IETS Annex XIV
Development and use of Process Integration in the iron- and steel industry

Workshop 2012
Luleå
What is the IEA?

The International Energy Agency (IEA) was founded by the OECD countries in 1974 to reduce dependence on imported oil.

The shared goals of IEA members today are energy security, economic growth and environmental protection.

Energy technology innovation and widespread deployment of more economical and environmentally benign technologies are central parts of the IEA’s work.

*This and next 4 slides from Per-Åke Franck*
What is an IEA Implementing Agreement?

IEA Implementing Agreements offer the framework for collaborative projects.

Interested countries join together to study applications of existing technologies, research new technologies, co-ordinate national research programs or share information.

Today there are 40 collaborative projects in the following areas: End-Use; Fossil Fuels; Renewable Energies and Hydrogen; Fusion Power; Cross-sectional Activities.
The IETS Implementing Agreement

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

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

IETS currently has 10 member countries: Belgium, US, Canada, Denmark, Sweden, the Netherlands, Norway, Portugal and Korea.

Note: this membership list is not updated.

For more information about IETS:
http://www.iea-industry.org/ Information Brochure “About IETS”
Strategic Objectives of IETS

• To strengthen international cooperation on energy saving and GHG mitigation in industry;

• To facilitate cooperation between different industrial R&D disciplines;

• To improve knowledge transfer and information between countries, researchers and industries;
The IETS Projects (Annexes)


Annex X: Energy efficient drying and dewatering technologies

Annex XI: Industry-based Biorefineries

Annex XII: Membranes as energy-efficient technologies for Separation of Hydrocarbons

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 SMEs
The IEA Definition of Process Integration

"Systematic and General Methods for Designing Integrated Production Systems, ranging from Individual Processes to Total Sites, with special emphasis on the Efficient Use of Energy and reducing Environmental Effects"

From an Expert Meeting in Berlin, October 1993

Source: Truls Gundersen
Process Integration

Overall Steelworks site

Integrated works

Sinter plant
Lime kiln
Coke plant
Blast furnace
Steel plant
Onsite logistics & other

Rolling

Heat and Power Plant

Oxygen Plant

Raw materials
Energy & CO₂
“backpacks”

Pollutants, Byproducts

Energy Balance

Raw materials balance (incl. byproducts)

Global

Global Pollutants, Byproducts

Global Process Integration

Global Raw materials

Global Energy & CO₂

Global “backpacks”

Global Pollutants, Byproducts
Annex XIV: Development and use of Process Integration in the iron- and steel industry

Towards a lower energy use and reduced carbon dioxide emissions
Annex XIV: Development and use of Process Integration in the iron- and steel industry

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.
Annex outline

Process Integration methods
- Task 1
- Tools
- Modelling

Energy efficiency
- Task 2
- Heat recovery
- Energy coordination
- Low temp streams
- Excess heat

GHG mitigation
- Task 3
- Alternate fuels
- Carbon lean technologies
Annex management

- Annex manager – Lawrence Hooey, Sweden
  - Financial support by Swedish Energy Agency

- Task coordinators
  - Task 1, Henrik Saxén, Åbo Akademi, Finland
  - Task 2, Marianne Viart, ArcelorMittal R&D, France
  - Task 3, Habib Zughbi, BlueScope Steel, Australia
Schedule

- Annex proposal accepted Nov 2010
- Annex work to start 1 Jan 2011
- First intermediate meeting 3 Feb 2011
- First workshop 1 July 2011 (Düsseldorf)
- Second workshop 13-14 June 2012 (Luleå)
- Third workshop: Tokyo 5 - 7 November 2013

- Swedish Energy Agency Funded Projects
- Fourth workshop: Time/Location tbd
- Duration 3½ years
Annex XIV Participants

Sweden
- Swerea MEFOS (research)
- SSAB EMEA (industry)
- Luleå Univ Technology (research)

Finland
- Ruukki Metals (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
- JFE
- NSSMC
Advantages & Challenges

- Establishes/enhances international network of experts with common interest
- Gives a structure & commitment to collaboration
- Annex participants require own funding/time commitments