



2017 ANNUAL REPORT

INDUSTRIAL ENERGY-RELATED
TECHNOLOGIES AND SYSTEMS

A TECHNOLOGY COLLABORATION
PROGRAMME UNDER THE AUSPICES OF
THE INTERNATIONAL ENERGY AGENCY

INTERNATIONAL ENERGY AGENCY, IEA.....	4
Background.....	4
International Collaboration through Technology Collaboration Programmes (TCP:s).....	4
IETS – INDUSTRIAL ENERGY-RELATED TECHNOLOGIES AND SYSTEMS	5
IETS Work.....	5
IETS Member Countries	6
Website: www.iea-idustry.org	6
HIGHLIGHTS 2017	8
Implementation of The New strategic direction	8
Changes of Members and Delegates.....	10
COMMUNICATION.....	10
EVENTS 2017	10
Executive Committee Meetings.....	10
Workshops.....	10
IDEAS FOR NEW ANNEXES AND ACTIVITIES	11
ONGOING ANNEXES 2017	13
Annex XI: Industry-Based Biorefineries	13
Annex XIV: Energy-efficiency in the Iron and Steel Industry	15
Annex XV: Industrial Excess Heat Recovery – Technologies and Applications	16
Annex XVI: Energy Efficiency in Small and Medium Enterprises (SMEs)	18
Annex XVII – Membrane Filtration for Energy-Efficient Separation of Lignocellulosic Biomass Components.	19
IETS EXECUTIVE COMMITTEE MEMBERS 2017.....	21
COORDINATORS 2017	22
ANNEX MANAGERS (Active Annexes).....	23

INTERNATIONAL ENERGY AGENCY, IEA

BACKGROUND

Founded in 1974, the IEA was initially designed to help countries co-ordinate a collective response to major disruptions in the supply of oil such as the crisis of 1973/4. While this remains a key aspect of its work, the IEA has evolved and expanded. It is at the heart of global dialogue on energy, providing authoritative statistics and analysis.

An autonomous organisation, the IEA examines the full spectrum of energy issues and advocates policies that will enhance the reliability, affordability and sustainability of energy in its 29 member countries and beyond.

The four main areas of IEA focus are:

- Energy Security: Promoting diversity, efficiency and flexibility within all energy sectors;
- Economic Development: Supporting free markets to foster economic growth and eliminate energy poverty;
- Environmental Awareness: Analysing policy options to offset the impact of energy production and use on the environment, especially for tackling climate change; and
- Engagement Worldwide: Working closely with partner countries, especially major economies, to find solutions to shared energy and environmental concerns.

INTERNATIONAL COLLABORATION THROUGH TECHNOLOGY COLLABORATION PROGRAMMES (TCP:S)

Through the Technology Collaboration Programme, the IEA provides a framework for international collaborative energy research, development and demonstration projects. It enables experts from different countries to work collectively and share results, which are usually published.

The IEA Technology Collaboration Programme is open to both IEA member and non-member countries. Typically, participants are governmental or energy technology entities representing governments, research institutes and universities, energy technology companies, and industry.

The breadth of the analytical expertise in the IEA Technology Collaboration Programmes (TCPs) is a unique asset to the global transition to a cleaner energy future.

To date, participants in the TCPs have examined more than 1 900 energy-related topics, and carried out projects on socio-economic aspects of technology deployment, research to reduce greenhouse gas emissions, advancing demonstration of innovative energy technologies, contributing to benchmarks and international standards, and sharing information through hundreds of expert stakeholder events.

The 39 TCPs operating today involve about 6 000 experts from government, industry and research organisations in more than 50 countries.

IETS – INDUSTRIAL ENERGY-RELATED TECHNOLOGIES AND SYSTEMS

IETS is a Technology Collaboration Programme dealing with new industrial energy technologies and systems. IETS was established in 2005 as the result of merging, revamping, and extending activities formerly carried out by a number of separate industrial IEA programmes: Process Integration, Pulp and Paper, Heat Exchangers and Heat Transfer. This was done to facilitate development of both industry-specific as well as cross-cutting technologies, and to ease participation by countries in a broad range of industrial areas.

The mission of IETS is to foster international cooperation among OECD and non-OECD countries for accelerated research and technology development of industrial energy-related technologies and systems. In doing so, IETS seeks to enhance knowledge and facilitate deployment of cost-effective new industrial technologies and system layouts that enable increased productivity and better product quality while improving energy efficiency and sustainability.

IETS will be evolving continuously with the aim to include a range of energy-intensive sectors, such as iron and steel, cement, non-metallic materials, aluminum, petrochemicals, chemicals and food, as well as manufacturing industries, and small and medium-sized enterprises.

Through its activities, the IETS TCP will increase awareness of technology and energy efficiency opportunities in industry, contribute to synergy between different systems and technologies, and enhance international cooperation related to sustainable development.

Additional information about IETS and its different activities can be found on the IETS website: www.iea-industry.org.

IETS WORK

The principal work of IETS is about identifying, observing, following and sharing work among countries and their organisations and industry clusters. This is done through defined projects, so called Annexes, in which experts from countries who choose to take part form a working group with an Annex Manager (also called Operating Agent in other IEA ITCPs) in charge of coordinating.

As of December 2017, the IETS TCP had the following on-going Annexes (read more about them and their specific activities later in this report):

- Annex XI: Industry-based Biorefineries
- Annex XIV: Energy-efficiency in the Iron and Steel Industry
- Annex XV: Industrial Excess Heat Recovery – Technologies and Applications
- Annex XVI: Energy Efficiency in Small and Medium Enterprises (SMEs)
- Annex XVII: Membrane Filtration for Energy-efficient Separation of Lignocellulosic Biomass Components

In addition, preparations were made for starting a new Task in Annex XIII Applications of Industrial Heat Pumps and Electrification in Industry, a new Task on Decision Support Tools and Ex-ante Research (see

section on Annex XI below) and an entirely new Annex in the area of digitalization (tentative name Control, Big Data and Data Analytics for Energy Efficiency and GHG Emissions Reduction).

The work of IETS is continuously proceeding and new Annexes are developing in order to meet the arising needs of the IETS members. The IETS ExCo has recently taken the strategic decision to start more long-standing annexes and continuously add new tasks to existing ones.

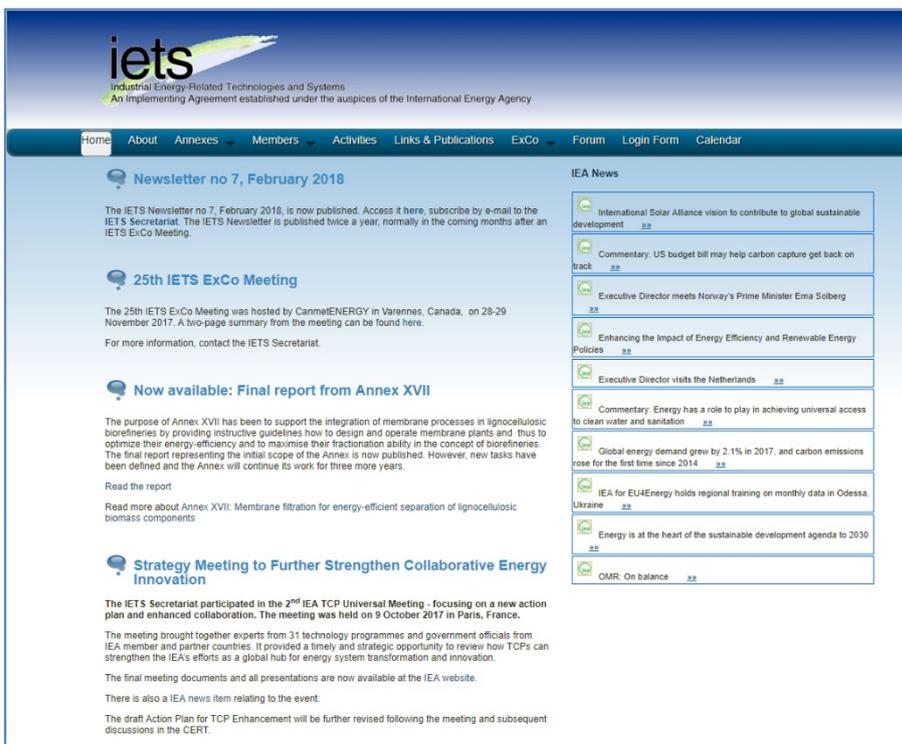
IETS MEMBER COUNTRIES

As of December 2017, the IETS IA Member Countries and Contracting Parties were the following:

- Austria: Climate and Energy Fund of the Austrian Federal Government
- Belgium: University of Liège
- Denmark: Danish Energy Agency
- Germany: Forschungszentrum Jülich GmbH
- Netherlands: RVO Netherlands Enterprise Agency
- Norway: ENOVA SF
- Portugal: Instituto Superior Técnico, Technical University of Lisbon
- Sweden: Swedish Energy Agency
- United States: U.S. Department of Energy

WEBSITE: WWW.IEA-INDUSTRY.ORG

The website consists of an official layer containing background information about IETS, descriptions of Annexes, procedures for participation, lists of events, and publications for downloading.



The screenshot shows the IETS website homepage. At the top left is the IETS logo and name. Below it is a navigation menu with links: Home, About, Annexes, Members, Activities, Links & Publications, ExCo, Forum, Login Form, and Calendar. The main content area features several news items:

- Newsletter no 7, February 2018**: The IETS Newsletter no 7, February 2018, is now published. Access it here, subscribe by e-mail to the IETS Secretariat. The IETS Newsletter is published twice a year, normally in the coming months after an IETS ExCo Meeting.
- 25th IETS ExCo Meeting**: The 25th IETS ExCo Meeting was hosted by CanmetENERGY in Varennes, Canada, on 28-29 November 2017. A two-page summary from the meeting can be found here. For more information, contact the IETS Secretariat.
- Now available: Final report from Annex XVII**: The purpose of Annex XVII has been to support the integration of membrane processes in lignocellulosic biorefineries by providing instructive guidelines how to design and operate membrane plants and thus to optimize their energy-efficiency and to maximise their fractionation ability in the concept of biorefineries. The final report representing the initial scope of the Annex is now published. However, new tasks have been defined and the Annex will continue its work for three more years. Read the report. Read more about Annex XVII: Membrane filtration for energy-efficient separation of lignocellulosic biomass components.
- Strategy Meeting to Further Strengthen Collaborative Energy Innovation**: The IETS Secretariat participated in the 2nd IEA TCP Universal Meeting – focusing on a new action plan and enhanced collaboration. The meeting was held on 9 October 2017 in Paris, France. The meeting brought together experts from 31 technology programmes and government officials from IEA member and partner countries. It provided a timely and strategic opportunity to review how TCPs can strengthen the IEA's efforts as a global hub for energy system transformation and innovation. The final meeting documents and all presentations are now available at the IEA website. There is also a IEA news item relating to the event. The draft Action Plan for TCP Enhancement will be further revised following the meeting and subsequent discussions in the CERT.

On the right side, there is a sidebar titled "IEA News" with several news items:

- International Solar Alliance vision to contribute to global sustainable development
- Commentary: US budget bill may help carbon capture get back on track
- Executive Director meets Norway's Prime Minister Erna Solberg
- Enhancing the Impact of Energy Efficiency and Renewable Energy Policies
- Executive Director visits the Netherlands
- Commentary: Energy has a role to play in achieving universal access to clean water and sanitation
- Global energy demand grew by 2.1% in 2017, and carbon emissions rose for the first time since 2014
- IEA for EU4Energy holds regional training on monthly data in Odessa, Ukraine
- Energy is at the heart of the sustainable development agenda to 2030
- OMR: On balance

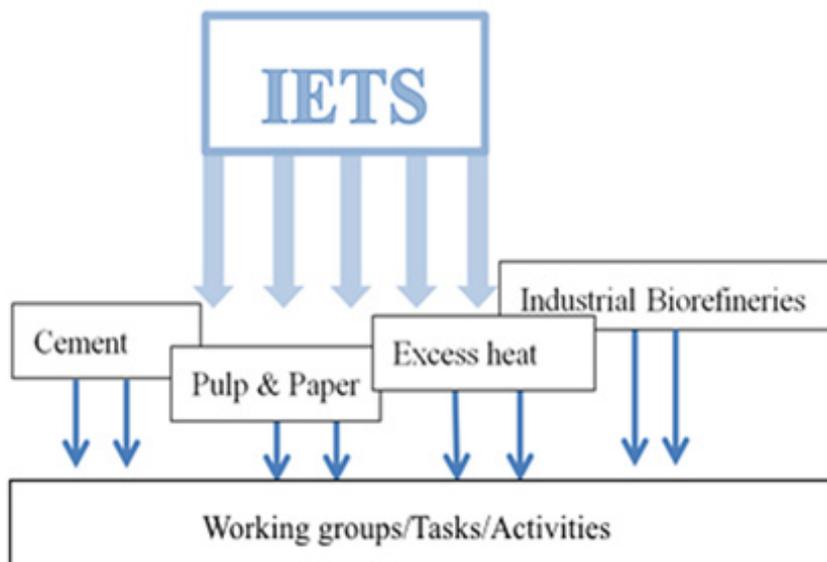
The IETS website is also the forum for material being internally shared between participants within the TCP. There is a specific password protected section for the ExCo delegates through which meeting agendas, material, and minutes are shared. The IETS Secretariat acts as the webmaster, being responsible for general updates. The IETS website will be completely redesigned during 2018.

HIGHLIGHTS 2017

IETS is the only TCP exclusively for the industrial sector, and there is a big scope for further development. The industrial sector is one of the main sectors with enormous opportunities for energy efficiency, GHG abatement, sustainable power production, and more sustainable raw materials/products. It is well known that industrial energy savings are among the most cost efficient ways to reduce GHG emissions.

IMPLEMENTATION OF THE NEW STRATEGIC DIRECTION

An important shift in the work of IETS has been towards more long-standing Annexes. The IETS should be organized according to the image below, i.e. partly like an “umbrella organization”, but also allowing new Annexes in more narrow areas.



A schematic image, with possible Annex examples, of the future IETS organization.

New Annexes should be set up for three years with possibility for extension and the participation in Annexes should be for free (with costs concentrated to the tasks).

Long-standing Annexes can be industry-type or cross-cutting technology oriented.

One important advantage is that it is easier to start a new task within an existing Annex, than starting a whole new Annex. Long-standing Annexes also mean a considerably improved visibility to industry and non-IETS countries about IETS activities.

ATTRACTING NEW MEMBERS

During 2017, Canada and France have started collaboration with the IETS ExCo and been involved in Annex work. Hence, both countries are interested in joining the IETS TCP and they have been formally invited by the IETS ExCo.

THE IMPORTANCE OF NETWORKS

The visibility of IETS is also important in the member countries to enhance the cooperative aspect internally. As a TCP covering all kinds of industrial activities, implementing National Support Groups (NSGs) on the ExCo level provides delegates with a broader platform for discussions and dissemination nationally. In general, the idea with an NSG is its evaluating and advising function when it comes to assisting the country's ExCo representative in responding to inquiries of different character from the IETS Chair, Secretariat and the ExCo as the decision-making body of IETS. The NSG network is also important for the future work of IETS as it can enhance and spread the knowledge about IETS in relevant contexts in the IETS member countries and thus contribute to the concrete as well as overall strategic development of the IETS.

Reporting from the National Support Groups is a standing item on the Agenda for each ExCo meeting.

THE MATRIX

Since 2013 the IETS TCP has been mapping areas of interest and industry initiatives in the IETS Member countries respectively, resulting in a general picture of the sectors with most activities on one hand, and technology areas on the other. This compilation of these fields of interest, shared by several IETS Member countries, is now referred to as the Matrix.

The Matrix on on-going research activities will be used as a tool to by the IETS identify areas of specific interest to the TCP. At the ExCo meeting in Canada in November 2017, all member countries were asked to provide five areas in the industrial sector in order to update the Matrix.

CHANGES OF MEMBERS AND DELEGATES

Korea has formally withdrawn from the IETS TCP.

For a complete list of delegates and alternates, please refer to page 21.

COMMUNICATION

The IETS website is continuously updated with current information. For example, the final report on the initial scope of Annex XVII has been published as well as reports from the IEA Expert Workshop on “The Role of Process Integration for Greenhouse Gas Mitigation in Industry” and the joint IETS-IEA BioEnergy workshop on “The role of industrial biorefineries in a low-carbon economy”, see below. Short summaries of the ExCo meeting minutes are also posted at the website.

Two newsletters were written and distributed online during the year. The Secretariat also supplied a two-page report for the vice Chair of Industry’s report to the EUWP (Working Party on Energy End-Use Technologies – one of CERT’s – the IEA Committee on Energy Research and Technology – four working parties).

EVENTS 2017

EXECUTIVE COMMITTEE MEETINGS

- 24th IETS ExCo Meeting in Gothenburg, Sweden, 17-18 May
- 25th IETS ExCo Meeting in Varennes/Montréal, Canada, 28-29 November

WORKSHOPS

- The IETS TCP organized an IEA expert workshop titled “The Role of Process Integration for Greenhouse Gas Mitigation in Industry” in Berlin on April 4-5. About 30 people from 13 countries participated in the workshop, sharing knowledge and experiences from different types of industries and research areas. The workshop has resulted in an open report, which has been disseminated through different channels.
- In connection to the IETS ExCo meeting in May, a joint workshop titled “The role of industrial biorefineries in a low carbon economy” was held together with the IEA Bioenergy TCP and gathered about 70 people from more than 20 countries. The workshop has resulted in an open report, which has been disseminated through different channels. An abstract has been provided for the international bioenergy conference EUBCE 2018 and there will be a full paper. There was also a study tour, including visits to the PreemEvolution Diesel biorefinery and the GoBiGasbiomass gasification plant.
- In October 2017, a webinar on digitalization and Big Data was organized by CanmetENERGY, Canada, and the Secretariat, with participation from six countries. This has led to a new annex proposal.
- In connection to the IETS ExCo meeting in November, a workshop on digitalization was held in order to further develop the annex proposals. The workshop was hosted by CanmetENERGY in Varennes, Canada and the 13 participants represented the IETS ExCo, Polytechnique Montreal and the host organization.

IDEAS FOR NEW ANNEXES AND ACTIVITIES

The following ideas for new Annexes and activities were presented and further discussed during 2017 by the IETS country delegates:

PROPOSAL FOR AN ANNEX ON BIG DATA AND DATA ANALYTICS FOR ENERGY EFFICIENCY AND GHG EMISSIONS REDUCTION

A proposal has been put forward to gather knowledge share knowledge and know-how about what industrial Big Data and Data Analytics could mean from improved productivity and energy perspectives in the natural resource sectors, recognizing its application in these sectors is embryonic. The aims of such an Annex would be to:

- Share the approaches and the conditions for large Big Data and Data Analytics adoption by the participating countries for industrial process energy efficiency
- Create value for the participating countries through a strategic use and collaborative implementation of advanced science and knowledge of Big Data and Data Analytics by:
 - Identifying or reinforcing synergies and complementarities between international research institutions, while respecting their individual mandates
 - Developing and sharing case studies in the natural resources sectors between the new IETS Annex member countries

The objectives shall be achieved by performing a number of workshops a year during a period of four years.

In addition, a proposal on Energy Efficient Process Control, “Towards a lower energy use and reduced carbon dioxide emissions by application of advanced process control”, has been put forward, which can be included as a separate Task in this Annex and hence more discussed at the IETS ExCo meeting in May 2018.

PROPOSAL FOR A NEW TASK IN ANNEX XI: DECISION SUPPORT TOOLS AND EX-ANTE RESEARCH FOR EVALUATING BIOECONOMY TRANSFORMATION STRATEGIES

The motivation for such a project, as proposed to the IETS ExCo in November, would be:

- The robustness of new biorefinery pathways will depend on their ability to survive under uncertain future conditions, for example changes in processes, production and policy instruments.
- Assessments and evaluations made at the present by companies considering transformation to the bioeconomy are made considering a set of complex criteria that are unique to the values of the company, eg economic, GHG mitigation, technology risk, market risk, unique competitive advantage, etc.
- A methodology for systematically quantifying and mitigating risk when assessing transformational strategies is essential, considering for example mathematical uncertainty, and/or different future scenarios.

PROPOSAL FOR A NEW TASK/ANNEX: ELECTRIFICATION IN INDUSTRY

Annex XIII, Application of industrial Heat Pumps was finished in 2014, but discussions has been going on and proposals for a continuation have been put forward since then. During 2017 a proposal for a continuation of the Annex under a broader name, focusing on electrification, has been approved by the IETS ExCo. The Netherlands has taken the lead in the planning and set-up of this Task/Annex.

The objectives and scope of the new activity would be:

- Developing a solid based information structure for key stake holders in industry and its supply and consulting chain and for policy makers.
- Getting insight in business decision processes in order to use trending topics and policy instruments as basis for tailor made communication.
- Increasing the knowledge and information about technologies for electrification, database and getting existing information available.
- Applying new technologies and identifying the needs for technological development
- Creating a network of experts.

A roadmap will be developed in which the various technologies are expected to be realized at different timescales based on maturity levels and wide-ranging business cases.

ONGOING ANNEXES 2017

ANNEX XI: INDUSTRY-BASED BIOREFINERIES

Responsible author: Isabel Cabrita, DGEG – Directorate-General of Energy and Geology, Portugal

Annex members: Belgium, Portugal, Sweden and the Netherlands.

Time schedule, Tasks 1-4: 1 March 2008 – 31 December 2016 (Final Report in November 2017)

Time schedule, new Task: 1 January 2018 – 31 December 2020. Proposed title: “Decision Support Tools and Ex-Ante Research for Evaluating Bioeconomy Transformation Strategies”

BACKGROUND

Annex XI has a multi-disciplinary approach to the concept of biorefineries integrated in industrial complexes, aiming at the optimization of energy efficiency in global terms. The approach is based on industry needs and application, combining the knowledge of industrial technologies with energy efficiency and biomass conversion processes.

Annex XI was launched in 2008 and has developed with the objective of sharing knowledge and experiences, as well as conducting research assessment based studies and R&D projects to promote the industry-based biorefineries' concept.

So far, activities have been implemented to reinforce international cooperation to structure partnerships that lead to optimization of energy efficiency in existing and new integrated industrial plants. Activities also include R&D on sustainability assessments, biofuels/bio-materials production technologies, and yields from thermo-chemical and biological conversion of biomass and waste materials.

Since transferred to a long-standing Annex in 2016, preparations for new Tasks have been made and the future scope is being developed. One of the proposed new Tasks will focus on the decision support systems (DSS) and ex-ante research. Its main objective consists of: **(a)** understanding the complex decision-making needs of industry related to bioeconomy transformation generally, and more specifically, energy decision-making needs as part of the overall decision considering ex-ante analysis; **(b)** identifying DSS software that assists in addressing the complex decision-making; and **(c)** understanding of ex-ante research related to energy policy, in the overall decision-making context. Further discussions on the scope and value of this new Task are scheduled for April 24, 2018.

DESCRIPTION OF ANNEX

The description and outcome of this Annex, so far, is found at the IETS web site.

ACTIVITIES DURING 2017

The overall report of the activity developed during 2008-2016 was finalized for publication. A workshop titled “The role of industrial biorefineries in a low carbon economy” organized together with the IEA Bioenergy TCP in Gothenburg on 16 May 2017.

In addition, interchange of information related to the implementation of new tasks has taken place.

WORK PLANNED FOR 2018

- Refine Annex objectives and methodology.
- Confirm Annex protocols and deliverables.
- Refine plan for the Annex Workshops.
- Short presentation of each DSS software – 3 webinars planned.
- Industry or government guest from forestry company presenting decision challenges related to bioeconomy transformation.
- Implementation of new Tasks.

CONTACT DETAILS

Annex manager:

Isabel Cabrita, DGEG – Directorate-General of Energy and Geology.

E-mail: isabel.cabrita@dgeg.pt

ANNEX XIV: ENERGY-EFFICIENCY IN THE IRON AND STEEL INDUSTRY

Responsible author: Mikael Larsson, Swerea MEFOS, Sweden

Annex Members: Sweden, and discussions with, Finland, France, Italy, Australia and Japan.

Time schedule, Tasks 1-3: 1 January 2011 – 31 May 2014

Time schedule, new Tasks: To be decided at the next ExCo meeting in May 2018

DESCRIPTION OF TASKS 4 AND 5

This Task on energy efficiency in the steel industry is a continuation and a broadened approach on working on energy efficiency in the steel industry. It will focus on applied studies for resource efficiency, training and dissemination and method development.

So far, an activity in the area of training and dissemination has been approved by the IETS ExCo, involving an international course on process integration in steelmaking.

ACTIVITIES DURING 2017

An international course on process integration in steelmaking was held in October.

WORK PLANNED FOR 2018

An international course on process integration in steelmaking is planned for spring 2018.

CONTACT DETAILS

Annex manager:

Mikael Larsson, Swerea MEFOS, Sweden

E-mail: mikael.larsson@swerea.se

ANNEX XV: INDUSTRIAL EXCESS HEAT RECOVERY – TECHNOLOGIES AND APPLICATIONS

Responsible author: Thore Berntsson, Division of Heat and Power Technology, Chalmers University of Technology, Sweden.

Annex Members: Austria, Canada, Denmark, France, Germany, Norway, Portugal and Sweden.

Time schedule: 1 October 2016 – 30 September 2018 (Phase/Task 2)

BACKGROUND

Despite political pressures, energy consumption in the world has increased by over 30% in the last twenty years. Without a change in policy, further increase of the use of fossil fuels and the related emission of CO₂ is unavoidable in the years to come. Only the development of breakthrough technologies can result in a serious improvement of energy efficiency as required by the energy goals set by the different nations.

Industrial energy use accounts for a third of the total energy used in society. In energy-intensive basic industries, such as chemicals, petroleum refining, iron and steelmaking, and pulp and paper, energy systems are the backbone of the manufacturing process and crucial to profitability and competitiveness. Hence, activities that promote efficient energy use with low environmental impact will be crucial for the future development, implementation and sustainability of these industrial processes. Changes in the efficiency and environmental performance of critical energy systems can significantly impact the cost of production. The diverse and widespread use of energy systems across industrial sectors creates numerous opportunities for energy efficiency improvements with potentially broad international impacts. Industries and processes are where the greatest potential energy benefits are to be gained.

DESCRIPTION OF ANNEX

The Annex takes on a multi-disciplinary approach to the concept of excess heat recovery integrated in industrial complexes, aiming at the optimization of energy efficiency in global terms. The approach is based on industry needs and application, combining the knowledge of industrial technologies with energy efficiency and cost-effectiveness.

The main objectives of Task 2 are:

- To enhance international collaboration in the field of industrial excess heat usage.
- To create a platform within IEA for sharing experiences and findings in R&D projects in the four areas
 - In-depth evaluation and inventory of excess heat levels
 - Methodology on how to perform an inventory in practice
 - Possible policy instruments and the influence on future use of excess heat
 - Technology Development
- To improve the knowledge in participating countries of technical and economic potentials for industrial excess heat usage, internally and externally, of experiences of and results from inventory studies in different types of industry and different countries.
- To exchange experience of conducting inventory studies.
- To enhance knowledge about consequences for the performance, economically and in terms of sustainability, of industrial excess heat projects of different possible future developments of policy

instruments and to identify future plans or trends for policy instrument development in participating countries.

The participants in Task 2 are:

Austria: Technische Universität Wien (TUW), AEE - Institut für Nachhaltige Technologien (AEE INTEC), Austrian Institute of Technology (AIT), and Energieinstitut an der JKU Linz

Canada: Natural Resources Canada – CanmetENERGY

Denmark: Weel & Sandvig

France: Agence de l'Environnement et de la Maîtrise de l'Énergie (ADEME), and Centre Technique des Industries Aérouliques et Thermiques (CETIAT)

Germany: Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg

Italy: Eurac Research

Norway: SINTEF

Portugal: Instituto Superior de Engenharia de Lisboa (ISEL), Instituto Superior Técnico (IST), and the National Group for Process Integration (GNIP)

Sweden: Linköping University (LiU), Chalmers University of Technology, and Faculty of Engineering Lund University (LTH)

ACTIVITIES DURING 2017

- Skype meeting, 17 February 2017
- Annex meeting in Lisbon, 26–27 April 2017
- Skype meeting, 27 June 2017
- Workshop in Vienna about pinch methodology (organized by AIT) with participants from AIT, AEE INTEC and Chalmers, September 2017
- Skype meeting, 30 October, 2017

WORK PLANNED FOR 2018

- Annex meeting in Vienna, 23–24 January 2018
- Workshop in Vienna about pinch methodology, 25 January 2018
- Skype meeting, 12 April 2018
- Skype meeting, 18 June 2018
- Final Annex meeting in Graz, 1–2 October 2018
(In connection with the ISEC conference 3–5 October)

CONTACT DETAILS

Annex Manager:

Thore Berntsson, Chalmers University of Technology, Sweden.

E-mail: thore.berntsson@chalmers.se

ANNEX XVI: ENERGY EFFICIENCY IN SMALL AND MEDIUM ENTERPRISES (SMES)

Responsible author: Patrik Thollander, Linköping University, Sweden

Annex Members: Norway, Sweden, Ireland, Japan, Germany, Italy and Australia.

Time Schedule initial Tasks: 1 January 2012 – 30 June 2015

Time Schedule new Tasks: 1 January 2018 – 31 August 2019

DESCRIPTION OF THE ANNEX

The objective of this Annex is to enhance practical and scientific knowledge of improved energy end-use in industrial SMEs, through specific studies of:

- Energy end-use efficiency policies with emphasis on energy efficiency networks towards industrial SMEs
- Review of scientific publications towards industrial SMEs

ACTIVITIES DURING 2017

None.

WORK PLANNED FOR 2018

Initiation of new Tasks (no 5 and 6).

CONTACT DETAILS

Annex manager:

Patrik Thollander, Division of Energy Systems, Linköping University, Sweden

E-mail: patrik.thollander@liu.se

ANNEX XVII – MEMBRANE FILTRATION FOR ENERGY-EFFICIENT SEPARATION OF LIGNOCELLULOSIC BIOMASS COMPONENTS.

Responsible author: Frank Lipnizki, Lund University, Sweden

Annex Members: Sweden, Belgium, Denmark, Portugal and Finland

Time Schedule initial Tasks: 1 January 2014 – 30 June 2017

Time Schedule new Tasks: 1 January 2018 – 31 December 2020

DESCRIPTION OF ANNEX

The transition of our society from a society largely dependent on fossil-based materials to a climate-smart society based on biomass does not only mean a change in the raw material base, but it will also require that new production concepts in the form of biorefineries are developed.

Within the concept of biorefineries membrane processes have been identified as a key separation technology due to their high selectivity and low energy consumption. While the design and operation of membrane processes in other industrial sectors, e.g. the dairy industry, is well established, the design, integration and operation of membrane processes in biorefineries is largely empirical. The fact that process streams in biorefineries contain a large variety of components increases further the complexity.

The first part of the Annex focused exclusively on biorefineries based on lignocellulosic biomass, while the second part of the Annex will transfer, exchange and extend the existing knowledge of the industrial and academic partners with regard to the energy-efficient use of membrane technology to the overall concept of biorefineries based on different renewable resources ranging from algae to agricultural residuals. The accessible knowledge will be mapped and structured and potential knowledge gaps will be identified together with the necessary actions to close those.

Thus the objectives of the extended IETS Annex are the development of energy-efficient and sustainable concepts of biorefineries utilizing the opportunities of membrane technology to produce biochemical, biofuels and energy based on renewable resources by:

- Maintaining and extending the current Annex network of industrial and academic experts by focusing on the integration and optimization of membrane processes in the overall concept of biorefineries.
- Mapping and structuring the current knowledge and experience related to membrane processes in biorefineries and identifying knowledge gaps and measures required to overcome those.
- Extrapolating and adding to the current guidelines for design and optimization of membrane processes in the overall concept of biorefineries.
- Extending the focus to emerging membrane processes and the membrane processes within the water loop of biorefineries.

The dissemination of the results will take place during Annex meetings, seminars with industrial participation, presentations at conferences and publications for the general public and scientific community. Furthermore, the results will be publically available on the webpage of the Annex.

ACTIVITIES COMPLETED DURING 2017

- Information exchange seminars.
- Annex meeting to finalize Annex and plan future activities.
- 34th EMS Summer School on “Membranes in biorefineries, June 26-30, 2017
- 4 peer-reviewed articles plus 7 presentations at international conferences.
- Final report delivered to and approved by the IETS ExCo.

WORK PLANNED FOR 2018

- Annex meeting to plan and coordinate the Annex extension (planned for Q2 2018)

CONTACT DETAILS

Annex manager:

Frank Lipnizki, Department of Chemical Engineering, Lund University, Sweden

E-mail: frank.lipnizki@chemeng.lth.se

IETS EXECUTIVE COMMITTEE MEMBERS 2017

AUSTRIA

Delegate: Elvira Lutter, the Climate and Energy Fund of the Austrian Federal Government:
elvira.lutter@klimafonds.gv.at

Alternate: Vacant

BELGIUM

Delegate: Angélique Léonard, University of Liège: a.leonard@ulg.ac.be

Alternate: Gilles Tihon, Service Publique de Wallonie. gilles.tihon@spw.wallonie.be

DENMARK

Delegate: Jan Sandvig Nielsen, Weel & Sandvig Energy and Process Innovation: jsn@weel-sandvig.dk

Alternate: Brian Elmegaard, DTU - Technical University of Denmark: be@mek.dtu.dk

GERMANY

Delegate: Claus Börner, Forschungszentrum Jülich GmbH: c.boerner@fz-juelich.de

Alternate: Vacant

NORWAY

Delegate: Marit Sandbakk, ENOVA SF: marik.sandbakk@enova.no

Alternate: Anne Merethe Kristiansen, ENOVA SF: anne.merethe.kristiansen@enova.no

PORTUGAL

Delegate: Clemente Pedro Nunes, Instituto Superior Técnico, Technical University of Lisbon:
pedronunes@gml.pt

Alternate: Isabel Cabrita, DGEG – Directorate-General of Energy and Geology: isabel.cabrita@dgeg.pt

SWEDEN

Delegate: Svante Söderholm, Swedish Energy Agency: svante.soderholm@energimyndigheten.se

Alternate: Thore Berntsson, Chalmers University of Technology: thore.berntsson@chalmers.se

THE NETHERLANDS

Delegate: Maurits Clement, Netherlands Enterprise Agency: maurits.clement@rvo.nl

UNITED STATES

Delegate: Isaac Chan, US Department of Energy: isaac.chan@ee.doe.gov

Alternate: Bob Gemmer, US Department of Energy: bob.gemmer@ee.doe.gov

COORDINATORS 2017

IETS EXECUTIVE COMMITTEE CHAIR

Thore Berntsson, Sweden: thore.berntsson@chalmers.se

IETS EXECUTIVE COMMITTEE VICE CHAIR

Maurits Clement, the Netherlands: maurits.clement@rvo.nl

Clemente Pedro Nunes, Portugal: c.pedronunes@tecnico.ulisboa.pt

IETS EXECUTIVE COMMITTEE SECRETARIAT

Heléne Johansson, Sweden: helene.johansson@cit.chalmers.se

Per-Åke Franck, Sweden: per-ake.franck@cit.chalmers.se

ANNEX MANAGERS (ACTIVE ANNEXES)

ANNEX XI: INDUSTRY-BASED BIOREFINERIES

Isabel Cabrita: isabel.cabrita@dgeg.pt

DGEG – Directorate-General of Energy and Geology, Portugal

ANNEX XIV: ENERGY-EFFICIENCY IN THE IRON AND STEEL INDUSTRY

Mikael Larsson: mikael.larsson@swerea.se

Process Integration Department at Swerea MEFOS, Sweden

ANNEX XV: INDUSTRIAL EXCESS HEAT RECOVERY

Thore Berntsson: thore.berntsson@chalmers.se

Division of Heat and Power Technology, Chalmers University of Technology, Sweden

ANNEX XVI: ENERGY EFFICIENCY IN SMALL AND MEDIUM ENTERPRISES (SMES)

Patrik Thollander: patrik.thollander@liu.se

Division of Energy Systems, Linköping University, Sweden

ANNEX XVII: MEMBRANE FILTRATION FOR ENERGY-EFFICIENT SEPARATION OF LIGNOCELLULOSIC BIOMASS COMPONENTS

Frank Lipnizki: frank.lipnizki@chemeng.lth.se

Department of Chemical Engineering, Lund University, Sweden

About the IETS Annual Report

This report has been prepared and published by the IETS Secretariat 2018. For further information, please contact helene.johansson@cit.chalmers.se, or visit the IETS website at www.iea-industry.org.

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.