

European Workshop on Underground Energy Storage



**November 7th-8th 2019,
Quartier latin, Paris, France**

Second announcement registration & call for posters

OVERVIEW

Energy storage will play a pivotal role in future energy systems compatible with a carbon-neutral and environmentally friendly society. It will enable to optimize the integration of renewable and recoverable energies into the electricity and heat mix and to contribute to the flexibility of energy systems, alongside improved grid interconnectivity, smart grids and demand-response functionalities. It will also facilitate sector coupling by the use of renewable power for producing green fuel in the mobility sector and green raw material for the chemical industry like hydrogen.

Energy storage in the subsurface has the potential to become an important component of transition to low carbon energy. Storing energy in the underground can lead to larger-scale, longer-term and safer solutions than above ground energy storage technologies, thus complementing the range of storage technologies to be able to meet very diverse needs.

ORGANISERS

This European workshop on Underground energy storage will take place from November 7th to 8th, 2019 at the Maison des Mines et des Ponts et Chaussées, 270 rue St Jacques, 75005 Paris.

- EuroGeoSurveys' GeoEnergy Expert Group
- the ANR Fluidstory project coordinated by BRGM
- BRGM, the French Geological Survey.

It is organised by ENeRG, the European Network for Research in Geo-Energy, in collaboration with:

This workshop is a back-to-back event with the National Energy Storage Days organised each year by the Energy Storage Club of ATEE, the French Technical Association on Energy and Environment.



OBJECTIVES OF THE EUROPEAN WORKSHOP

Subsurface energy storage represents a complex and broadly evolving field of research, as it covers multiple scales of application, a variety of end-user profiles, and different types of energy carriers. Subsurface storage capacities are present in many types of geological formations, each of which has its own criteria for identifying techno-economic viability.

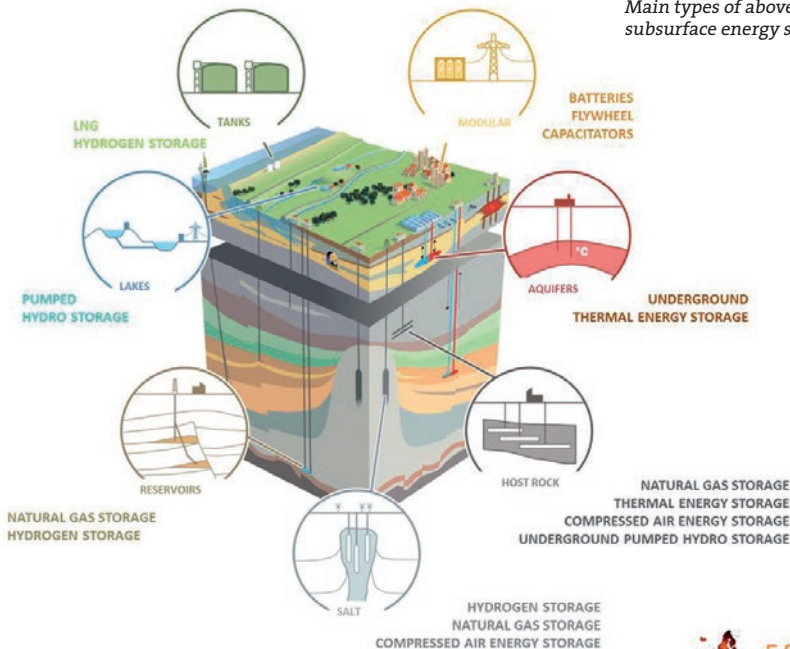
Some of the subsurface energy storage technologies (e.g. natural gas storage) have been applied at large scale for decades, while others have thus far been applied in pilot projects or at modest scale only (e.g. compressed air energy storage, heat storage). It is crucial to further increase our level of understanding of subsurface energy storage potential based on new geoscientific data,

improved models and common agreed assessment principles.

The key to unravelling the full potential and effective implementation of large-scale subsurface energy storage lies in the integration of geological knowledge, engineering solutions, market economy information and a comprehensive analysis of the entire energy system. Close cooperation between all actors from science, industry and policy areas is therefore essential to a successful development.

The objectives of the workshop are to discuss current technological status and research needs for the development of the subsurface energy storage technologies, and exchange with energy producers and consumers who need energy storage solutions.

Main types of above ground and subsurface energy storage





TECHNOLOGIES

- Underground hydrogen storage
- Underground (synthetic) natural gas storage
- Underground methanogenesis
- Compressed air energy storage (CAES)
- Power to Gas to Power in closed loop (EMO)
- Underground pump hydro storage (UPHS)
- Aquifer thermal energy storage (ATES)
- Borehole thermal energy storage (BTES)
- Cavern thermal energy storage (CTES)
- Any other innovative technologies (new engineering solutions, etc.)

TOPICS

- Evaluating technologies
- Demand for energy storage
- Social license to operate
- Assessing geological formations
- Research topics
- Case studies and pilots
- Future challenges

WHO SHOULD ATTEND

Researchers and industry experts. Energy producers and distributors. Regulators. Policy makers. NGOs. All stakeholders interested in carbon-neutral and environmentally friendly economy.

REGISTRATION

This workshop is free of charge within the limit of available place.

Registration is required for every participant/speaker/panellist **before September 30th 2019** by using the following link:

www.brgm.eu/workshop-ues/registration

CALL FOR POSTERS

If you would like to make a poster presentation, then please submit an abstract (max one A4 page, including title, authors and affiliations) **before September 30th 2019**. Please send your abstract to: workshop-ues@brgm.fr

Your poster presentation will be confirmed at the latest **on October 7th 2019**.

Posters will be visited during the breaks. Before each break one slide will be presented with the list of posters that will be described during the break. Then, each author will give a 5 min pitch in front of his/her poster.

WORKSHOP VENUE

Maison des Mines et des Ponts et Chaussées,
270 rue St Jacques, 75005 Paris

NOVEMBER 7TH THURSDAY 2019

8:30-8:50 Welcome, coffee

Opening Session: European perspectives on energy storage and the role of underground options

8:50-9:05 **Introduction**
Objectives, goals, expectations
Dr. Isabelle Czernichowski-Lauriol & Dr. Vit Hladik (ENeRG)

9:05-9:30 **Policy perspective**
EC representative
- to be confirmed (tbc)

9:30-9:55 **Research perspective**
Dr. Serge van Gessel, Chair of EuroGeoSurveys' GeoEnergy Expert Group, TNO, The Netherlands

9:55-10:20 **Industry perspective**
Mr. Patrick Clerens, Secretary of the European Association for Storage of Energy (EASE)

10:20-10:40 **General discussion with session's speakers and audience**

10:40-11:10 Coffee break & poster session 1

Session 1: Introducing the technologies

11:10-11:30 **Compressed Air Energy Storage (CAES) underground technologies**
Prof. Seamus Garvey, Nottingham University, UK

11:30-11:50 **Underground Pump Hydro Storage (UPHS) concepts**
Dr. Wolfgang Littmann, erneo Energiespeichersysteme GmbH, Germany

11:50-12:10 **Underground storage of Hydrogen in salt caverns**
Dr. Grégoire Hévin, Storengy, France

12:10-12:30 **Underground storage of Hydrogen in porous geological media**
Mr. Markus Pichler, RAG AG, Austria

12:30-13:30 Lunch & poster session 2

13:30-13:50 **Technologies status and perspectives of Power-to-Gas in connection with seasonal underground storage**
Mr. Martin Thema, OTH Regensburg, Germany

13:50-14:10 **Electrolysis-Methanation-Oxyfuel (EMO) concept - an overview of the results of the FLUIDSTORY project**
Dr. Anne-Gaëlle Bader, BRGM, France

14:10-14:30 **Underground storage of Heat**

*Dr. Joris Koornneef, TNO,
The Netherlands*

14:30-15:00 **General discussion with session's speakers and audience**

15:00-15:30 **Coffee & poster session 3**

Session 2: Future demand for underground energy storage

15:30-15:50 **Future demand for underground energy storage in Europe with an economical point of view**

*Mr. Sebastian Escagües,
ENEA, France*

15:50-16:10 **Providing seasonal energy supply: future perspectives for the underground storage of natural gas and conversions into storages for green gas & hydrogen**

*Mr. Ladislav Barkoci, NAFTA,
Slovakia*

16:10-16:30 **Balancing renewables: the role of salt caverns in Germany's future energy system**

*Dr. Ing. Lara Welder,
Forschungszentrum Jülich,
Germany*

16:30-16:50 **Value of integrating High-Temperature Underground Thermal**

Energy Storage (HT-UTES) with district heating to enhance performance

*Mr. Fleury de Oliveira,
University of Geneva,
Switzerland*

16:50-17:10 **General discussion with session's speakers and audience**

Session 3: Social license to operate

17:10-17:20 **What role for society in the development of underground energy storage? Presentation of the GEFISS project – Social Governance for Subsurface Engineering**
*Ms. Joanna Henderson,
Blue Dot, France*

17:20-18:00 **Panel discussion and interaction with audience**
*Lead by Ms. Joanna Henderson,
Panel members - Mr. Edward Hough, British Geological Survey, UK, etc.
- tbc*

18:00 **End of first day**

NOVEMBER 8TH FRIDAY 2019

Session 4: Results from the FLUIDSTORY research project: Massive and reversible underground storage of fluids (O₂, CO₂, CH₄) for energy storage and recovery

8:30-8:50 Process modelling and capacity building potential for application of EMO storage concepts
Dr. Yann Le Gallo, Geogreen, France

8:50-9:10 Thermo-mechanical integrity of salt cavern during the exploitation period
Dr. Ing. Pierre Berest, Lab. of Solid Mechanics, Ecole Polytechnique, France

9:10-9:30 Thermodynamic and geochemical behavior of salt caverns
Dr. Christophe Coquelet, Armines, France

9:30-9:50 Salt-cavern safety and risk management
Mr. Thomas Le Guénan, BRGM, France

9:50-10:10 Energy and economic profitability of the EMO concept
Mr. Arnaud Réveillère, Geostock, France

10:10-10:30 General discussion with session's speakers and audience

10:30-11:00 Coffee break & poster session 4

Session 5: Subsurface assessments

11:00-11:20 How to assess the storage performance? (working volumes, production/injection rates, sensitivities on various parameters, etc.)
Dr. Joaquim Juez Larré, ECN, TNO, The Netherlands

11:20-11:40 How to classify underground energy storage capacities?
Mr. Edward Hough, British Geological Survey, UK

11:40-12:00 ESTMAP – First pan-European assessment of underground energy storage potential
Dr. Vit Hladik, Czech Geological Survey, Czech Republic

12:00-12:20 General discussion with session's speakers and audience

12:20-13:20 Lunch & poster session 5

Session 6: Industry Pilot Projects and Research

13:20-13:40 Full scale hydrogen storage facility in a salt cavern in Texas and envisaged facility in Europe (ROSTOCK-H and STOPIL-H₂ GEODENERGIES projects)
Dr. Simon Jallais, Air Liquide R&D, France

- 13:40-14:00** **World wide first pilot plant of an advanced adiabatic compressed air energy storage technology in the Swiss Alps**
tbc
- 14:00-14:20** **Field experience on underground heat storage in aquifers, rocks and old coal mines (Heerlen-NL, DK, etc.)**
Mr. Thomas Vangkilde-Pedersen, GEUS, Denmark
- 14:20-14:40** **Underground controlled methanogenesis in a depleted gas reservoir in Patagonia, Argentina, as a way to store green hydrogen**
Dr. Sébastien Dupraz, BRGM, France
- 14:40-15:00** **Experimental underground pump hydro facility in a mine in the Czech Republic**
VSB -Technical University of Ostrava, Czech Republic - tbc

15:00-15:20 **General discussion with session's speakers and audience**

15:20-15:50 **Coffee break & poster session 6**

Final Session: Conclusions

15:50-16:30 **Panel Debate: What is our key message to the EC and national decision-makers, and potential stakeholders?**

*Panelist 1 - Industry:
Mr. Christian Hue, Deputy Director, STORENGY*

*Panelist 2 - Science & Technology:
Dr. Ing. Pierre Berest, Laboratory of Solid Mechanics, Ecole Polytechnique*

*Panelist 3 - Economy:
tbc*

*Panelist 4 - Social sciences:
tbc*

*Panelist 5 - Policy:
tbc*

16:30

Workshop closure

Isabelle Czernichowski-Lauriol and Vit Hladik (ENeRG)

SCIENTIFIC COMMITTEE

- Dr. Isabelle Czernichowski-Lauriol (co-chair), ENeRG, BRGM, France
- Dr. Vit Hladik (co-chair), ENeRG President, Czech Geological Survey, Czech Republic
- Dr. Serge Van Gessel, Chair of EuroGeoSurveys' GeoEnergy Expert Group, TNO, The Netherlands
- Prof. Behrooz Bazargan-Sabet, Coordinator of the ANR FLUIDSTORY project, BRGM, France
- Mr. Patrick Canal, General Delegate of the ATEE Energy Storage Club, France
- Prof. Bernardo Llamas Moya, Polytechnic University of Madrid, Spain
- Mr. Fritz Crotofino, Senior Expert, DEEP.KBB GmbH, Germany
- Dr. Lionel Nadau, Energy Storage Expert, ENGIE Lab CRIGEN, France
- Dr. Simon Jallais, Industrial Risks International Expert, Air Liquide R&D, France

- Dr. Christophe Rigollet, Director of GIS Géodénergies, France
- Dr. Patrick Egermann, Energy Solutions coordinator, STORENGY, France
- Dr.-Ing. Amer Abdel Haq, Business Development Manager, UGS GmbH, Germany

IMPORTANT DATES

- **September 9th 2019:**
Opening date for registration and call for posters
- **September 30th 2019:**
Deadline for registration and abstracts submission
- **October 7th 2019:**
Notification of posters acceptance
- **November 7th-8th 2019:**
European Workshop on Underground Energy Storage

CONTACT

email: workshop-ues@brgm.fr

website: www.brgm.eu/workshop-ues

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