



Project no: 608578

Project acronym: SCARLET

**Project title: Scale-up of Calcium Carbonate Looping Technology  
for Efficient CO<sub>2</sub> Capture from Power and Industrial Plants**

***Deliverable D8.3***  
**Second public workshop**

*Due date of deliverable: 2017-03-31*  
*Actual submission date (to coordinator): 2017-03-31*

Start date of project: 1<sup>st</sup> April 2014

Duration: 36 months

*TU Darmstadt*

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## **1 Introduction**

During the course of the SCARLET project, the second public workshop was organized to inform relevant stakeholders about the results of the project. Stakeholders should be notified by email and through the website – energy engineers, utilities, academia and research institutions, industry, consultants and general public.

## 2 Preparations

The preparation of the workshop started in October 2016. It was decided to hold the workshop on 23 March 2017 at the premises of the Technische Universität Darmstadt in order to provide the possibility to all participants to visit the 1 MW<sub>th</sub> Calcium Carbonate Looping (CCL) pilot plant at the Institute for Energy Systems and Technology (EST). The participation was free of charge to attract as much people as possible. It was planned to inform interested people via email, through the website and various other announcements. The activities are listed:

- 12.10.2016: Save the date mail via email distributor list
- 21.12.2016: Official invitation, registration opened
- 03.03.2017: Reminder sent, registration elongated
- 20.03.2017: Last minute reminder sent, registration elongated

In addition, the 2<sup>nd</sup> Public SCARLET workshop was announced at different homepages and presentations (conferences etc.) in order to attract as many stakeholders as possible. The announcements are listed below:

- SCARLET homepage  
<http://www.project-scarlet.eu/wordpress/?p=685>
- idw – Informationsdienst Wissenschaft (idw – scientific information service)  
<https://idw-online.de/de/event56398>
- Calendar of events of Technische Universität Darmstadt  
<https://redaktion.tu-darmstadt.de/veranstaltungskalender/veranstaltungen/einzelansicht.de.jsp?id=90116&keywords=&monat=&untertitel=&inhalt=&veranstalter=&suchbegriff=&filter=&jahr=&titel=&modus=bearbeiten&pageNo=7&tag=&historie>
- Press release of Technische Universität Darmstadt  
[https://www.tu-darmstadt.de/media/illustrationen/referat\\_kommunikation/pressemeldungen/2017\\_5/22-2017-SCARLET.pdf](https://www.tu-darmstadt.de/media/illustrationen/referat_kommunikation/pressemeldungen/2017_5/22-2017-SCARLET.pdf)
- CEMENT INTERNATIONAL, No. 01/2017 (magazine)
- European Energy Innovation, Winter 2016 (magazine)
- Researchgate  
<https://www.researchgate.net/project/SCARLET-Scale-up-of-Calcium-Carbonate-Looping-Technology-for-Efficient-CO2-Capture-from-Power-and-Industrial-Plants>
- Various presentations at conferences

### 3 Workshop

The 2<sup>nd</sup> Public SCARLET Workshop presented the results of the second phase of the project focusing on the scale-up and engineering of a 20 MW<sub>th</sub> pilot plant including CFD simulations of the up-scaled pilot plant reactors. Integration scenarios of CCL retrofits at various full-scale reference power (hard coal, lignite) and industrial (cement, steel) plants were assessed evaluating thermodynamics, economics and environmental impact. In addition, experimental results from CCL pilot testing in a 1 MW<sub>th</sub> pilot plant with more than 1,200 hours stable operation were presented. The possibility of a site visit of the 1 MW<sub>th</sub> CCL pilot plant was also given. The agenda is shown in Table 1 including a guest presentation from K. Jordal (SINTEF Energy Research) presenting the EU H2020 project CEMCAP.

Table 1: Programme of the 2<sup>nd</sup> Public SCARLET Workshop

<b>Time</b>	<b>Topic, Presenter</b>
09:00	<b>Welcome,</b> <i>B. Epple (Technische Universität Darmstadt)</i>
09:10	<b>Introduction to the SCARLET project</b> <i>J. Ströhle (Technische Universität Darmstadt)</i>
09:20	<b>Long-term CCL pilot testing in 1 MW<sub>th</sub> scale</b> <i>J. Hilz (Technische Universität Darmstadt)</i>
10:00	<b>Coffee break</b>
10:20	<b>Scale-up of CCL to a 20 MW<sub>th</sub> pilot plant</b> <i>C. Weingärtner (GE Carbon Capture GmbH)</i>
11:00	<b>CFD simulation of 20 MW<sub>th</sub> CCL pilot plant reactors</b> <i>M. Balfe (GE Carbon Capture GmbH), A. Stroh (Technische Universität Darmstadt), A. Nikolopolous (CERTH)</i>
12:00	<b>Lunch break</b>
13:00	<b>Full-scale reference power and industrial plants</b> <i>D. Peralta-Solorio (Uniper Technologies Ltd), G. Wiechers (RWE Power AG), A. Pita (CEMEX Research Group AG)</i>
13:30	<b>Thermodynamic assessment of full-scale CCL integration scenarios</b> <i>M. Haaf (Technische Universität Darmstadt)</i>
14:15	<b>Economical and environmental assessment of full-scale CCL integration scenarios</b> <i>Y. Huang, A. Rolfe (University of Ulster)</i>
15:00	<b>Coffee break</b>
15:20	<b>Introduction to the H2020 project CEMCAP</b> <i>K. Jordal (SINTEF)</i>
15:50	<b>Open discussion, recommendations for future developmental work of CCL and concluding remarks</b> <i>J. Ströhle (Technische Universität Darmstadt)</i>
16:10	<b>Visit of the 1 MW<sub>th</sub> CCL pilot plant</b>
17:00	<b>End of workshop</b>

All presentations are available for download from the public SCARLET website. Download can be accessed by the following link:

[http://www.project-scarlet.eu/wordpress/?page\\_id=704](http://www.project-scarlet.eu/wordpress/?page_id=704)

All stakeholder will be notified by the regularly newsletter to take a look and download the presentations from the public website.

The participants were experts from the SCARLET consortium partners, other research institutes, and universities and industrial representatives – about 40 participants all in all. Table 2 summarizes the participants of the 2<sup>nd</sup> Public SCARLET workshop.

**Table 2: Participants of the 2<sup>nd</sup> Public SCARLET Workshop**

<i><b>Family Name</b></i>	<i><b>First name</b></i>	<i><b>Organisation</b></i>
Balfe	Michael	GE Carbon Capture GmbH
Belete	Tesfaye	Dutch Institute for Fundamental Energy Research (DIFFER)
Blamey	John	Imperial College London - Department of Chemical Engineering
Boenkendorf	Ulf	Fels-Werke GmbH - Application Engineering /Research and Development
Daikeler	Alexander	Institute for Energy Systems and Technology - Technische Universität Darmstadt
Di Felice	Luca	Institute for Energy Technology
Diaz	Luis	Hunosa - La Pereda Power Plant Manager
Emmerich	Jens	Lhoist Business & Innovation Center
Feige	Fritz	Verlag Bau + Technik
Gilles	Hellmut	TBS-Transportbeton Rhein-Neckar GmbH & Co. KG
Gomez	Rodrigo	ThyssenKrupp Industrial Solutions AG - Business Unit Resource Technologies
Gräf	Sven	KSB AG
Haaf	Martin	Institute for Energy Systems and Technology - Technische Universität Darmstadt
Helbig	Martin	Institute for Energy Systems and Technology - Technische Universität Darmstadt
Hilz	Jochen	Institute for Energy Systems and Technology - Technische Universität Darmstadt
Huang	Ye	Ulster University
Jordal	Kristin	SINTEF Energy Research
Lorenzo	Maria	Hunosa - La Pereda Power Maintenance Manager and CO2 Pilot Manager
Moreno	Joseba	University of Stuttgart - Institute of Combustion and Power Plant Technology
Nikolopoulos	Nikos	Centre for Research and Technology Hellas (CERTH)
Ohlemüller	Peter	Institute for Energy Systems and Technology - Technische Universität Darmstadt
Ohnemüller	Frank	Forschungsgemeinschaft Kalk und Mörtel e. V.

<b>Family Name</b>	<b>First name</b>	<b>Organisation</b>
Penkuhn	Mathias	Technische Universität Berlin - Institute for Energy Engineering
Peralta-Solorio	David	Uniper Technologies Limited
Pita	Antonio	CEMEX Research AG
Pust	Christopher	Lhoist Germany - Rheinkalk GmbH
Reitz	Michael	Institute for Energy Systems and Technology - Technische Universität Darmstadt
Rolfe	Angela	Ulster University
Romano	Matteo	Politecnico di Milano - Department of Energy
Sakowski	Bastian	Technical University Dresden
Saleh	Ahmed	Heriot-Watt University - Center for Innovation in Carbon Capture and Storage
Schwaab	Frank	KSB AG

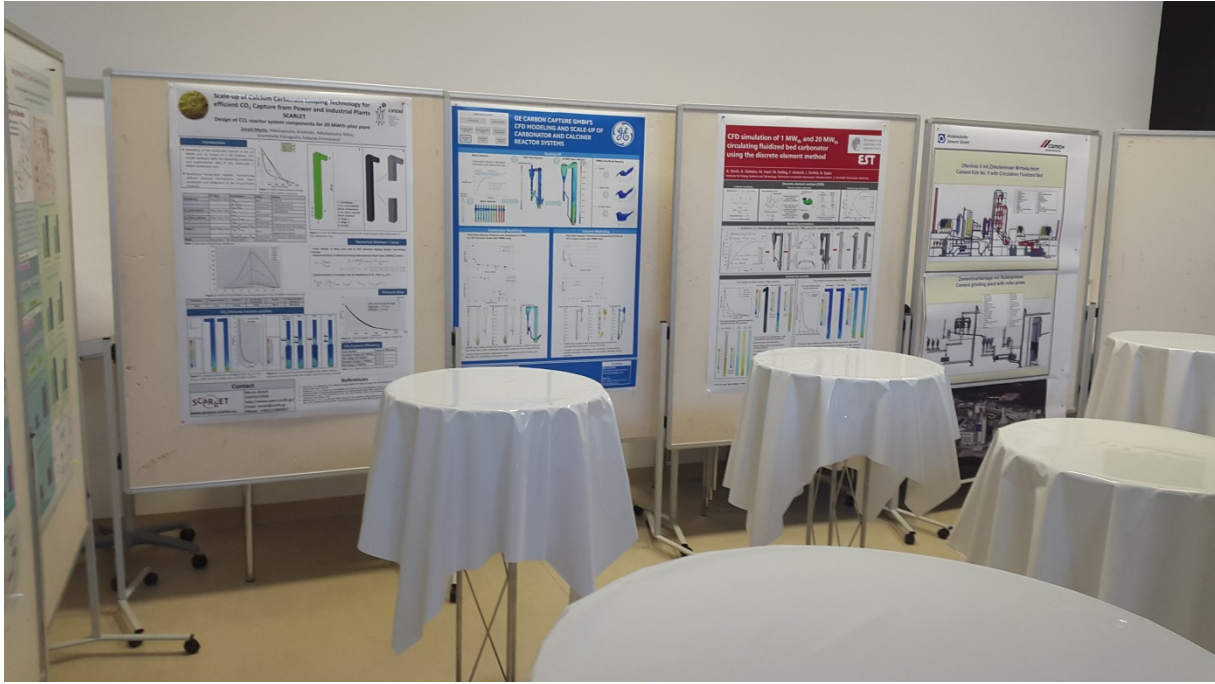
Some impressions of the workshop are shown in Figure 1.



**Figure 1: Opening of the 2<sup>nd</sup> Public SCARLET Workshop**

The participants had also the opportunity to attend a poster session, held during the breaks. The results obtained in the Work Packages of the SCARLET project were presented by posters in the break room, where attendants had the possibility to take a look at. Figure 2 shows the posters.





**Figure 2: Poster session in the break room**

At the end of the workshop, participants were invited to visit the 1 MW<sup>th</sup> CCL pilot plant and the other research facilities of the EST (e.g. cold flow model, indirectly heated carbonate looping pilot). Figure 3 shows the auditorium of the workshop in front of the pilot plant.





**Figure 3: Pilot plant visit of the workshop participants**