventory of excess heat levels**

**Subtask 2: Methodology on how to perform an inventory in practice**

**Subtask 3: Possible policy instruments and the influence on future use of excess heat**



# iets

IEA Industrial Energy-related Technologies and Systems

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