

Clean and Efficient Combustion TCP

Highlights and updates from the TCP for EUWP.

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Policy related messages

- Continued efficiency and clean combustion advancements are critical to our energy future. Combustion will continue to be a significant part of the world energy mix for the foreseeable future, currently accounting for 80% of energy production.
- Advanced combustion and fuel technologies offer sustainable pathways to zero-carbon, carbon-neutral, and highly reduced carbon emissions for all the energy sectors and provide the most viable approach to hard-to-abate sectors (off-road, heavy-duty, marine, aviation, ...).
- Combustion TCP is uniquely positioned to advise on transition technologies while low-carbon fuels are not widely/reliably available.

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Collaboration

- The Combustion TCP, AMF, and H2 TCPs are collaborating on LCA of hydrogen-fueled ICEs for the IEA GREET+ Project. Can provide technology selection guidance for technologies (*e.g.*, Fuel cell vs ICE) and program usage.
- Exploring:
 - Workshop with the H2 TCP on “Hydrogen combustion for electricity: Hydrogen gas turbines”
 - Joint project with ETSAP on “Modelling of Advanced Combustion Technology & Joint Workshops.”
- Collaborating with AMF TCP Annex 60 on marine fuels.
- Joined in the TCP Sectoral Group Discussions on E-fuels.
- External collaboration – Oivind “Fuels Advocacy Group” ??

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Achievements

- Three new tasks initiated that are essential to developing new technologies for reduced carbon emissions and providing policy guidance:
 - a) System Analysis.
 - b) Policy Briefs for Hydrogen and Its Vector Fuels (HVF).
 - c) net-Zero Carbon Engine Technology (n-ZCET).
- Vehicle level systems analysis translates research results into policy relevant information, *e.g.*, demonstrated 20% fuel economy improvement using advanced combustion over diesel in a US Class 6 delivery application.
- Research transitioning to primary focus on renewable, decarbonized, and low-carbon fuels, *e.g.*, gas turbines task expanding to include NH₃ fuel research.
- New jet contrails research focus on their secondary impacts on global climate (estimated to account for 2/3 of the effect of air transportation).

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Dissemination and Outreach

- Proceeding with bringing Italy into the Combustion TCP. **Denmark, Austria and China under consideration.**
- Submitted “Combining Low Temperature Combustion and Low Carbon E-fuels or Bio-fuels for Cleaner and More Efficient Transportation” to “Today in the Lab, Tomorrow in Energy.”
- Held first post pandemic in-person 3-day Task Leaders Meeting in Japan with a hybrid option. More than 45 presentations and 40 participants.
- Visibility in the scientific community continues to be high with extensive contributions to journals and conferences.

