



**84th Meeting of the Committee on Energy Research and
Technology
19 – 20 November 2019**

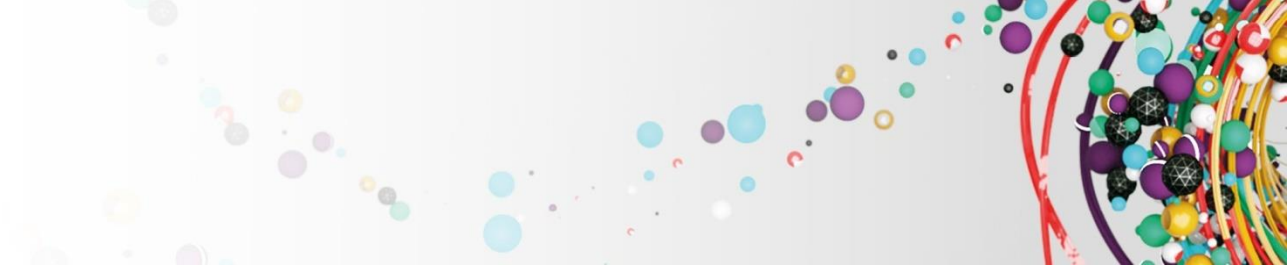
**Working Party on Energy End-Use Technologies
Annual Report**

Gudrun Maass, EUWP Chair



Up Front

- **Key message has not changed from last year:**
 - **Energy end-use consumption has to be reduced as much as possible if we want to achieve decarbonization targets**
 - **Energy end-use technologies' development and deployment is vital to reach this objective**



TCPs' Activities and Achievements

EUWP Portfolio



- **Very broad, concerning four sectors: Industry, Buildings, Electricity, Transport**
- **14 TCPs in the above sectors**

EUWP TCPs make many valuable contributions to IEA work

TCPs input to IEA work

Deliverable	TCP	Note
Global Status Report	EBC	Project was featured
Future of Cooling	DHC, EBC, ECES, HPT	Review
Tracking Clean Energy Progress	HPT, 4E	Input website
EE Market Report	4E	Review
Policy and measures Database (PAMS)	4E	Input
CERT discussion on Transport	AFC, AMF, Combustion, GOTCP, Hydrogen, Bioenergy	Input
Joint IEA-EC Workshop on electrofuels	AFC, AMF, Combustion, Bioenergy	Input
2019 Digitalisation webinar series	4E	Input
Global EV Outlook (GEVO)	HEV, AFC	Input and review
Renewable Markets 2018	AMF	Input
Global Fuel Economy (GFEI)	Combustion	Review
Survey policies to 'Future of Hydrogen'	Hydrogen	Leading task
Iron&Steel Roadmap	IETS	Review

Transport



- **Responsible Vice-Chair: Carina Alles, Switzerland**
- **5 EUWP TCPs in the Transport Coordination Group (TCG):**
 - **Advanced Fuel Cells (AFC TCP)**
 - **Advanced Motor Fuels (AMF TCP)**
 - **Advanced Materials for Transportation (AMT TCP)**
 - **Clean and Efficient Combustion (Combustion TCP)**
 - **Hybrid and Electric Vehicles (HEV TCP)**
- **2 REWP TCPs regularly participating in the TCG**
 - **Bioenergy TCP**
 - **Hydrogen TCP**

Open to further collaborations!

TCPs with pending Requests for Extension (RfE)



- **Advanced Motor Fuels (AMF TCP)**
- **Hybrid and Electric Vehicles (HEV TCP)**

Both TCPs submitted extensive documentation on the accomplishments of the past term and the plans for the next term. In each case, oral presentations at the EUWP Fall Meeting were followed by lively Q/A sessions. EUWP delegates acknowledged TCP progress and provided feedback for further improvements.

For both AMF and HEV, the EUWP recommended that the CERT approve the extension of the Technology Collaboration Programme from 1 March 2020 to 28 February 2025.

TCG Meetings

- **Informal side meeting @ TCP Universal Meeting 06/19**
- **Full day meeting 09/19**
 - Updates from EUWP, IEA Transport, all 7 TCPs
 - Sharing of best practices
 - Special topic: Transport System Analysis
- **Follow-up already planned**
 - Webinar on IEA Mobility Model, ETP analyses c/o IEA staff
 - Webinar on systemic approaches to transport c/o N.O. Nylund
 - Other Webinars etc. as identified in ongoing TCP survey

*Contributions & support by IEA desk officers and staff
are very much appreciated!*

Joint TCP Meetings

Joint Workshop of the IEA Technology Collaboration Programmes

Clean & Efficient Combustion with Advanced Motor Fuels (AMF)

November 6, 2019
Montreux, Switzerland



The TCP on *Clean and Efficient Combustion* was created in 1977 to accelerate the development and deployment of combustion technologies with reduced fuel consumption and lower pollutant emissions. Today, our collaborative tasks address specific research questions from combustion fundamentals to technical applications in internal combustion engines, furnaces & gas turbines, thus enabling efficiency gains and emission reductions in the industry, buildings, transportation and power generation sectors.

www.ieacombustion.com



The TCP on *Advanced Motor Fuels* provides an international platform for co-operation to promote cleaner and more energy efficient fuels and vehicle technologies. The activities of AMF relate to R&D, deployment and dissemination of advanced motor fuels. AMF looks upon transport fuel issues in a systemic way, taking into account production, distribution and end-use related aspects. As fuels, engines and exhaust after-treatment systems have to be considered as interactive systems, the scope of AMF also covers propulsion systems (vehicles) using advanced motor fuels.

<https://iea-amf.org>



IEA Combustion & AMF Workshop, November 6, 2019 / Organized by Swiss Federal Office of Energy /cma/iea/SR

Technology Collaboration Programme
by IEA

- Co-located ExCo meetings
AMF & Combustion TCP
- Joint workshop on Nov 6
with external guests
 - Over 90 participants
 - Plenary & breakout sessions:
 - 1) low emission propulsion systems
w/ conventional and drop-in fuels
 - 2) novel fuels
for advanced engine concepts
- Joint dinners & tech. excursion
- Combustion TLM open to AMF

*Desk officer participation appreciated!
cf. to Swiss country report for event details*

■ **Priorities & projects (2019 – 2020)**

- Event on hydrogen refuelling stations (September 2019)
- Heavy duty applications
- Alkaline fuel cells
- Fuel cell modelling
- High-temperature electrolysis activities
- Stationary fuel cells for combined heat and power (CHP)
- New fuel cell applications

■ **Stable Membership:** 14 countries + 2 sponsors

■ **IEA Networks:** Strong collaborations with AMF (EUWP), Hydrogen (REWP)

<http://www.ieafuelcell.com/> - <https://www.iea.org/tcp/afc/>



Advanced Motor Fuels

■ Priorities & projects (2019 – 2020)

- Lessons learned from Alternative Fuels Experience
- Transport Decarbonisation w/Advanced Renewable Fuels
- Methanol as motor fuel
- Real driving emissions & fuel consumption
- GDI engines and alcohol fuels
- Sustainable bus systems – phase 2
- Methane emission control

■ **Membership:** 15 countries; Thailand withdrew, India joined

■ **IEA Network:** esp. Bioenergy (joint annexes),
Combustion (joint events, collaboration @ task level)

■ **RfE:** Case convincingly presented by Chair M. Lundgren & N.O. Nylund; EUWP recommends extension 2020-25

<https://www.iea.org/tcp/amf/> - <https://amf-tcp.org/com>

■ Main work areas and priorities 2019-20*

- Friction reduction in vehicles
=> * complete engine testing
 - Thermoelectric materials
=> * round robin tests on efficiency
 - Model based coatings
 - Multi-material vehicle lightweight structures,
materials joining technology
 - Automotive glazing, weight reduction, materials substitutions
- **Membership:** 9 countries, Austria & Brazil ready to join
- **IEA Networks:** Active in TCG, open symposia at ExCos

<https://www.iea.org/tcp/amt/> - www.tcp-ia-amt.org

■ **Priorities and projects (2019 – 2020)**

- Implement 2019-24 strategic plan & continue TCP renewal process
- Synthesising the science base needed to optimise combustion technologies for use of renewable fuels and minimal environmental impacts
- Promoting sustainable, economically accessible energy solutions
- NEW Systems Analysis: placing the impact of advanced combustion and renewable fuels in the context of other low-carbon solutions
- Scouting: How closer collaboration between aftertreatment & combustion engineers can alleviate design constraints on both sides.

■ **Stable Membership:** 11 countries

■ **IEA Networks:** Pursuing closer collaboration with AMF (s. slide on joint events in Montreux 2019); interest in further collaboration w/ AMF, Bioenergy TCP, HEV & ETSAP TCPs

Hybrid and Electric Vehicles

- **Recent Accomplishments:** Highly active TCP - V2X Roadmap re grid integration; GHG Analyses of drive train options; reports on electrification of logistic vehicles; task and cross cutting workshops (7 resp. 14 in 2018)
- **Priorities and projects (2019 – 2020)**
 - EV deployment strategies and EV policy
 - EV infrastructure
 - EV batteries and electric drive technologies
 - Niche markets and new markets
- **Growing Membership:** 18 countries + 1 sponsor; Norway joined in 2019; Invitations extended to Brazil, China, Japan, Latvia, South Africa, Thailand; Interest from Czech Republic, Hungary, Poland, Slovakia; Morocco & EU in 2018 ExCo meetings as observers
- **IEA Networks:** incl. Clean Energy Ministerial Electric Vehicle Initiative, TCP on Energy in Buildings and Communities
- **RfE:** Case convincingly presented by Chair C. Burelle; EUWP recommends extension 2020-25

Industry



- **Responsible Vice-Chair: Paulo Partidario, Portugal**
- **Activities to revive the Industry Coordination Group have started; a webinar on hydrogen utilization in the industry sector is being planned**
- **Only one TCP in this area : Industrial Energy-related Technologies and Systems (IETS TCP) with a very broad portfolio**

- **Key aspects:** Sustainable innovative and competitive industrial energy-related solutions; Industrial systems are key in the deep decarbonization paradigm - from specific process or energy technologies to overall system approaches, e.g. process integration; the interplay between system elements and subsequent impacts;
- **Members:** Contracting parties are Austria, Canada, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, Sweden; In each IETS country, a National Support Group is being formed;
- **Key outcomes:** Scientific-based R&I, 7 Annexes running, Technology and systems-oriented approaches, Demonstration and deployment, Technology and systems foresight, New opportunities for radical GHG mitigation, Technology and systems assessment of policies and impacts, Knowledge sharing & transfer (2019: 2 WS + 2 Conferences), Dissemination and communication (Reports, Topic Sheets, Newsletters);
- **End of term date:** Feb 28, 2021

Electricity



- **Responsible Vice-Chair: Michele de Nigris, Italy**
- **Three TCPs in this area:**
 - **Demand-Side Management (DSM TCP), now User-centred Energy Systems**
 - **High-Temperature Superconductivity (HTS TCP)**
 - **Smart Grids (ISGAN TCP)**

EUWP agreed at its last meeting to expand the sector into Integrated Energy Systems

■ ExCo meetings:

- Stockholm 1-5 April 2019; Montroux 30 September – 4 October 2019

■ News:

- Management: Chair L.Martini (IT), Vice chairs R.Conklin (US), A.K.Misra (IN), M.Noeninckx (BE)

■ Workshops:

- India Smart Utility Week 2019 (ISUW 2019)
- Smart Grids & District Heating and Cooling: Key Integration Aspects ISGAN – DHC TCP
- The future of electricity markets in a low carbon economy
- Needs, challenges and opportunities of TSO-DSO coordination

■ Partnerships:

- Mission Innovation IC1 Smart Grids (23/11/2018)
- EraNet Smart Energy Systems (1/3/2019);

■ Webinars:

- Coordinating Power Control 10/12/2018
- How to Replicate solutions for the flexibility challenge? 20/2/2019
- Vehicle-to-Everything (V2X) Energy Services 25/4/2019
- Dynamic Line Rating: Principles - Applications – Benefits 29/7/2019
- Flexibility needs in the future power system – 6/11/2019

■ ExCo meetings:

- Lausanne 11-12 April 2019; web meeting 13 September 2019

■ News:

- RfE procedure to be started;

■ Publications:

- Energy Efficiency, Resilient Electric Systems, and Transportation Applications Using High-Temperature Superconductivity
- Annual Report 2018: IEA Technology Collaboration Program on High Temperature Superconductivity

■ Ongoing projects:

- Document for Policy Makers
- Summary of Application Projects
- HTS Applications Benefits Analysis

■ Collaborations:

- Collaboration with the TCP on Smart Grids (ISGAN TCP)
- Engagement with the Applied Superconductivity Conference 2018 planning committee
- Liaison with the International Symposium on Superconductivity organising committee for participation in a special session in 2019

■ **ExCo meetings:**

- Bern 3-5 April 2019; Melbourne 12-15 October 2019;

■ **News:**

- RfE – recommended by EUWP – approved by CERT
- <https://userstcp.org/>
- Management: D.Shipworth (UK), E.Bjørnstad (NO), OA: S.Thomas

■ **New annexes:**

- Global Observatory on Community Self-Consumption and Peer-to-Peer Energy Trading
- Social Licence to Automate DSM
- Energy-sector Behavioural Insights Platform
- Hard to Reach Energy Users

■ **Webinars:**

- DSMU#39 Key findings from the IEA's Energy Efficiency 2017 report.
- DSMU#40 Energy Efficiency for Municipalities
- DSMU#41 Better Homes: a cooperative business solution.
- DSMU#42 Changing energy behaviour – what works?
- DSMU#43 Energy Consumption in Europe –what are the policy implications?
- DSMU#44 Demand Response in US Markets: Lessons for a low-carbon transformation

Findings from the RfE process:

- The period of extension agreed with the EUWP (CERT) has been fruitfully used to assess new strategy and seek support.
- The DSM TCP has undergone a period of strategic thinking and re-founding
- Development of a new strategy with strong involvement of entire ExCo + elected new chair (and Operating Agent to support the ExCo);
- The target has been reached: new strategic vision and mission, new name, new set of Tasks
- The new management structure now seems strong and the commitment of ExCo Member Country participants well established and proven;
- The DSM University has continued its outstanding production of top-level webinars.

Buildings

- **Responsible Vice-Chair: Sabine Mitter, Austria**
- **Five TCPs in this area:**
 - **Buildings and Communities (EBC TCP)**
 - **District Heating and Cooling including Combined Heat and Power (DHC TCP)**
 - **Energy Efficient End-Use Equipment (4E TCP)**
 - **Energy Storage (ECES TCP)**
 - **Heat Pumping Technologies (HPT TCP)**
 - **Coordination Group meeting in February 2019**

- **China has joined DHC as members for Annex XII, US did not participate in Annex XII – IDEA will become a DHC sponsor in 2009**
- **TS3 Annex “Hybrid Energy Networks” in preparation**
- **Procedure for short-term projects developed – first call for “Sustainable district cooling guidelines”**
- **16th International Symposium on District Heating and Cooling (ISDHC) in Hamburg 9-12 Sept. 2018**
- **DHC+ Student Award sponsored**
- **Participates in WG on Cities and Communities**

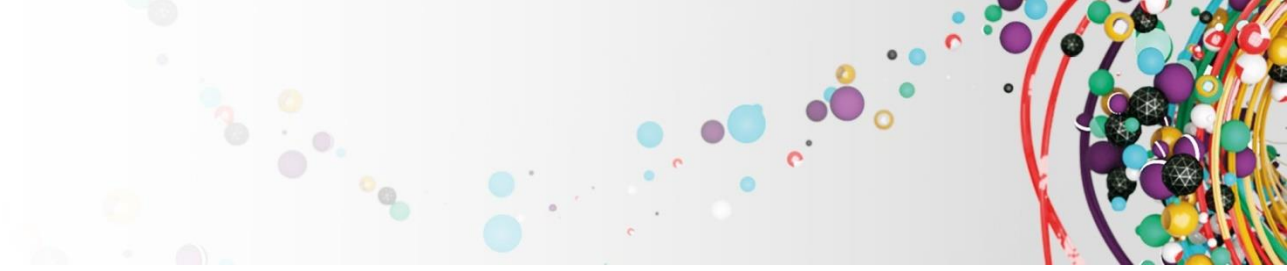
- **EBC aims at supporting practitioners by generating proposals for standards, design guidelines and technical knowledge, supported by data for validation through experiments, survey and theoretical analyses practitioners**
- **TCP with 16 ongoing annexes**
- **Website tracking (900 newsletter downloads)**
- **TCP collaborations with SHC (Lightning, Renovation), DHC**
- **Joint Exco EBC/SHC Sweden, June 2018**
- **RfE approved in Feb. 2019**
- **5 priority themes (integrated planning and building design, building energy systems, building envelope, community scale methods, real building energy use)**

- **14th International Conference on Energy Storage – EnersSTOCK2018, April 2018 in Adana, Turkey, 220 visitors**
- **New Annex with MI IC#7 – affordable combined heat pump/storage system**
- **new orientation on a more holistic approach towards the entire energy systems (electricity, heating, cooling and mobility) – sector coupling drives the need for more and improved storage solutions – new Annex!**
- **ECES recommends: energy models should better include effects and impact of energy storage, support schemes should include energy storage, regulatory framework need to be more adaptive to encourage more flexibility (2017)**
- **Austria as new member**
- **Call for tender for secretariat support functions**

- **Policy guidelines for pumps, fans and compressors – Minimum Energy Performance Standards in China, EU and US – adoption of “best practice policies” s.a controls, more efficient components – to be considered in IEC and ISO technical standards**
- **New round robin testing programme for motor system converters launched by 4E EMSA to update the test method IEC 61800-9-2**
- **4 new Connected Devices studies: Network Standby Power Basics, Barriers and Solutions for Smart Homes, Energy Harvesting Technologies for IoT Edge Devices, Networked Audio Products**
- **Power Electronics Conversion Annex started**
- **RfE approved in Feb. 2019**



- **10 ongoing Annexes**
- **Call for 13th IEA Heat Pump Conference in Jeju, Korea launched**
- **New or special markets and applications, including automotive, industry and consumer products**
- **New annex: New, alternative or natural refrigerants with lower global warming potential (phase out of F-gas-based refrigerants)**
- **New annex: Advanced Cooling/Refrigeration Technologies**
- **Collaboration with SHC, ECES, DHC, IETS and MI#7**
- **China is about to join the TCP**



EUWP Activities and Achievements

Continued efforts



- **Support TCPs**
- **Discuss new developments in the end-use sector**
- **Collaborate with other entities**
- **Improve EUWP management and structures**

Examples for EUWP activities



- **Workshop „Flexibility for a sustainable energy system“, held in Rome on 20 March 2019**
- **Roundtable with all TCPs at the March meeting (Thanks to IEA LO for taking up TCPs requests)**
- **Proposal for possible new TCP „Decarbonisation of Cities and Communities“ (Details will be presented by Sabine Mitter)**

Collaboration with other WPs



Collaboration with EEWP

Joint and back-to-back meetings have been tried in a number of different formats.

Result: More or less disappointing, no added value, should be discontinued (ad-hoc possible), instead put efforts and resources in increased collaboration with REWP

Collaboration with other WPs



Collaboration with REWP

- Activities to initiate more collaboration just started
- Conversation between both Chairs in October
- Cabinet TelConf last Friday
- Positive reaction on both sides

Next steps:

- Invitation to EUWP Chair to present proposals for collaboration (back-to-back meetings, joint workshops, joint management of Coordination Groups) to REWP
- Ad-hoc: Back-back meeting of CG “Integrated Energy Systems” with REWP WS on Storage in April 2020

Re-Organising the Coordination Groups

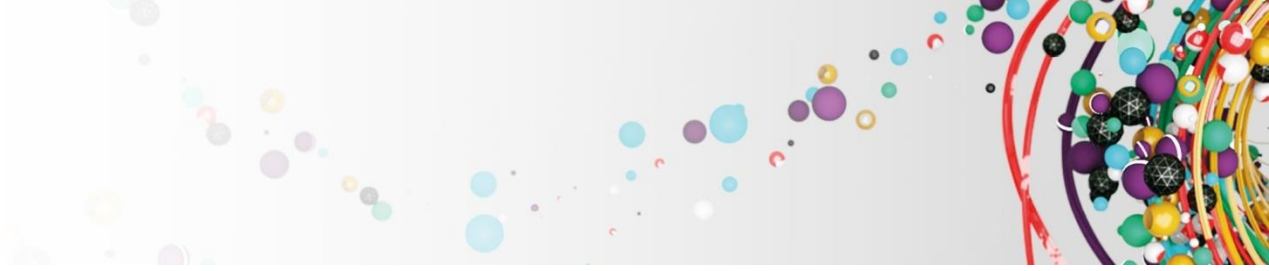


- **Objective of the CGs: facilitate improved coordination, synergies and sharing of best practices between TCPs and between TCPs and IEA activities**
- **Much appreciated by TCPs**
- **Need improved support since not all four Groups are equally active**
- **Presently under discussion between EUWP Cabinet and Secretariat how functioning can still be improved, including considerations to collaborate with REWP in this area**

Question

ETN Network

- Does it still exist?
- What is the status?



Thanks to support from Vice-Chairs. Without them complex portfolio could not be handled

Thanks to colleagues from the Secretariat for advice and support

Last, but not least: Thanks to the outgoing CERT Chair, Alicia Mignone who has always constructively supported the work of the EUWP.