



2019 ANNUAL REPORT

INDUSTRIAL ENERGY-RELATED
TECHNOLOGIES AND SYSTEMS

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

IETS EXECUTIVE COMMITTEE
SECRETARIAT 2020

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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 significantly.

The IEA examines the full spectrum of energy issues including oil, gas and coal supply and demand, renewable energy technologies, electricity markets, energy efficiency, access to energy, demand side management and much more. Through its work, the IEA advocates policies that will enhance the reliability, affordability and sustainability of energy in its 30 member countries and beyond.

Today, the IEA is at the heart of global dialogue on energy, providing authoritative analysis through a wide range of publications, including the flagship *World Energy Outlook* and the *IEA Market Reports*; data and statistics, such as Key World Energy Statistics and the Monthly Oil Data Service; and a series of training and capacity building workshops, presentations, and resources.

The four main areas of IEA focus are:

- Energy Security: Promoting diversity, efficiency, flexibility and reliability for all fuels and energy sources;
- 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 air pollution; and
- Engagement Worldwide: Working closely with partner countries, especially major emerging 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 around 2 000 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 TCPs involve over 6 000 experts worldwide who represent nearly 300 public and private organizations located in 55 countries, including a large participation by IEA Association countries, such as China, India and Brazil.

IETS – INDUSTRIAL ENERGY-RELATED TECHNOLOGIES AND SYSTEMS

IETS is a Technology Collaboration Programme dealing with new industrial energy-related 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 (SMEs).

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 organizations 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 TCPs) in charge of coordinating.

As of December 2019, 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 Processes in Biorefineries
- Annex XVIII: Digitalization, Artificial Intelligence and Related Technologies for Energy Efficiency and GHG Emissions Reduction in Industry
- Annex XIX: Electrification in Industry

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 AND SPONSORS

As of December 2019, the IETS TCP Member Countries and Contracting Parties were the following:

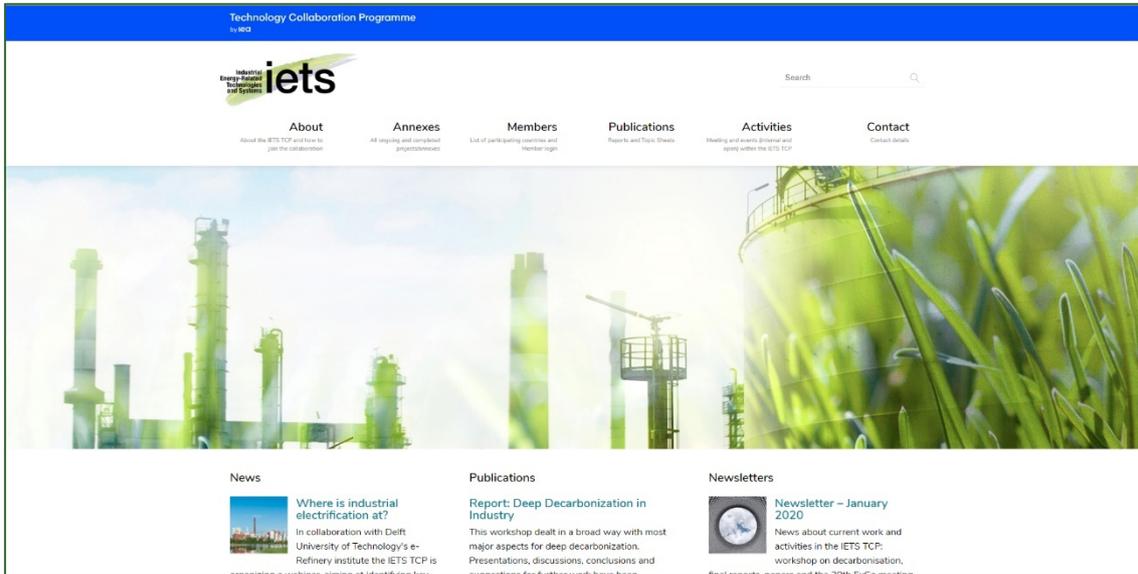
- Austria: Climate and Energy Fund of the Austrian Federal Government
- Canada: Natural Resources Canada (NRCan)
- Denmark: Danish Energy Agency
- France: ADEME - Agence de l'Environnement et de la Maîtrise de l'Énergie
- Germany: Forschungszentrum Jülich GmbH
- Italy: ENEA – Italian National Agency for New Technologies, Energy and Sustainable Economic Development
- Netherlands: RVO Netherlands Enterprise Agency
- Norway: ENOVA SF
- Portugal: Instituto Superior Técnico, Technical University of Lisbon
- Sweden: Swedish Energy Agency

The following organizations are/were Sponsors to the IETS TCP, i.e. they can participate in Annex Work and ExCo meetings but without the right to vote:

- Ricerca sul Sistema Energetico S.p.A. (RSE), Italy (until July 1st, then Italy became a full member)
- EURAC Research, Italy (until July 1st, then Italy became a full member)
- Universidad de la Costa, Colombia
- Central Research Institute of Electric Power Industry, Japan
- Limerick Institute of Technology, Ireland

WEBSITE: WWW.IEA-INDUSTRY.ORG

The IETS TCP website focuses on IETS projects, findings and collaboration activities. 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. There is a specific password protected section for the ExCo delegates through which meeting agendas, documents and minutes are shared. The IETS Secretariat acts as the webmaster, being responsible for general updates. During 2019 the website and other communication material was updated according to the new IEA TCP branding guidelines and an RSS feed was introduced.

HIGHLIGHTS 2019

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.

ATTRACTING NEW MEMBERS

During 2019, Italy has joined the IETS TCP as full member.

Discussions about joining the IETS TCP are currently ongoing with representatives from both individual organizations and potential new member countries.

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. 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 and the technology and system areas of highest interest. This compilation of these fields of interest, shared by several IETS Member countries, is now referred to as the Matrix.

The Matrix is continuously updated and is used as a tool to identify areas of specific interest to the IETS TCP in order to start new activities.

CHANGES OF MEMBERS AND DELEGATES

Italy has joined the IETS TCP and the US has formally withdrawn.

German delegate Claus Börner has resigned and been replaced by alternate delegate Gordon Kaußen from Forschungszentrum Jülich GmbH.

Joop Bormans from Netherlands Enterprise Agency (Rijksdienst voor Ondernemend Nederland) has been appointed Dutch alternate delegate.

For a complete list of delegates and alternates, please refer to page 25.

COMMUNICATION

The IETS website is the main communication channel – in addition to personal meetings – and attracted about 3500 visitors from all over the world during 2019. The website is continuously updated with current information, e.g., regarding activities in and status updates from Annex work, seminars and conferences, news and new publications. Short summaries of the ExCo meeting minutes are also posted at the website.

In 2018, the EITS Secretariat started producing fact sheets on important and relevant topics, based on Annex reports, workshop summaries etc. The following Topic Sheets were produced and published during 2019:

- No 5: Membrane Processes in Biorefineries, based on the final report from Annex XVII.
- No 6: Digitalization for Energy Efficiency and GHG Emissions Reduction, based on the proposal for new Annex XVIII.
- No 7: Industrial Excess Heat Recovery – Technologies and Applications, based on the final report from Annex XV Task 1
- No 8: Industrial Excess Heat Recovery – Technologies and Applications, Task 2, based on the final report from Annex XV, Task 2

Two issues of the IETS Newsletter was distributed online to about 110 subscribers and posted at the IETS website. The Secretariat also supplied an Annual Brief 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).

To increase visibility and dissemination, news, reports etc. are also posted on Twitter.

EVENTS 2019

EXECUTIVE COMMITTEE MEETINGS

- 28th IETS ExCo Meeting in Paris, France, 14-15 May
- 29th IETS ExCo Meeting in Espoo, Finland, 27-28 November

WORKSHOPS & WEBINARS

- In connection to the 28th IETS TCP ExCo meeting in Paris (May 14-15) a well-attended workshop on national roadmaps for industry was organized together with French stakeholders.
- In connection to the IETS ExCo meeting in November, a workshop on “Major activities for energy efficiency and GHG mitigation in industry” was held together with a number of Finnish stakeholders. The presentations and the subsequent discussion resulted in enhanced understanding and potential collaboration.
- The process industry was in focus when 50 invited international experts met in Vienna on October 9-11 for a workshop on deep decarbonization in industry, organized by the IETS TCP and hosted by the Austrian Climate and Energy Fund together with TU Wien. The aim of the workshop was to highlight the importance of process industry in radical GHG mitigation, to point out opportunities and hurdles, to identify need for further international R,D&D and for knowledge transfer to strategic industrial and policy decision makers.

IDEAS FOR NEW ANNEXES AND ACTIVITIES

The following ideas for new Annexes and activities were presented and further discussed during 2019 by the IETS country delegates:

PROPOSAL FOR A NEW ACTIVITY (TASK/ANNEX): ROADMAPS/ ROADMAP/TRANSITION PLAN FOR THE DECARBONISATION OF INDUSTRY

A proposal for a new activity, partly based on the findings in the international expert workshop in Vienna in October, see section Workshops & Webinars, has been put forward by the French delegate. The approach for this will be further developed and discussed in the IETS ExCo meeting May 2020.

PROPOSAL FOR A NEW ACTIVITY (TASK/ANNEX): INDUSTRIAL SYMBIOSIS IN A SUSTAINABLE (RENEWABLE & CIRCULAR) ECONOMY

A proposal for an activity on “Industrial Symbiosis in a closed carbon cycle economy”, has been put forward by Austria. The approach for this will be further developed and discussed in the IETS ExCo meeting May 2020.

ONGOING ANNEXES 2019

ANNEX XI: INDUSTRY-BASED BIOREFINERIES

Earlier tasks in Annex XI have been reported by the former Annex Manager Isabel Cabrita and the Final Report was published in April 2018.

Paul Stuart, Polytechnique Montreal, Canada, is Annex Manager. A task force group is working on identifying possible new activities and collaboration with IEA Bioenergy. The Task Force consists of Paul Stuart, Isabel Cabrita, Thore Berntsson and Marzouk Benali. In the task “Decision Support Tools and Ex-Ante Research for Evaluating Bioeconomy Transformation Strategies”, several webinars have been carried out. The approach for the further work in this task will be discussed at the IETS ExCo meeting in May 2020.

Time schedule, new Task: 1 January 2018 – 31 December 2020.

CONTACT DETAILS

Annex manager:

Paul Stuart, Chemical Engineering Department – Polytechnique Montreal

E-mail: paul.stuart@polymtl.ca

Task manager:

Marzouk Benali, CanmetENERGY – Natural Resources Canada

E-mail: marzouk.benali@canada.ca

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

Responsible author: Mikael Larsson, Swerim, 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 discussed at the next ExCo meeting in May 2020

DESCRIPTION OF CURRENT TASKS

The new Tasks on energy efficiency in the steel industry are 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 (Subtask A).

ACTIVITIES DURING 2019

Further discussions with potential partners have been conducted. Partners in delivery of the course as well as continuation to start Subtask B (Methodology development) and Subtask C (Applied Process integration studies on Energy efficiency, resource efficiency and greenhouse gas mitigation) have been addressed. Additional contacts have been taken with potential sponsors. Unfortunately, a finalisation of activities and partners have not been able to be secured during the year. A continuation seems difficult to manage, partly due to difficulties securing funding for participating partners.

WORK PLANNED FOR 2020

In order to start Subtask B (Methodology development) and Subtask C (Applied Process integration studies on Energy efficiency, resource efficiency and greenhouse gas mitigation) partners need to sign a formal contract. Due to difficulties securing the participation of the partners a pause of the annex for 2020 is proposed.

CONTACT DETAILS

Annex manager:

Mikael Larsson, Swerim, Sweden

E-mail: mikael.larsson@swerim.se

ANNEX XV: INDUSTRIAL EXCESS HEAT RECOVERY – TECHNOLOGIES AND APPLICATIONS

*Responsible author: Rene Hofmann, Vienna University of Technology and AIT, Centre for Energy, Austria
Annex Members: Austria, Canada, Denmark, France, Norway, Portugal and Sweden and observer organization Switzerland.*

Time schedule: 1 November 2019 – 31 October 2021 (Task 3)

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 findings from **Task 2** lead to a number of areas of future work for **Task 3**. Thus, the present Annex XV, Task 3 will broaden the scope and include some new aspects, which may not be considered separately for changed framework conditions within an industrial environment.

The identified Subtasks of **Task 3** are:

- **Subtask 1:** Combination of methods for excess heat identification and quantification
- **Subtask 2:** Consequences for excess heat levels of future changes in industrial energy systems
- **Subtask 3:** Operational aspects in industrial energy systems
- **Subtask 4:** Opportunity and risk assessment for excess heat projects
- **Subtask 5:** Compilation of innovative excess heat projects

The main objectives of **Task 3** 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 five areas included,

- to improve the knowledge in participating countries regarding the combination of methods for excess heat identification and quantification,
- to address to operational aspects, e.g. monitoring, control
- to exchange experience about risk minimization in excess heat projects
- to broaden awareness about consequences for excess heat levels of future changes in industrial energy systems
- to enhance knowledge about consequences for the performance, economically and in terms of sustainability, of industrial excess heat projects of different possible future innovative developments to identify future plans or trends in participating countries.

The participants in **Task 3** 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, DTU

France: Greenflex

Norway: SINTEF

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

Sweden: Chalmers University of Technology

Switzerland: Lucerne University of Applied Sciences and Arts

ACTIVITIES DURING 2019

- Presentation of the Annex XV within the ExCo Meeting in Paris (May 2019) and Finland (November 2019)
- Annex Kick-off Meeting, Skype, 03.10.2019 (Kick-off Meeting, Introduction of Annex Managers & all participating countries)

WORK PLANNED FOR 2020

- Annex Q1 Meeting, Skype, 28 January 2020
- Annex Q2 Meeting, Skype, 2 April 2020
- Annex Q3 Meeting, Skype is planned for June 2020
- Annex Q4 Meeting, Skype is planned for the end of the year 2020
- Annex physical workshop was planned in spring 2020 in Vienna and will be postponed due to COVID-19 to autumn 2020. Location is under discussion.

For 2020, planned work is the start, continuation and deepening of the proposed work from the legal text of Task 3. The Annex Manager for Task 3, Rene Hofmann, TU Wien, Austria, will be supported by Thore Berntsson, CIT Industriell Energi, Sweden. The aim is to deepen the recently established matrix of project contributions of the individual subtasks. Therefrom, the project work and all detailed research questions in the individual subtasks with each group associated will be elaborated and answered regarding:

- Methods combination
- Consequences for future changes
- Operational aspects
- Risk assessment

CONTACT DETAILS

Annex Manager:

Rene Hofmann, Vienna University of Technology and AIT, Centre for Energy, Austria.

E-mail: Rene.Hofmann@ait.ac.at

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

Responsible author: Patrik Thollander, Linköping University, Sweden

Annex Members: Germany, Italy, Norway and Sweden and sponsor organizations in Colombia, Ireland and Japan.

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

Time Schedule new Tasks: 1 January 2018 – 29 February 2020

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

The structure and planned outcome of the new Tasks (5 and 6) are as follows:

5. Energy end-use efficiency policies towards industrial SMEs with emphasis on energy efficiency networks
 - i. Overview of energy end-use policies and programs in the participating country including subsidies, administrative policies, energy audit checks, investment funds, networks, general information campaigns including self-scanning, and benchmarking methods, i.e. possibility for SMEs to compare their energy use
 - ii. Feedback and outcomes. Overview of the experience, e.g. difficulties met during implementation of the program/policy with major emphasis on energy efficiency networks.
6. Review of scientific publication on energy end-use efficiency and industrial SMEs
 - i. Literature review of policy programs and industrial SMEs
 - ii. Literature review of barriers to and drivers for energy efficiency and SMEs

ACTIVITIES DURING 2019

- Finalized Task 5. Presented Task 5 at the ACEEE Summer Study in Portland, August 2019: <https://2019aceee.conferencespot.org/index.html#/paper/event-data/f036>
- Initiated Task 6. A review paper on this was published in Energies in 2019 with the title “Designing Policies and Programmes for Improved Energy Efficiency in Industrial SMEs”: <https://www.mdpi.com/1996-1073/12/7/1338>
- Annex meetings were held every other month (online) during the year.

WORK PLANNED FOR 2020

- Present the Final Report together with the work and results from the Annex to the IETS ExCo in May 2020.
- Publish the Final Report.

CONTACT DETAILS

Annex manager:

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

E-mail: patrik.thollander@liu.se

ANNEX XVII: MEMBRANE PROCESSES IN BIOREFINERIES

Responsible author: Frank Lipnizki, Lund University, Sweden

Annex Members: Austria, Denmark, Germany, Portugal and Sweden.

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

Time Schedule new Tasks: 1 April 2019 – 30 March 2022

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 publicly available on the webpage of the Annex.

ACTIVITIES DURING 2019

- 8 April, Kick-off Meeting Annex XVII, Båstad, Sweden.
 - 26-29 August, PERMEA 2019 (Budapest, Hungary), Representation of Annex and co-ordination meetings.
 - Swedish Seminar on New Development of Separation Technologies in Process Industry (Stockholm, Sweden), Presentation of Annex.
 - 24 October, Forum for Membrane Filtration (Silkeborg, Denmark), Representation of Annex and co-ordination meetings.
 - 12 December, Annex Meeting Skype.
-

WORK PLANNED FOR 2020

- 30 January, Presentation of Annex during the workshop on „Nexus: Energy Water & (Bio)Industry – Technological solutions towards industrial resource efficiency?“ Vienna, Austria.
 - 9-10 February, Representation of Annex during European Membrane Society Council Meeting, Paris, France.
 - 12-17 July, Representation of Annex and co-ordination meetings during ICOM 2020, London, UK
 - 26-27 August, Annex Meeting in combination with the Nordic Filtration Symposium, Gothenburg, Sweden.
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CONTACT DETAILS

Annex manager:

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

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

ANNEX XVIII - DIGITALIZATION, ARTIFICIAL INTELLIGENCE AND RELATED TECHNOLOGIES FOR ENERGY EFFICIENCY AND GHG EMISSIONS REDUCTION IN INDUSTRY

Responsible author: Mouloud Amazouz, CanmetENERGY, Natural Resources Canada

Annex Members: Austria, Canada, Denmark, France, Germany, Portugal, Netherlands, Italy and Sweden and observer organizations in Finland (VTT) and Switzerland (EPFL).

Time Schedule Tasks 1: December 2018 – March 2020

DESCRIPTION OF ANNEX

This Annex seeks to advance knowledge and development of digitalization, artificial intelligence and related technologies to improve the economic and environmental performance of targeted energy and GHG-intensive industries. The initiative would seek to assemble a network of academic, research labs, IT providers and process industry stakeholders to cooperate on the availability, quality and use of data (quality, quantity, location, operational, energy, etc.); to align capacity; and inform decision-making relevant to the targeted sectors;

The objective of this Annex is therefore to stimulate the adoption and digitalization technologies for energy efficiency improvement and GHG emissions reduction in the process industries. To achieve this objective, the Annex sub-goals are:

- To create an international network and information infrastructure for stakeholders to exchange knowledge in the area of digitalization technologies
- To facilitate joint development of new knowledge and expertise on Digitalization
- To support and accelerate the deployment of digitalization practices in the energy-intensive process industries.

ACTIVITIES COMPLETED DURING 2019

- Webinar to discuss technical issues on digitalization was held in April 2019. Twenty-nine participants have attended. Twelve presentations on activities and interests from 10 countries have been shared and technical issues have been discussed.
- A series of interviews were carried out by CanmetENERGY, in June and July 2019, with the countries experts to develop a matrix of interest and a lexicon of terms related to the digitalization for GHG emissions reduction in the process industry.
- A webinar on potential future tasks identification was held on September 17, 2019. Nine (9) ideas of potential tasks were pitched and discussed. 24 persons from 7 countries have attended the webinar. It was proposed to combine some ideas to reduce the number of new tasks to 3 or 4.
- A face-to-face meeting was held in Paris on October 15-16, 2019. 15 delegates from 8 countries (6 members, 1 sponsor and 1 observer of the annex) have attended the 2-day meeting hosted by ADEME (France). Three new tasks have been defined for 3 years (2020-2023) period.
 - Task 2: digital twins for design & engineering and operation
 - Task 3: Lessons learned and created values by digitalization
 - Task 4: Digitalization implementation roadmaps
- Meeting minutes, webinar recordings, presentation reports and country reports are available.

WORK PLANNED FOR 2020

- Virtual meeting between Task 2, 3 and 4 co-leads to finalize the task proposals, define potentials projects in each task and continue recruiting new members
-

CONTACT DETAILS

Annex Manager:

Mouloud Amazouz, CanmetENERGY, Natural Resources Canada

Email: mouloud.amazouz@canada.ca

Task 1 manager:

Paul Stuart, Polytechnique – Montréal, Canada

Email: paul.stuart@polymtl.ca

ANNEX XIX - ELECTRIFICATION IN INDUSTRY

Responsible author: Jonathan Moncada, TU Delft, Netherlands

Annex Members: This Annex is currently being set up. Part of the work in this first task is to identify stakeholders and potential members. So far, there has been active participation in the activities planned but due to recent events (Corona) we had to postpone the face to face workshop and the second webinar.

Time Schedule Task 1:

September 2019- January 2020. Mapping of activities

- Interviews with potential stakeholders
- Webinar “Where is industrial electrification at?” (January 13, 2020)

February 2020 – now. Scoping analysis

- Workshop “Moving industrial electrification forward” (Initially scheduled for March 21 and 22 - 2020, due to COVID-19 spread and measures, the workshop needed to be postponed. The new date was set to June 22 and 23 -2020. This can be modified depending on how COVID-19 evolves)
- Webinar to disseminate the results of the workshop/plan. New date to be decided depending on the workshop and of course how COVID-19 evolves.

DESCRIPTION OF ANNEX

Industrial Electrification is the newest Annexes of the IETS TCP program. It focuses on on the system aspects of industrial electrification (e.g., system economics, sector coupling and impacts, GHG emissions) rather than on specific technologies or processes. The Annex aims to foster the creation of “critical mass” in the area of industrial electrification by, for instance, increasing communication between parties, providing opportunities for identifying common problems, undertaking complementary approaches on joint projects, developing, sharing and validating common working methods or developing joint databases, etc.

The planning and preparations for this Annex have been ongoing since 2017 and the final scope and organization will be finalized during 2020 (this would depend on how COVID-19 evolves). TU Delft took the leading role of the preparation of the task since September 2019.

The objectives of Task 1 are:

- to enhance international collaboration in the field of industrial electrification, and to set up and sustain a platform within IEA for sharing experiences and findings in R&D projects in the long term.
- to improve the awareness of the topic of industrial electrification in participating and other IETS countries in course of identifying partners in participating and other IETS countries.
- to identify and clarify areas of joint interest for further cooperation, in order to focus the subtasks and contents of a subsequent Task 2 and help to define annex and task leadership within that Task 2.
- to elaborate a basic overview on ongoing activities, roadmaps, and areas of common interest.

ACTIVITIES COMPLETED DURING 2019

- Kick-off meeting with task plan (September 2019)
- Preparation of survey and feedback (September - October 2019)
- Circulation of survey and interviews with potential stakeholders (October 2019 – December 2019)

- Bibliometric Analysis (September 2019 – November 2019)
- Identification of potential groups for participation in webinar (November 2019).
- Circulation of webinar invitations and preparation of webinar (December 2019).

WORK PLANNED FOR 2020

Mapping

- Webinar “Where is industrial electrification at?” (January 13, 2020)
- Collection of surveys, and communication with potential stakeholders (after webinar) (January 2020)

Scoping

- Identification of common activities, research questions, and interests (initiated in February, currently on hold).
- Desk research, identification of overlap areas with other annexes and IEA-TCPs from IEA (February 2020 – March 2020)
- Communication with potential stakeholders (on hold)
- Preparation of draft version of plan for discussion during the workshop (March 2020 – Currently on hold)
- Face-to-Face workshop “*Moving industrial electrification forward*” (tentatively scheduled for June 22-23, 2020)

Note: Activities are delayed and on hold due to the impact of COVID-19, and the restrictions that this caused to carry out the workshop in the original date. The workshop is a key activity of the work as we aim to prepare the work plan in collaboration with experts and members.

Synthesis & Recommendations (to be carried out after the workshop is conducted)

- Processing of outputs from the workshop
- Feedback round with stakeholders on the plan delivered from the workshop
- Webinar 2
- Multi-year plan report (final report)

CONTACT DETAILS

Annex Managers (Task 1):

Prof. Andrea Ramirez and dr. Jonathan Moncada Botero, TU Delft

Email: C.A.RamirezRamirez@tudelft.nl and J.MoncadaBotero@tudelft.nl

IETS EXECUTIVE COMMITTEE MEMBERS 2019

AUSTRIA

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

Alternate: Rene Hofmann, AIT Austrian Institute of Technology GmbH: Rene.Hofmann@ait.ac.at

CANADA

Delegate: Eric Soucy, CanmetENERGY: eric.soucy@canada.ca

Alternate: Fiona Zuzarte, Office of Energy Research and Development: fiona.zuzarte@canada.ca

DENMARK

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

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

FRANCE

Delegate: Thomas Gourdon, ADEME: thomas.gourdon@ademe.fr

Alternate: Tristan Hubé: tristan.hube@ademe.fr

GERMANY

Delegate: Claus Börner, Forschungszentrum Jülich GmbH: c.boerner@fz-juelich.de (resigned late 2019)

Alternate: Gordon Kaußen, Forschungszentrum Jülich GmbH: g.kaussen@fz-juelich.de (new Delegate)

ITALY

Delegate: Stefano Stendardo, ENEA: stefano.stendardo@enea.it

Alternate: Simone Maggiore, Ricerca sul Sistema Energetico – RSE SpA: simone.maggiore@rse-web.it

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, Technical University of Lisbon: pedronunes@gml.pt

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

SWEDEN

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

Alternate: Thore Berntsson, CIT Industriell Energi: thore.berntsson@chalmersindustrietechnik.se

THE NETHERLANDS

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

Alternate: Joop Bormans, RVO Netherlands Enterprise Agency: joop.bormans@rvo.nl

COORDINATORS 2019

IETS EXECUTIVE COMMITTEE CHAIR

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

IETS EXECUTIVE COMMITTEE VICE CHAIR

Clemente Pedro Nunes, Portugal: c.pedronunes@gml.pt

IETS EXECUTIVE COMMITTEE SECRETARIAT

Heléne Johansson, Sweden: helene.johansson@chalmersindustriateknik.se

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

ANNEX MANAGERS (ACTIVE ANNEXES)

ANNEX XI: INDUSTRY-BASED BIOREFINERIES

Paul Stuart: paul.stuart@polymtl.ca

Polytechnique Montréal, Canada

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

Mikael Larsson: mikael.larsson@swerim.se

Process Integration Department at Swerim, Sweden

ANNEX XV: INDUSTRIAL EXCESS HEAT RECOVERY

Rene Hofmann: Rene.Hofmann@ait.ac.at

Vienna University of Technology and AIT, Centre for Energy, Austria

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 PROCESSES IN BIOREFINERIES

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

Department of Chemical Engineering, Lund University, Sweden

ANNEX XVIII: DIGITALIZATION, ARTIFICIAL INTELLIGENCE AND RELATED TECHNOLOGIES FOR ENERGY EFFICIENCY AND GHG EMISSIONS REDUCTION IN INDUSTRY

Mouloud Amazouz: mouloud.amazouz@canada.ca

CanmetENERGY, Natural Resources Canada

ANNEX XIX - ELECTRIFICATION IN INDUSTRY

Prof. Andrea Ramirez and dr. Jonathan Moncada Botero, TU Delft, Netherlands

C.A.RamirezRamirez@tudelft.nl and J.MoncadaBotero@tudelft.nl

About the IETS Annual Report

This report has been prepared and published by the IETS Secretariat 2020. For further information, please contact helene.johansson@chalmersindustriteknik.se, or visit the IETS website at www.iea-industry.org.

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