Depok, Jakarta, geocap progress meeting 2017

Geothermal capacity building program NL-IND GEOCAP

Freek van der Meer, Sanusi Satar, Tia den Hartog, Geocap team
Objective of GEOCAP:
increase the capacity of Indonesian Ministries, Local Government, Agencies, Public and Private Companies, and Knowledge Institutions in developing, exploring and utilization of geothermal energy resources and to assess and monitor its impact on the economy and the environment

Sustainability
Knowledge to knowledge cooperation
  joint education
  joint degree PhD
Business to business cooperation
Government to government cooperation

6 m. euro + additional contributions through LPDP and BPSDM
Why a Geocap

• (1) there is not enough skilled personnel to work on the development of geothermal fields particularly in prospective areas outside Java, **1.7fte per installed Mw gte**

• (2) many operational research challenges related to the uptake of geothermal

• (3) many prospective geothermal areas are in forest conservation areas thus there are competing claims between forest management and energy production,
The bigger picture
Emerging economies are a serious transnational environmental threat.
In COP21, for the first time in over 20 years of UN negotiations, countries ratified an agreement ‘to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C.’
• 10,000 MW Fast-Track Program late 2008
• INISIATIF ENERGI BERSIH (More Energy, less Carbon)

Source: MEMR
<table>
<thead>
<tr>
<th>Education &amp; training</th>
<th>Research</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01 - Geothermal exploration knowledge and skills deepening</td>
<td>2.01 – Techno-economic risk assessment</td>
<td>3.0 – Use of low-medium enthalpy resources</td>
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<td>1.02 - GGG regional and site exploration workflows</td>
<td>2.02 – Geomechanics and reservoir modeling</td>
<td>4.0 – Geothermal database integration</td>
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<td>1.03 – Drilling skills</td>
<td>2.03 – Advanced geothermal drilling (detailed drilling data logging and analysis)</td>
<td>5.0 – Management and coordination</td>
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<td>1.04 – Geothermal exploitation knowledge and skills</td>
<td>2.04 – Improvement of exploration concepts</td>
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<td>1.05 – Operation and maintenance skills for geothermal power plants</td>
<td>2.05 – Hydro-fracturing and acidizing</td>
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<td>1.06 – Master class course/training for high level decision makers for geothermal projects</td>
<td>2.06 – Geothermal power plant efficiency systems development</td>
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<td>1.07 – Project decision and risk management and financing</td>
<td>2.07 – Geothermal geodynamics (e.g., geothermal 2050)</td>
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<td>1.08 – Environmental assessment (EIA, SEA, PGIS)</td>
<td>2.08 – Rules, regulations, policy and governance</td>
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<td>1.09 – Development of integrated training materials (compilation)</td>
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<td>1.10 – Dissemination of project outcomes</td>
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Engaging universities outside Java (joint activity with BPSDM ESDM)

Workshop and Train the Trainers

Industries:
- Star Energy
- PGE
- OTP
- Supreme Energy
- GEODIPA

BAPPENAS BPSDM ESDM

Universities:
- ITB
- UGM
- UI
- Universitas Manado
- Udayana University
- Universitas Lampung
- Universitas Sam Ratulangi
- USAKTI
- Universitas KHAIRUN
- Universitas ANDALAS
- UNSYIAH
- UPN
- UNDIP
- UNPAD
- UNBRAW
- ITS
- USU
- UNPATI

21/03/2017
PhD research Joint Supervision Program toward joint or double degree PhD

• Tuition fee
• Living allowance in IND
• Living allowance in NL

Endorsed by:

Solving real geothermal development issues

21/03/2017
Direct use

- Significant for:
  - Process heat for companies: Drying of crops like tea
  - Electricity on remote locations (replace diesel) by using an ORC on low enthalpy source (Dutch technology)

WP 3: goal, main activities & partners
IF, IND uni’s & operators

GOAL: Develop potential of medium and low enthalpy resources in Indonesia by
- Mapping of subsurface and market potential
- Demonstrate potential in feasibility case studies
- Make plan of approach for market development by IND stakeholders in cooperation with NL partners
Geothermal database products

Welcome to the NL Oil and Gas Portal

This site provides information about oil and gas exploration and production in the North Sea and the Dutch sector of the North Sea Continental Shelf. It aims to help users access information furnished by the Dutch government in an easy, comprehensive fashion.

Recent changes
We keep this site continually up-to-date. Click here for an overview of recent changes.

Other topics
Salt intrusion
Underground gas storage

NL one of few countries with public data access to almost all E&P data

>20 years experience
State of the art 3D subsurface mapping

thermoGIS temp models

Resource mapping
Information systems

Unique aspect
geocap
Corporate and government decision making for geothermal power plants

Objectives of the 3 day course:
- Provide an introduction to Governmental policy making (how, geothermal tax), Governmental licensing, decision making and Company decision making
- Cover an overview of environmental assessment tools and how they impact on Governmental decision-making (licensing)
- Introduce processes and evaluation methods to help evaluate geothermal projects from concept to first investments (Decision- Commercial Operation). 

Day 1
- Morning: The energy landscape: Geothermal power plant basics
- Afternoon: Strategic, environmental assessment: Evaluation of opportunities (sounding, drilling)

Day 2
- Morning: Geothermal plant project basics
- Afternoon: Technical-economic processes for feasibility study (GEOPHYSICS)

Attendee by 18 participants:
- 8 industries
- 7 academics
- 3 government
Outreach

ITB International Geothermal Workshop 2013-2016

IIGCE 2014-2016
Progress in 2016

Training

- 9 trainings held
- 93 academia trained
- 23 operators trained
- 41 government officials trained
- Other interested organisations 2 people trained

2015
- 128 trainees successfully followed GEOCAP training

2016
- 252 trainees successfully followed GEOCAP training
Progress in 2016

Java

- Akamigas Balongan: 2
- ITB: 15
- ITS Bdg: 1
- ITSN: 5
- Politeknik Geologi dan Pertambangan Bandung: 1
- Politeknik Negeri Bandung: 2
- Politeknik Negeri Jember: 1
- Pusat Studi Geosains FMIPA Universitas Indonesia: 2
- UGM: 4
- Universitas Brawijaya Malang: 2
- UNDIP: 5
- UI: 1
- Universitas Jember: 2
- Universitas Jenderal Soedirman: 5
- Universitas Pendidikan Indonesia: 1
- USAKTI: 5
- Universitas Padjadjaran: 5
- UPN Veteran Jakarta: 2
- UPN Veteran Yogyakarta: 2

Sumatra

- Universitas Andalas: 2
- Universitas Islam Riau: 1
- UNILA: 6
- Universitas Negeri Padang: 1
- UNSRI: 1
- Universitas Syiah Kuala: 8

Sulawesi and Maluku

- Universitas Khairun: 2
- Universitas Negeri Manado: 4

Papua

- Universitas Papua: 2
Progress in 2016

Research

3 conference papers
4 workshop papers
8 project papers

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<th>Year</th>
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<tr>
<td>2014</td>
<td>Conference Paper</td>
<td>Indonesia - Netherlands geothermal capacity building: a collaboration among universities to support geothermal development in Indonesia</td>
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<td>2015</td>
<td>Conference Paper</td>
<td>GEOCAP: Geothermal Capacity Building Program (Indonesia - Netherlands)</td>
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<td>2015</td>
<td>Conference Paper</td>
<td>Geocap overview, research and education opportunities</td>
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<tr>
<td>2015</td>
<td>Project paper</td>
<td>Literature Survey of Stimulation techniques in Geothermal Wells</td>
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<td>Literature evaluation of stimulation techniques worldwide and modeling thermal stimulation</td>
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<td>Hydrofracturing and acidizing: data analysis and selection criteria for the wayang windu site</td>
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<td>Characterizing and time series modeling of surface manifestation at geothermal system using synthetic aperture radar (SAR) data</td>
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<td>2016</td>
<td>Conference Paper</td>
<td>Exploration and comparison of geothermal areas in Indonesia by fluid-rock geochemistry</td>
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<td>Project paper</td>
<td>Resource Assessment</td>
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<td>Market Survey</td>
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<td>Workshop paper</td>
<td>GEOCAP plan for increasing the role of Indonesian Human Resources in International Geothermal Industry</td>
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<td>Geosciences for governance related to widely societal beneficiaries</td>
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<td>Resilient society: food - water - energy: powerpoint</td>
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<td>2017</td>
<td>Conference Paper</td>
<td>Fluid-rock geochemical interaction for modelling calibration in geothermal exploration in Indonesia</td>
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Thank You on behalf of the Geocap community!