



2016 ANNUAL REPORT

INDUSTRIAL ENERGY-RELATED
TECHNOLOGIES AND SYSTEMS

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

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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 IA 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 2016, 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 (formerly called Process Integration in the iron- and steel industry and finished in 2014 but may be continued)
- Annex XV: Industrial Excess Heat Recovery – Technologies and Applications
- Annex XVI: Energy Efficiency in Small and Medium Enterprises (SMEs) (finished in 2015, but may be continued)
- Annex XVII: Membrane Filtration for Energy-efficient Separation of Lignocellulosic Biomass Components

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 2016, 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
- Korea: Korea Institute of Energy Technology Evaluation and Planning (KETEP)
- 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 IETS website was established during 2006 and got a new platform in 2011. 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 IETS website is also the forum for material being internally shared between participants within the TCP. This is managed through a password protected layer of the website that offers sections for each Annex, controlled by the Annex manager respectively. There is a specific section for the ExCo delegates

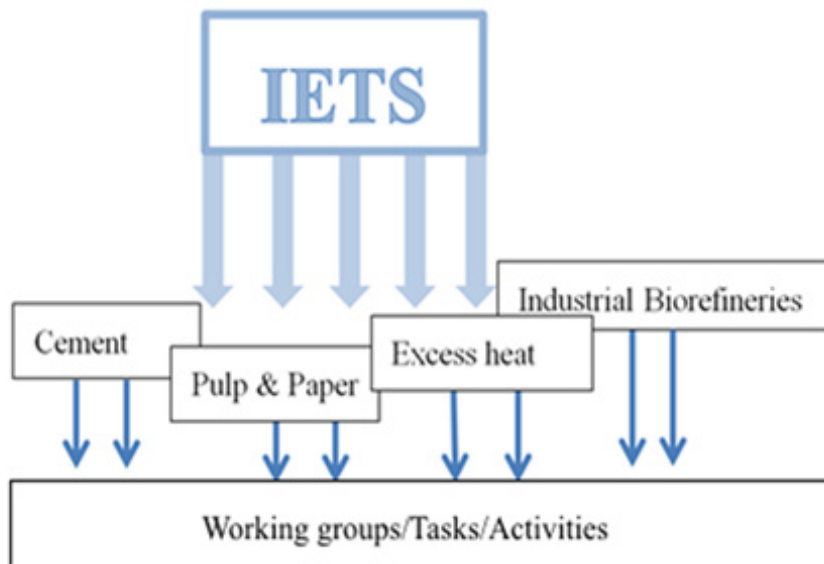
through which meeting agendas, material, and minutes are shared. The IETS Secretariat acts as the webmaster, being responsible for general updates.

HIGHLIGHTS 2016

IETS is the only TCP exclusively for the industrial sector, but 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.

During 2016, Annex XI Industry-based Biorefineries has been converted to a long-standing Annex with, so far, two new Tasks, see section ONGOING ANNEXES 2016.

ATTRACTING NEW MEMBERS

Austria has officially joined the IETS TCP, which will strengthen the IETS ExCo TCP. Austrian groups are also involved in Annex work.

The IETS Chair and Secretariat are discussing possible future membership also with other countries and hope to attract new members in order to widen the base of expertise and spread the knowledge further.

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 on the ExCo level provides delegates with a broader platform for discussions and dissemination nationally. In general, the idea with a National Support Group 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.

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

National Support Groups (NSGs), i.e. networks on the TCP level that covers a range of relevant research and industry areas, are crucial 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. The overview that was presented at this ExCo meeting, showed that NSGs exist, to some extent, in most member countries, but the use, activities and composition of the groups vary considerably.

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 technique 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 Liège in November 2016, a summary of the Matrix work, so far, was presented and also a suggestion for how to use the Matrix when starting new annexes. An annex on "industrial automation and digitalization from an energy perspective" will be the first annex to start in this way, i.e. by mapping specific parameters.

CHANGES OF MEMBERS AND DELEGATES

Austria is now formally a member of the IETS, represented by the Climate and Energy Fund of the Austrian Federal Government. Austrian delegate is Elvira Lutter.

Belgium, Denmark, Portugal and Sweden have appointed new alternate delegates. For a complete list of delegates and alternates, please refer to page 21.

COMMUNICATION

The work of improving and up-dating the IETS website continued during 2016. For example, final reports from finished Annexes have been published.

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 2016

EXECUTIVE COMMITTEE MEETINGS

- 22nd IETS ExCo Meeting in Freiburg, Germany, 12-13 May
- 23rd IETS ExCo Meeting in Liège, Belgium, 22-23 November

WORKSHOPS

- In connection to the ExCo meeting in Freiburg in May 2016, there was a workshop on R&D Activities in Germany and on Strategic Development for the IETS. In addition to the ExCo members, researchers from Fraunhofer IPN and IEA representatives participated.
- The IETS was part of the organization of a workshop titled "Industrial Energy Agility - Business opportunities for industries through electrification" during the conference "Industrial Technologies 2016 – Creating a Smarter Europe" that was held on 23-25 June in Amsterdam during the Dutch EU presidency.
- The IETS TCP provided three speakers for a workshop titled "Heat Pumping Technologies for Commercial and Industrial Applications" at the CHILLVENTA Exhibition on 10 October in Nuremberg, Germany.

IDEAS FOR NEW ANNEXES AND ACTIVITIES

The following ideas for new Annexes and activities were presented and further discussed during 2016 by the IETS country delegates:

ACTIVITY ON MULTIPLE BENEFITS OF ENERGY EFFICIENCY MEASURES

A joint Annex with the Demand-Side Management Programme on Multiple Benefits has been elaborated and discussed for some time. During 2016, the IETS ExCo decided not to start the proposed Annex. However, the IETS ExCo still finds this area of high interest and intends to organize a workshop later on.

JOINT WORKSHOP WITH IEA BIOENERGY

A joint workshop together with IEA Bioenergy will be held in Gothenburg, Sweden, during the “Bioenergy Week”, which also includes, e.g., the TCPs’ ExCo meetings. The workshop is scheduled for May 16, with open invitation, and there will also be an ExCo study tour including visits to the PreemEvolution Diesel biorefinery and the GoBiGasbiomass gasification plant.

HIGH-LEVEL IEA EXPERT WORKSHOP ON PROCESS INTEGRATION

The IETS TCP will organize a workshop in Berlin on April 4-5, 2017, that will gather about 30 experts in the field. After the workshop, a report will be published highlighting the most important outcomes of the speeches and discussions.

PROPOSAL FOR AN ANNEX ON INDUSTRIAL AUTOMATION AND DIGITALIZATION FROM AN ENERGY PERSPECTIVE

A proposal has been put forward to gather knowledge about what industrial digitalization could mean from an energy perspective. The aims of such an Annex would be to:

- survey national initiatives related to industrial digitalization (or similar concepts) and identify to what extent and how these describe benefits for and applications related to industrial energy use and energy efficiency, and
- identify examples of how automation and digitalization can be means of achieving improved energy efficiency.

The objectives shall be achieved by performing three to four workshops during a period of one and a half years.

PROPOSAL FOR AN ANNEX ON EX-ANTE EVALUATION ECONOMIC AND ENVIRONMENTAL EVALUATION OF NEW INDUSTRIAL TECHNOLOGIES

Such an Annex would show how important the selection of parameters is for the future result and how different scenarios effect the outcome, both economically and in terms of climate consequences, one argument being that concepts may be developed today, but not economically viable until in 10 years’ time – when the technology is developed and policy instruments are different.

ONGOING ANNEXES 2016

ANNEX XI: INDUSTRY-BASED BIOREFINERIES

Responsible author: Isabel Cabrita, LNEG – National Laboratory of Energy and Geology, Portugal

Annex members: Belgium, Portugal, Sweden and the Netherlands

Time schedule, Task 1: 1 March 2008 – 31 December 2016

Time schedule, Task 2: TBD

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.

DESCRIPTION OF ANNEX

The Annex is divided into the following ongoing tasks:

Task 1 – Bioenergy & Biofuels

Task 2 – Biochemicals & New Fibre Materials

Task 3 – Sustainability Analysis of Process Integrated Biorefineries.

Task 4 – Process Integration of Gasification-based Biorefineries.

Task 5 – Membrane Separation of lignocellulosic biomass components (under implementation jointly with Annex XV)

Task 6 – Dissemination and information Exchange (under implementation)

The following R&D specific areas as opportunities for cooperation have been identified: Sustainability studies, Process Integration for optimization of energy efficiency, Catalysis, Enzymes, Pyrolysis, Gasification, and Carbon fixation for biodiesel production using microalgae. In this context, projects were developed and information exchange and dissemination activities were implemented as well as development of benchmarking and/or prospective studies in the area of industry-based biorefineries.

The program of work has been set up to improve international collaboration and to add initiatives related to one or more of the above mentioned areas. Achievements and initiatives implemented in the period 2008-2015 are presented in an overall report to be issued for dissemination in 2016.

ACTIVITIES DURING 2016

No information available.

WORK PLANNED FOR 2017

No information available.

CONTACT DETAILS

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Responsible for Task 3 (Sustainability Analysis of Process Integrated Biorefineries):

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Responsible for Task 4 (Process Integration of Gasification-based Biorefineries):

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

Responsible author: Lawrence Hooey, Process metallurgy department, Swerea MEFOS, Sweden

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

Time schedule, Task 2: To be decided at the next ExCo meeting in May 2017

DESCRIPTION OF ANNEX

The background, scope and outcome of this Annex, so far, is described at the IETS web site.

WORK PLANNED FOR 2017

No work is yet planned and/or decided for this Annex during the coming year, but will be discussed at the IETS ExCo meeting in May.

CONTACT DETAILS

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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: USA, Portugal, Denmark, Sweden and Norway.

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), and Austrian Institute of Technology (AIT)

Denmark: Weel & Sandvig

Germany: Fraunhofer Institute for Physical Measurement Techniques IPM, Freiburg

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 2016

During 2016, including the planning and startup phase, five telephone and Skype meetings were held.

WORK PLANNED FOR 2017

Activities in the participating groups in the four subtasks have been identified. During 2017, direct cooperation between groups in each subtask will be identified and carried out. In addition, interest in information transfer between groups and subtasks will be identified and a plan for that will be developed. In an Annex 15 workshop, in Lisbon, detailed discussions about these aspects will be held.

ACTIVITIES PLANNED FOR 2017:

In 2017 four Skype-meetings, the first one February 17, are planned and there will also be a workshop in Lisbon on April 26-27, 2017.

CONTACT DETAILS

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

Responsible author: Patrik Thollander, Linköping University, Sweden

Annex Members: Belgium, Sweden, Japan, Spain and Italy.

Time Schedule: 1 January 2012 – 30 June 2015 (may be continued)

DESCRIPTION OF THE ANNEX

The background, scope and outcome of this Annex, so far, is described at the IETS web site.

WORK PLANNED FOR 2017

No work is yet planned and/or decided for this Annex during the coming year, but will be discussed at the IETS ExCo meeting in May.

CONTACT DETAILS

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

Responsible author: Ann-Sofi Jönsson, Lund University, Sweden

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

Time Schedule: 1 January 2014 – 30 June 2017

BACKGROUND

Distillation is the unit operation that dominates the separation scheme in petroleum refineries as most compounds are volatile. In contrast to petroleum compounds, most compounds derived from biomass are non-volatile. Especially size, and to some extent charge, are the main separation characteristics of extracted biomass compounds, which make membrane processes a natural key separation technique in biorefineries.

Development of new biorefinery processes is often carried out by persons with deep knowledge about biotechnology but no, or only limited, experience of membrane processes. In order to optimize energy-efficiency and fractionation ability of membrane processes in biorefineries co-operation between experts on membrane processes and biotechnology is needed. The aim of the Annex is to be a bridge between these groups and by active networking build strong clusters for future work in this area.

OBJECTIVES AND SCOPE

The objective of the Annex is the development of sustainable and energy-efficient separation methods enabling utilization of renewable resources for production of chemicals, materials and energy by:

- Creation of a network of experts involved in projects with the aim of recovering value-added components in biomass.
- Bringing together and sharing information on the present state of sustainable and energy-efficient separation methods to be used in biorefineries.
- Creation of guidelines for design and optimization of membrane processes in biorefineries.
- Survey of fouling and cleaning of membranes in biorefineries.

TASK STRUCTURE

Four tasks are outlined in Annex XVII:

- A. Recovery of biomass components
- B. Sustainable and energy-efficient separation methods in biorefineries
- C. Design and optimization of membrane processes in biorefineries
- D. Fouling and cleaning of membranes in biorefineries

ANNEX DELIVERABLES

- Status reports presented to the IETS Executive Committee.
- Newsletters presented at the IETS homepage.
- For each of the subtasks the result will be summarized in the format of a handbook that can be distributed to industry and organizers.

ACTIVITIES DURING 2016

Two articles

Thuvander, J. and Jönsson, A.-S., Extraction of galactoglucomannan from thermomechanical pulp mill process water by microfiltration and ultrafiltration – influence of microfiltration membrane pore size on ultrafiltration performance, *Chemical Engineering Research and Design* 105 (2016) 171-176.

Thuvander, J., Oinonen, P. and Jönsson, A.-S.

Enzymatic treatment of hemicelluloses and lignin isolated from thermomechanical pulp mill process water, *Chemical Engineering Journal*, 296 (2016) 141-145.

Seven oral presentations at conferences and workshops/seminars

J. Thuvander, and A.-S. Jönsson, Isolation of hemicelluloses in waste water from thermomechanical pulp mills, The Gunnar Sundblad Session for young researchers, Ekmandagarna 2016, 26-27 January 2016 (oral).

F. Lipnizki: Present and future membrane applications, Moving from C2/C3 chemistry to biotechnological processes. Russian Membrane Society, 2016, Moscow, Russia, February 09, 2016 (oral).

F. Lipnizki and A.-S. Jönsson, Membrane processes in the separation and utilisation of wood biomass in the context of the pulp and paper industry, World Filtration Congress, Taipei, Taiwan, April 11 -15, 2016 (oral).

F. Lipnizki, Membrane applications for bulk fermentation processes: From antibiotics to bio-chemicals. Membranes in Bioprocessing, Bologna, Italy, May 08 – 10, 2016 (oral).

F. Lipnizki, C. Plesskott and H. Schuster, Membrane opportunities in production and water loop of biorefineries based on lignocellulosic biomass, Paper & Biorefinery 2016, Graz, Austria, May 10 – 17, 2016 (oral).

J. Thuvander, P. Oinonen and A.-S. Jönsson, Laccase treatment of galactoglucomannan from thermomechanical pulp mill process water, 16th Nordic Filtration Symposium, Lappeenranta, Finland, August 24 – 26, 2016 (oral).

A.-S. Jönsson and F. Lipnizki, Costs for membrane cleaning - an economic assessment, 16th Nordic Filtration Symposium, Lappeenranta, Finland, August 24 – 26, 2016 (oral).

Book contribution

Jönsson, A.-S., *Membranes for lignin and hemicellulose recovery in pulp and paper mills* in Membrane technologies for biorefining, ed. A. Figoli, A. Cassano and A. Basile, Woodhead Publishing (2016).

Thesis to obtain the Master of Science Degree in Chemical Engineering

Teófilo Rodrigo Leitão São Pedro, Ultrafiltration and Nanofiltration of E-stage bleaching plant effluent of a sulphite pulp mill, December 2016

Supervisors: Professor Ann-Sofi Jönsson (Lund University, Lund, Sweden) Professor Maria Norberta Neves Correia de Pinho (Instituto Superior Técnico, Lisboa, Portugal)

WORK PLANNED FOR 2017

Information exchange seminars. An Annex meeting during the 34th EMS Summer School, June 26-30, 2017, to plan next steps and to coordinate a dissemination plan.

CONTACT DETAILS

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IETS EXECUTIVE COMMITTEE MEMBERS 2016

AUSTRIA

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

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BELGIUM

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ANNEX MANAGERS (ACTIVE ANNEXES)

ANNEX XI: INDUSTRY-BASED BIOREFINERIES

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

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