



Minutes from Workshops

Deliverable D2.7

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Version 1

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Executive summary

The GEMex project is a research cooperation between a European consortium (funded through H2020) and a Mexican consortium (funded by CONACyT) to develop and address exploitation concepts for superhot geothermal resources and for hot Enhanced Geothermal Systems (EGS). The project includes resource assessment, exploration and characterisation of the deep structures, advanced reservoir models and exploitation concepts incl. drilling, stimulation and operational issues. In addition, environmental impact was assessed and public acceptance was actively investigated.

To disseminate the GEMex project results outside the Consortium and to get feedback from stakeholders several events have been organised between month 1 (September 2016) and month 36 (September 2019):

- Workshops for consulting stakeholders: event to present first project results to key actors
- Information events for stakeholders: side-events of the final conferences of IMAGE and DESCRAMBLE project during the first and the second year of GEMex project respectively.
- Contribute, upon invitation by the INEA, to common information and dissemination activities to increase the visibility and synergies between H2020 supported actions.

On top, a final project conference for presenting project results to all the targeted groups will be organised on 17-18 February 2019 in Potsdam (Germany). The final conference of GEMex will serve as a platform to present and discuss results from the projects and to learn about other researches and projects related to the topics of superhot geothermal sources (SHGS) and hot EGS. Contributions are encouraged and welcome addressing any of the aspects associated with the investigation, development and/or exploitation of such geothermal resources in any part of the world.

1 Workshops for consulting stakeholders

1.1 Mapping key actors

A map of key actors was firstly created during the first months of the project. The aim was to select key stakeholders in order to create the Stakeholder Board and then to develop a Stakeholder network to facilitate dissemination of GEMex project results.

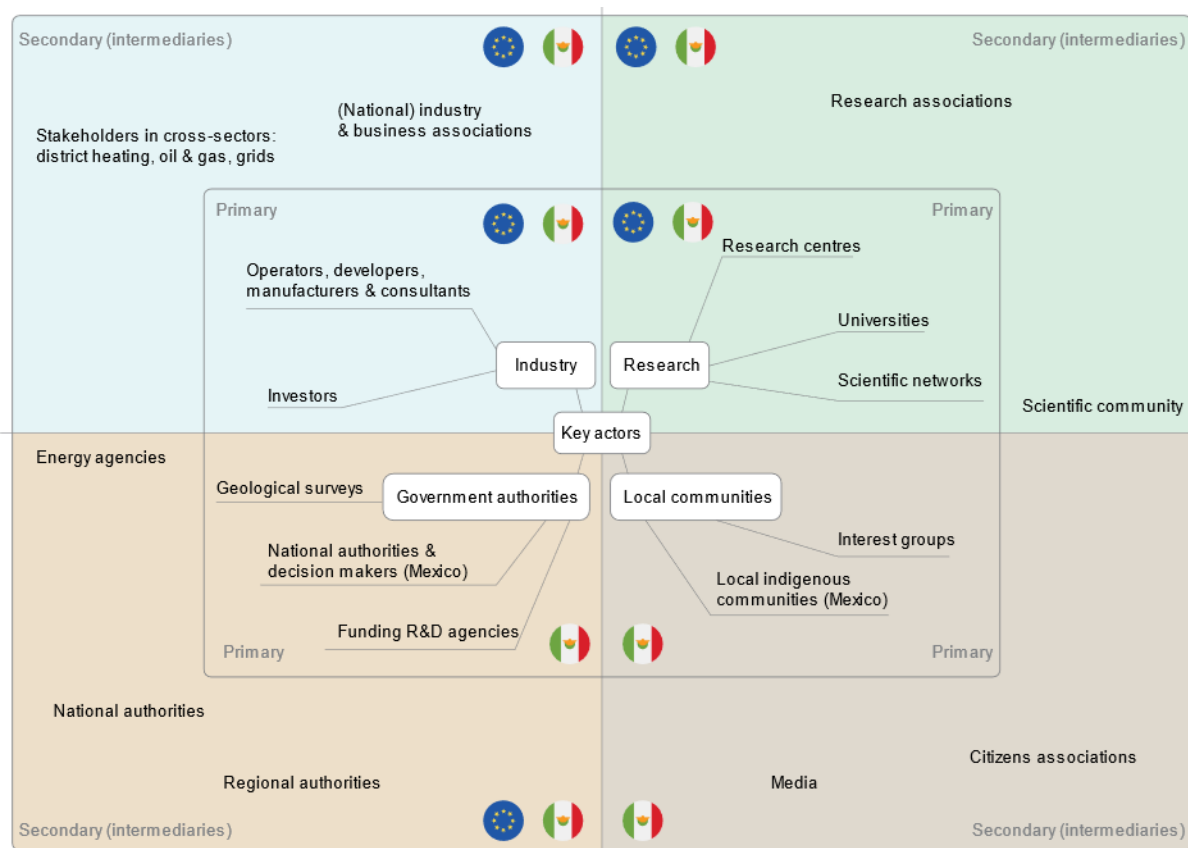


Figure 1: Map of key actors

1.2 The stakeholder Board

Composed by 10 experts, the stakeholder board (SB) members were selected after a call for of interest to Industry partners who expressed support to the project proposal; to CFE from Mexico; and to other industry partners in the EU and Mexico.

Following a public call for expression of interest the GEMex Stakeholder Board has been established and it officially commenced its activities in November 2017.

The stakeholder board’s mission is to strengthen the liaison between industry and research, preparing the basis for a continued cooperation between Europe and Mexico on future geothermal development.

Name	Last name	Company	Position	Country
Bodo	von Düring	CloZEd Loop Energy AG (CH) & AAT Geothermae d.o.o. (HR)	Founder and CEO	CH & HR
Roy	Baria	EGS Energy UK Ltd	Founder and CEO	UK
Joerg	Baumgaertner	BESTEC GmbH	Founder and CEO	Germany
Riccardo	Pasquali	Terra GeoServ Ltd	Managing Director	Ireland
Stefano	Benato	University of Cranfield, UK	Lecturer in Geothermal and O&G Engineering	UK
Jean Philippe	Soulé	Fonroche Géothermie	Managing Director	France
Pierre	Vergnes	Fonroche Géothermie	Chargé de développement	France
Bruno	Leray	Storengy	Chief International & New Markets Officer	France
Marco	Baresi	Turboden S.p.a.	Institutional Relations Director	Italy
Jean-Jacques	Graff	ES Géothermie	Directeur général	France
Albert	Genter	ES Géothermie	Deputy General Manager	France
Carsten	Sørli	Statoil ASA	Project leader, R&D Geothermal Energy	Norway
Pieter	van Heiningen	Provenance Exploration Consultancy BV	Owner - Geologist	The Netherlands
Fausto	Batini	Magma Energy	CEO	Italy
Laurent	Escare	Storengy	Geologist	France
Sara	Montomoli	ENEL GP	Geothermal R&I manager	Italy

Table 1 Composition of the SB

The GEMex Stakeholders Board serves as a platform for stakeholders' consultation, preparing the basis for a continued cooperation with Mexico on geothermal development. The Stakeholders Board

has the access to the reports on project results and discuss them in dedicated meetings organised throughout the course of the project.

One of the activities, on which the GEMex Stakeholders Board was called to give its feedback, is an Action Plan EU-Mexico on EGS and superhot systems (SHS), that aims at envisaging the future of the cooperation between Europe and Mexico for geothermal development.

1.3 Workshops

The stakeholder board members have been invited to two stakeholder board workshops in order to inform them about first project results. During the workshops, the stakeholders were also consulted for advise on further developments within the project. In order to facilitate the participation of SB-members, the workshops have been connected to meetings of the European Technology & Innovation Platform on Deep Geothermal (ETIP-DG), which is an open stakeholder group, endorsed by the European Commission under the Strategic Energy Technology Plan (SET-Plan), with the overarching objective to enable deep geothermal technology to proliferate and reach its full potential everywhere in Europe.

1.3.1 First workshop – Bruxelles 14/11/2017

Agenda

10:00 – 14:00	Topic	Presenter
09:45 – 10:00	Welcome & Coffee	
10:00 – 10:15	<i>Presentation of the GEMex project: why the cooperation between Europe and Mexico on geothermal development</i>	D. Bruhn (GFZ), GEMex Coordinator
10:15 – 11:30	Presentation of results	
	<i>Regional resources models: Integrated regional models</i>	P. Calcagno (BRGM)
	<i>Tectonic control on fluid flow: State of the art after one year of Gemex</i>	D. Liotta (UNIBA)
	<i>Stimulation concepts for EGS (WP7) & Concepts for the development of super-hot resources (WP8)</i>	J. van Wees (TNO)
11:30 – 12:30	Feedback and Roundtable discussion	
12:30 – 13:15	Lunch	

Minutes

The meeting opened with a presentation to introduce the GEMex project by the coordinator of the project, D. Bruhn (GFZ), followed by three technical talks on the preliminary results of the geological modelling by P. Calcagno (BRGM), field works to gather data useful to clarify the fluid pathways by D. Liotta (UNIBA), and the EGS stimulation concepts and concepts to develop in supercritical conditions by J. van Wees (TNO).

After the presentations, the following points were raised:

- Possibility to work in Mexico in the next stage and related legal aspects: An Action plan will be defined in the frame of GEMex project to pave the way for market development.
- Other events to involve the stakeholders: another Stakeholder Board meeting is planned in the second half of the project, while two side events will be organized jointly as side-events with two important geothermal contexts (e.g. fairs, geothermal project final conferences, ...)
- The lessons learnt in the GEMex project have to be deployed/applied for EU Market development
- High interest on Acozulco area: both as possible EGS area (e.g., stimulation, ...) and as brown field area (i.e., in case a conventional reservoir will be identified)
- EGS definition is confused (used as geological concept in the earth science research, but for industry it is essentially a technological development). The same confusion applies to the term unconventional.
- Stakeholder access to GEMex data: they can access the data produced within GEMex, but not the CFE background data. Data publically available will be provided by means of the Open Access DataBase.

1.3.2 Second workshop – Bruxelles 10/01/2019

Agenda

	Topic	Presenter
09:15 – 09:30	Welcome & Coffee	
09:30 – 10:00	<i>Update on the GEMex project</i>	D. Bruhn (GFZ), GEMex Coordinator
10:00 – 10:30	<i>Action Plan for cooperation EU-Mexico on EGS and superhot systems</i>	T. Garabetian (EGEC)
10:30 – 10:45	Coffee break	
10:45 – 11:15	<i>Stakeholders and public engagement strategies</i>	A. Manzella (CNR)
11:15 – 12:15	Feedback and Roundtable discussion	
12:15 – 13:15	Lunch	

Minutes from GEMex 2nd Stakeholder board meeting

Attendants: David Bruhn (GFZ), Roy Baria (EGC Ltd), Marco Baresi (Turboden), Philippe Dumas (EGEC), Thomas Garabetian (EGEC), Adele Manzella (CNR-IGG), Eugenio Trumpy (CNR-IGG)

D. Bruhn introduced GEMex, including the last project results, e.g.:

- from MT T-strike between 0.01 s and 0.1 s / 0.1 s and 1 s / 1s and 10 s / 10 s and 100 s / 100 s and 1000 s – domains defined and possible faults location, resistivity maps a different depth,
- temperature measurements in the shallow boreholes outside the caldera, conceptual model,
- MT cross-sections notable the spikes at depth, soil gas diffusion, analogue modelling – hottest would be outside the caldera,
- reservoir modelling in LH,
- prediction of pore and crustal stress from wire-line logs and drilling parameters,
- cement sheath integrity (CSI) model

T. Garabetian introduced the D2.6 'Action Plan' and its Table of Contents (ToC):

- Overview of the technologies: EGS and superhot
- Geothermal assessment of the resources (EU & MEX)
- SWOT analysis (EU & MEX) plus recommendations
- Good practices on environmental aspects and public concerns (EU & MEX plus recommendations) in liaison with 7.4
- EGS and Superhot action plan: establish a research framework – transfer of knowledge – strengthening of EU technology and EU-MEX cooperation

The draft document was circulated to the Stakeholders Board for feedback and comments. Discussion between participants of meeting on the significant impact of social acceptance on exploitation of geothermal projects.

R. Baria: The stakeholder board could be consulted on the issue of the parameters for stimulation of EGS systems in the GeMEX project

A. Manzella introduced the ongoing activities related to public engagement (Task 7.4):

- Main goals: public engagement
- Literature review, considering different perspectives
- Measurements of socio-economic impacts of renewable energy projects
- Compare potential consumer and company perspectives
- Questionnaire survey with 1500 respondents (urban consumers) in BRICS (Brazil, Russia, India, China, South Africa) countries looking for common trends
- Consumers vs ...
- Field trip last April (2018) – gathering context information
- Analysis are ongoing, showed the tables where information are organised (qualitative analysis)
- Future activities: sustainability scenarios conceptual models, scenario for public engagement, validation at dissemination events

- Dissemination: Leibniz International Conference 2018, two papers, published a book “Geothermal Energy and Society”, strong cooperation with Mexican partners in term of internal communication, ...

P. Dumas: For social acceptance, benefit sharing mechanisms have proven effective in other regions than Mexico, notably in Europe. Do such mechanisms exist in Mexico, and to what results? The Advisory Committee of the project could provide inputs on the observation of task 7.4 (notably through the description in Action Plan).

2 Information events for stakeholders

2.1 Type of events

Information events for stakeholders are larger events than for the SB. Larger events meant to inform a wider audience about the GEMex project, therefore stakeholders not only from the industry but also from other related sectors (public authorities, academia, etc). The following table shows events that were considered.


2.2 Dissemination events

Event	Location	Planned Date	Type of event
Workshop on public acceptance	Mexico, Morelia	Feb 2017	WP9
Workshop on Corrosion, Erosion and Scaling in Los Humeros	Los Humeros (Puebla), Mexico	07.-10.3. 2017	CFE-GEMex workshop
INEA meeting	Brussels	July 2017	Presentation to INEA and other H2020 projects
German Geothermal Congress	München	September, 2017	Presentation on the project → Keynote lecture David Bruhn
EU-MX dialogue on Energy (invited presentation on GEMex)	Mexico City, Mexico	23 Jan 2018	Presentation by Paromita Deb
Geotherm 2018	Offenburg, Germany	Mar 2018	Joint booth with other deep geothermal H2020 projects

European Science Diplomacy Week in Mexico (invited presentation on GEMex)	Mexico City, Mexico	24 March 2018	Presentation by Jan Diederik van Wees
GEMex side-event at Descramble final conference and in conjunction with ETIP-DG	Italy	27 March 2018	Stakeholder information event
INEA meeting	Brussels	18 June 2018	Presentation to INEA and other H2020 projects
Workshop on "Interpreting electrical resistivity in terms of hydrothermal activity: Advances and challenges"	Reykjavik	27 August 2018	Scientific workshop dedicated to industry stakeholders (mainly from Iceland and France) and academics
EGC 2019	Den Haag	11-14 Jun 2019	Presentation in parallel sessions

Table 2: List of Dissemination events

2.2.1 Descramble Side Event: Agenda

		<h2>Side-event</h2> <p>@ DESCRAMBLE Final Conference</p>
DATE	VENUE	
27 March 2018	CNR Research Area of Pisa, Via G. Moruzzi 1 – 56124 Pisa, Italy CNR Room 28	

Agenda

	14:00 – 17:30	Topic	Presenter
	14:00 – 14:30	Welcome Coffee	
GEMex parallel to ETIP-DG WG Drilling	14:30 – 14:45	Presentation of the GEMex project: why the cooperation between Europe and Mexico on geothermal development	Eugenio Trumpy (CNR)
	14:45 – 15:45	Presentation of results	

	14:45 – 15:00	Regional resources models: Integrated regional models	Damien Bonté (UU)
	15:00 – 15:15	Tectonic control on fluid flow: State of the art after one year of Gemex	D. Liotta (UNIBA)
	15:15 – 15:30	Detection of deep structures	Biancamaria Farina (OGS)
	15.30 – 15:45	Reservoir characterization	C. Clauser (RWTH)
	15:45 – 16:00	Feedback + Discussion	
Joint part with-ETIP-DG WG Drilling	16:00 – 16:30	Joint Coffee break with DG-ETIP WG drilling	
	16:30 – 16:45	Concepts for EGS development	Jan Diederik van Wees (TNO)
	16:45 – 17:00	Concepts for the development of super-hot resources (WP8)	Ernst Huenges (GFZ)
	17:00 – 17:30	Feedback and discussion	

2.2.2 GEMex at the 7th European Geothermal Workshop

GEMex project to be presented as part of the the 7th European Geothermal Workshop, contributing to the objectives of dissemination of the GEMex project. Instead of implementing a side-event per se, the WP2 team decided to showcase the GEMex project within the sessions of the EGW with one keynote and oral presentations in all GEMex-relevant sessions. Combined with 8 project presentations during the poster session, this will allow for an extensive presentation of the GEMex project results to an audience of approximately 150 people.

7th European Geothermal Workshop – Characterization of Deep Geothermal Systems – Karlsruhe, Germany – GEMex oral and poster presentations

9:00 – 9:15	Welcome Message	
9:15 – 9:55	Keynote 1: Volcano-tectonic model guide for the geothermal exploration of the Los Humeros Volcanic Complex, Mexico	Dr. Gianluca Norini
9:55 – 10:10	Regional structures in the Los Humeros geothermal system: insights for super-hot geothermal fluids location	Natalia Cornejo
11:25-11:40	Thermo- and petrophysical rock properties of the Los Humeros geothermal field (Mexico): comparison of outcrop analogues and reservoir formations	Leandra Weydt
17:00 -17:15	Predictive Mechanical model for fracture stimulation in an enhanced geothermal system (EGS) context	Baptiste Lepillier

Poster		
	Constraining caldera structures to understand geothermal fluid migration: insights from analogue modelling, and implications for the Los Humeros Volcanic Complex	Daniele Maestrelli
	Effect of temperature on physical properties of carbonatic rocks.	Giuseppe Mandrone
	Field methodologies aimed at geomechanical and geophysical characterization of faults zones in geothermal areas	Giuseppe Mandrone
	Geological structures and analogue permeability studies in Los Humeros geothermal system	Walter Wheeler
	Local earthquake tomography of Los Humeros geothermal field	Tania Toledo
	Magnetotelluric phase tensor analysis and its significance for tectonic interpretation: Case studies of the Los Humeros and Acochulco geothermal resources, Mexico	Sebastian Held
	The Los Humeros Superhot Geothermal Resource in Mexico: Results from an Extensive Resistivity Survey	Ásdís Benediktsdóttir
	Thermal modelling of magmatic geothermal systems: the role of deep-seated heat sources	Gianluca Gola

2.3 Scientific events

Contributions of scientists to scientific events are expected anyway. Nonetheless, a small number of special scientific events, in which the GEMex project and its results are presented, should add to this:

Event	Location	Planned Date	Type of event
Final conference	Potsdam, Germany	Feb 2020	Project final conference
Stanford meeting	Stanford, US	2018	Presentation, Egbert Jolie
PhD days	Zurich, Switzerland	2018	Poster/Presentation
GRC	Reno, US	15-17 Oct 2018	Presentations, Session on “International Research on Engineered and Superhot Geothermal Systems”
PhD days	Potsdam	2019	Poster/Presentation
EGC2019	The Hague, The Netherlands	11-14 Jun 2019	Posters/Presentations

Table 3: List of scientific events



Coordination Office, GEMex project

Helmholtz-Zentrum Potsdam
Deutsches GeoForschungsZentrum

Telegrafenberg, 14473 Potsdam

Germany