SCO2 Working GROUP

Minutes of the teleconference

*Monday, 05th of October 2020*

List of the members

|  |  |  |
| --- | --- | --- |
| First name | Last name | Organisation |
| Participants |
| Carlo | Aringhieri | BH |
| Paolo | Bruttini | BH |
| Paolo | Del Turco | BH |
| Vittorio | Michelassi | BH |
| Marco | Ruggiero | BH |
| Giuseppe | Bianchi | Brunel University |
| Abdulnaser | Sayma | City, University of London |
| Kumar  | Patchigolla | Cranfield University |
| Dhinesh  | Thanganadar | Cranfield University |
| Gary | Turner | Cullum Detuners Limited |
| Carlo | De Servi | Delft University |
| Tim | Held | Echogen |
| Albannie  | Cagnac | EDF |
| Eugenio  | Giacomazzi | ENEA |
| Giuseppe | Messina | ENEA |
| Frederiek | Demeyer | ENGIE |
| Olaf | Brekke | Equinor |
| Ugo | Simeoni | ETN |
| Elisa  | Todesco | ETN |
| John  | Marion | GTI |
| Markus  | Lesemann | GTI |
| Renaud | Les Pierres | Heatric |
| Sungho | Chang | KEPCO |
| Rafael | Guedez | KTH |
| Silvia | Trevisan | KTH |
| Tom | Chupick | Shell |
| Olaf  | Bernstrauch | Siemens |
| Francois | Salin | Siemens |
| Peter | Rop | Siemens |
| Hugues | Greder | Total |
| Mario Luigi | Ferrari | University of Genoa |
| David | Sanchez | University of Seville |

U. Simeoni opened the teleconference and presented the agenda with the following items:

1. Presentation Echogen’s State of the Art – *Tim Held, Chief Technology Officer, Echogen*
2. Presentation Oil & Gas Climate Initiative and potential ETN cooperation – *Tom Chupick, Principal Technical Expert, Shell*
3. Contributions for the sCO2 State of the Art Inventory
4. AOB

T. Held delivered the presentation “[Echogen-Brief intro](https://etn.global/research-innovation/working-groups-technical-committees/supercritical-co2-wg/?preview_id=17806&preview_nonce=d3bee8f6f7&_thumbnail_id=-1&preview=true" \l "h2wg-documentation)”, available on the “Documentation” section of the WG’s webpage. He stated that Echogen was founded in 2007 with a primarily focus on Waste Heat Recovery applications. Echogen has established key partnerships with Siemens and GE. The first commercial product was the EPS100 – 7.5MWe, while the first commercial sale was the EPS120 9.5MWe, for which have signed a contract with TransCanada. Furthermore a feasibility study is underway for Petrobras.

Currently Echogen’s R&D focus is on the following topics:

* Nuclear – WestingHouse on a micro-reactor power plant;
* Fossil – 10MWe indirectly-fired power plant (pre-FEED);
* Solar – thermochemical energy storage;
* Electro Thermal Energy Storage;
* Thermal power plant integration;

T. Held stated that the main focus of Echogen is the system design and optimisation and operation and control. Also, Echogen has the following world-class testing facilities:

* Lab-scale system: 700⁰C/200bar (upgrading to 250bar) or 800⁰C/80bar
* Mid-scale system: 300C/200bar at 5 kg/s (upgrading to 600⁰C)
* 200 kWth-scale Electrothermal Energy Storage system in commissioning

T. Held reported on a techno-economic analysis run by Echogen from which it is clear that a sCO2 WHR technology has 10-20%lower cost for the same power or 7-14% higher power for the same cost.

T. Chupick asked when Echogen expect the TransCanada project to start up. T. Held stated that it depends also on the delivery of the technology, which is being handled by Siemens.

T. Chupick asked how mature is the expander. T. Held replied that he would assess the technology at TRL6.

T. Chupick asked what is the temperature needed to cool down to the liquid state the fluid. T. Held stated that during cold days the fluid reach a sub-critical state, while during hot days the fluid already reaches the supercritical state at the inlet of the compressor. One of the drawbacks is that you may lose some efficiency in the compressor.

G. Bianchi asked whether Echogen has considered CO2 blends. T. Held stated that some promising activities have been carried out on this but currently Echogen’s business is focused on commercialising product using only sCO2 as fluid.

G. Bianchi asked what is the share of CAPEX costs for the auxiliaries. T. Held stated that costs of auxiliaries depend on a number of factors and are dependent on site specifics.

C. De Servi asked what are the temperature limits considered in the techno-economic analysis. T. Held stated that ISO conditions were considered for the lower temperature. The upper temperature limit is not specified and determined by the primary heat exchanger.

T. Chupick presented the OGCI initiative. The presentation is available on the [ETN’s sCO2 WG page](https://etn.global/research-innovation/working-groups-technical-committees/supercritical-co2-wg/#h2wg-documentation). He is involved in the “Energy efficiency” group, which get 10% of the total OGCI’s budget (€ 1 Billion).

A number of initiatives have been carried out since the start of the OGCI, among which the *Methane Intensity Target*, in which the gas turbines play a major role.

T. Chupick presented also the companies and initiatives part of the OGCI Climate Investments Portfolio.

T. Chupick showed the Action Plan for the mitigation efforts in the Oil&Gas Industry, highlighting the main activities, ambitions and targets until 2025.

With regards to potential collaboration with ETN, T. Chupick highlighted three areas:

1. (Affordable) Best Practice development & sharing
2. Electrification
3. Support CCS

U. Simeoni stated that, due to lack of time, it would be worth to discuss the topics of cooperation during the next teleconference.

# Actions list:

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| --- | --- | --- | --- |
| No | New Actions | Resp. | Deadline |
| **1** | To send a doodle for the next teleconference. | U. Simeoni | 8 October 2020 |