



GEOCAP
Geothermal Capacity Building Program Indonesia - Netherlands

Bandung, 19 March 2015

Geocap Overview, Research and Education Opportunities

Presented at the IIGW 2015, ITB, Bandung

Freek van der Meer, Abadi Poernomo, Sanusi Satar, Nenny Saptadji, Suryantini, Pri Utami, Khasani, Yunus Daud, Chris Hecker, David Bruhn, Fred Beekman, Guus Willemsen, Henny Cornelissen, Jan Diederik van Wees, Manfred van Bergen, Kees van den Ende

Cooperating companies & universities



IF Technology



Gadjah Mada University

IND coordinator:
INAGA



DNV GL



University of Indonesia

NL coordinator:
ITC



Well Engineering Partners



University of Twente –
Faculty ITC

Advisory board:
BAPPENAS (chair)
INAGA (secretary)
MEMR
DIKTI
Min. Foreign Affairs NL



Technical University
Bandung



Utrecht University –
Faculty of Geosciences –
Department of Earth
Sciences



Delft University of
Technology – Department
of Geo-Technology



Netherlands Organisation
for Applied Scientific
Research

Funded by



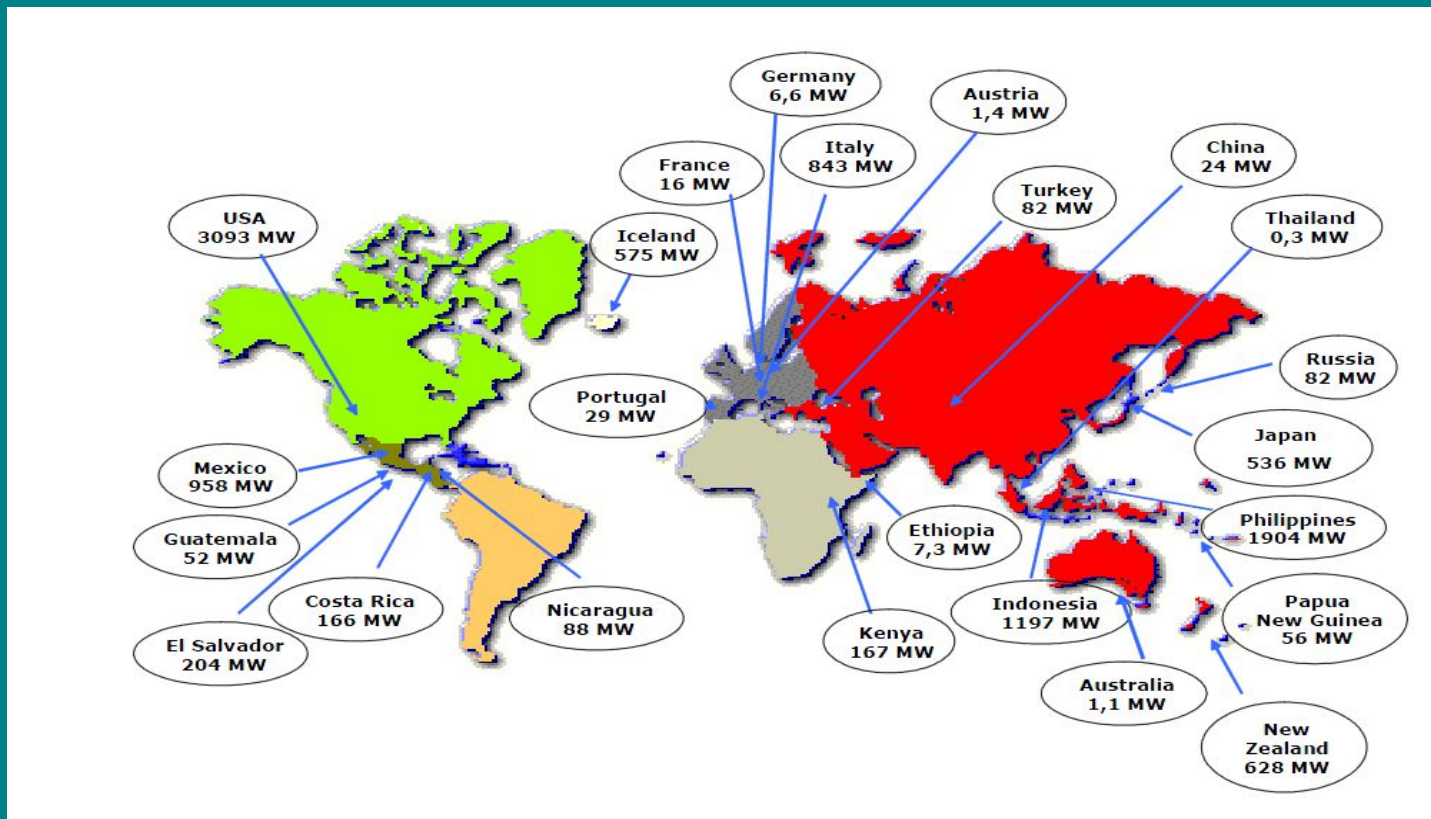
Ministry of Foreign Affairs of the
Netherlands



Indonesia geothermal potential

Indonesia has an economic growth of 6-8%

>80% energy based on fossil fuels



Source: http://jbbp.kankyo.tohoku.ac.jp/jbbp/PDF/2012_Bertani.pdf

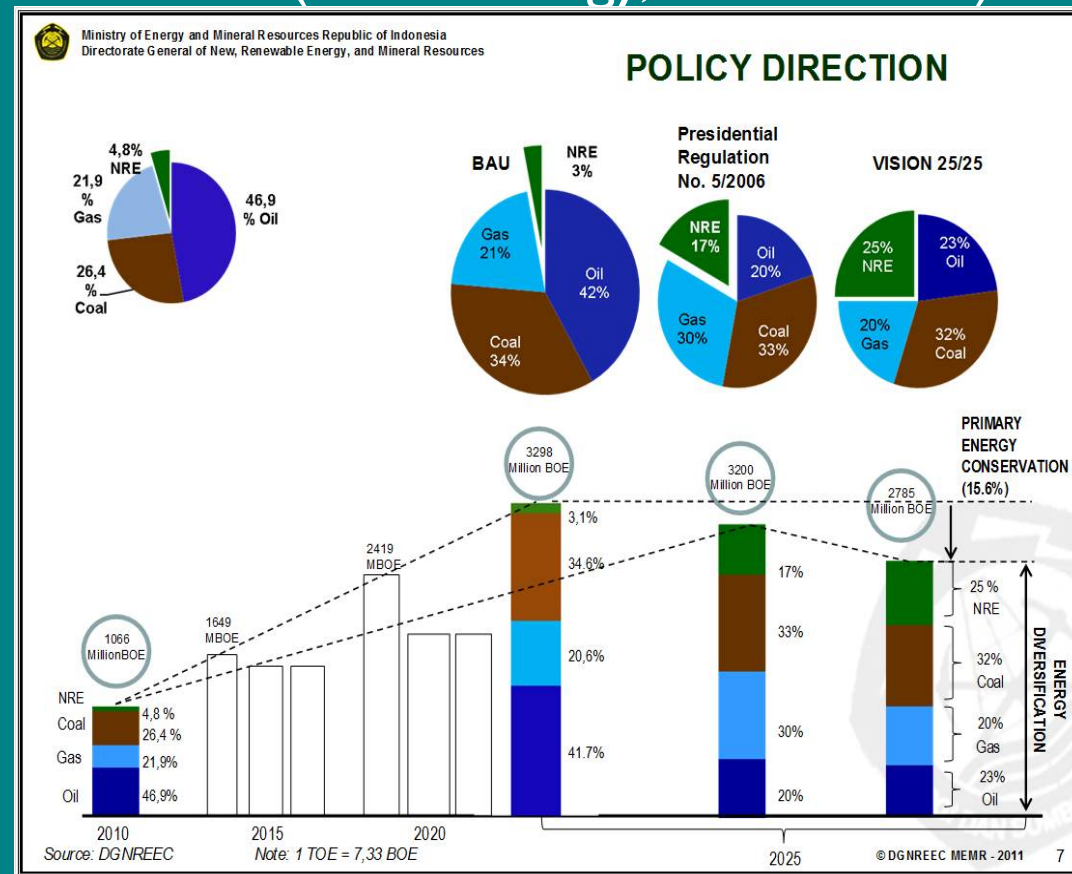
>80% energy based on fossil fuels



Indonesia geothermal potential

10,000 MW Fast-Track Program late 2008

INISIATIF ENERGI BERSIH (More Energy, less Carbon)



Source: MEMR

Nat. Geoth. Dev. Plan

Issued by bappenas 11 november 2011:

- Ambitious plans to upscale activities in Geothermal Energy
- Substantial increase in Geothermal Energy
- Assessment of the need for trained personnel
 - Scientific staff in Universities
 - National and local Government staff
 - Management and technical staff in Companies
 - 1.7 FTE per additional MW of GE installed
- Request from BAPPENAS to Netherlands for support in Capacity Building
- GEOCAP as a 6 m euro contribution to support geothermal capacity building

Funded by



Ministry of Foreign Affairs of the Netherlands



JOINT DECLARATION BY NL and IND heads of state, November 2013



*To continue cooperation in the areas of science and technology, environment, forestry, fishery, **energy**, transportation, and telecommunications with a view to enhancing human-resource development, **capacity building**, research, technical assistance, productivity and sustainable management.*

GEOCAP as a contribution to support geothermal capacity building

GEOCAP: geothermal capacity building program

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

- Training Capacity – 10 work packages
- Research Capacity – 8 work packages
- Design of a geothermal database in Indonesia
- Inventory of low-medium enthalpy for direct use
- Management and coordination

Cooperating companies & universities



IF Technology



DNV GL



Well Engineering Partners



Technical University
Bandung



Delft University of
Technology – Department
of Geo-Technology



Gadjah Mada University



University of Indonesia



University of Twente –
Faculty ITC



Utrecht University –
Faculty of Geosciences –
Department of Earth
Sciences



Netherlands Organisation
for Applied Scientific
Research

IND coordinator:
INAGA

NL coordinator:
ITC

Advisory board:
BAPPENAS (chair)
INAGA (secretary)
MEMR
DIKTI
Min. Foreign Affairs NL

Funded by



Ministry of Foreign Affairs of the
Netherlands



GEOCAP: geothermal capacity building program

Consortium:

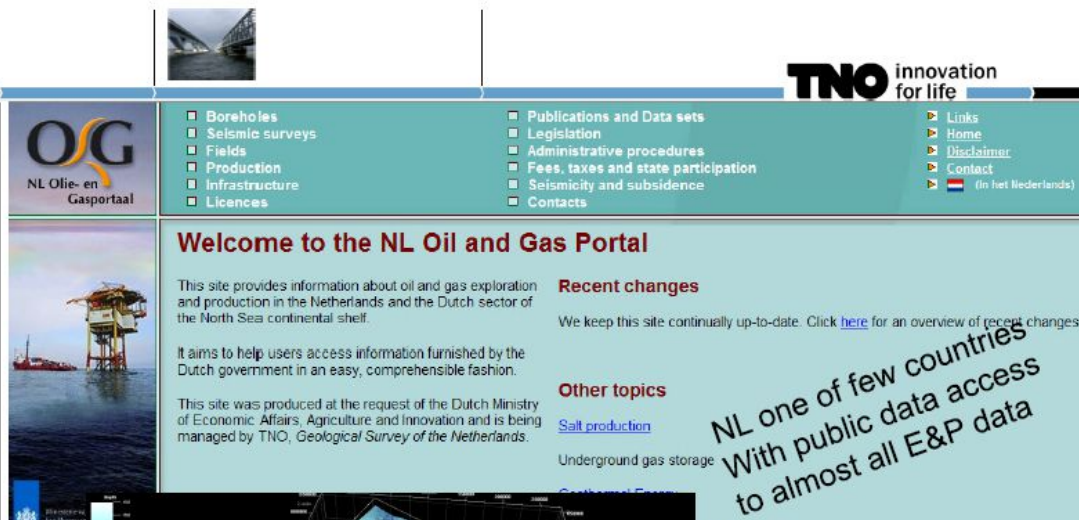
- Universities with a focus and lead in GE
- ITB, UGM, UI, UT, UU, TUD
- Regional Universities in Indonesia
- Knowledge institutions: TNO (hosts the Geol. Surv. Netherlands)
- NL GE sector: IF, WEP, DNV GL
- Asosiasi Panas Bumi Indonesia (API) – INAGA (Coordinator)
- BAPPENAS chair of advisory board (with MEMR, DIKTI, Min. foreign affairs of Netherlands)
- Pertamina (Geothermal Energy) – committed (star, ..)
- Open to other institutions, companies, universities
- In association with MEMR Pusdatim, Pusdiklat, WWF Indonesia

GEOCAP: geothermal capacity building program

- First fact finding mission and NL-IND engagement (end 2009)
- Official request by BAPPENAS made to the Netherlands Government (Oct.2011)
- Project Idea Document prepared by Consortium (Nov.2011)
- Partners committed
- Decision by Ministry of Foreign Affairs (NL) to start inception (March 2013)
- Inception report (25 September 2013)
- GEOCAP program document (25 September 2013)
- Expected running time: 3,5 years – end 2017

Exploration success

Resource mapping
Information systems



TNO innovation for life

OG NL Olie- en Gasportaal

- Boreholes
- Seismic surveys
- Fields
- Production
- Infrastructure
- Licences

- Publications and Data sets
- Legislation
- Administrative procedures
- Fees, taxes and state participation
- Seismicity and subsidence
- Contacts

- Links
- Home
- Disclaimer
- Contact
- (In het Nederlands)

Welcome to the NL Oil and Gas Portal

This site provides information about oil and gas exploration and production in the Netherlands 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, comprehensible fashion.

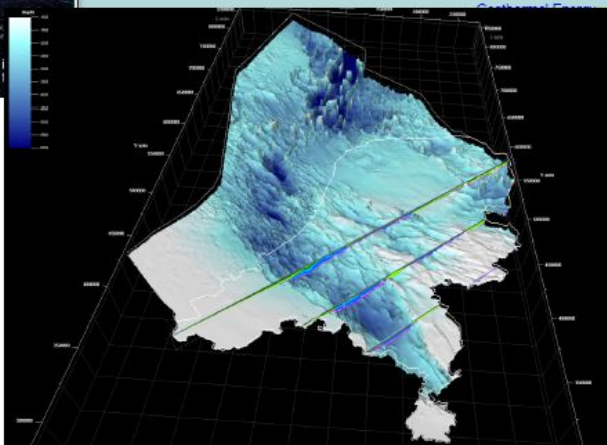
This site was produced at the request of the Dutch Ministry of Economic Affairs, Agriculture and Innovation and is being managed by TNO, Geological Survey of the Netherlands.

Recent changes

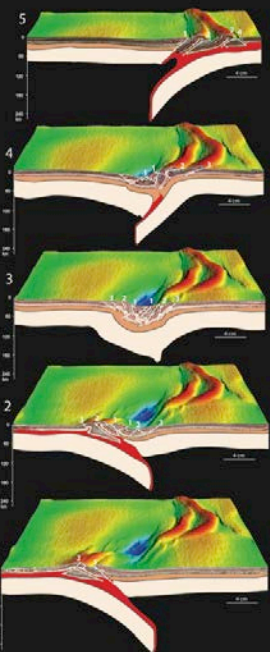
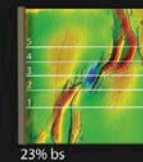
We keep this site continually up-to-date. Click [here](#) for an overview of recent changes.

Other topics

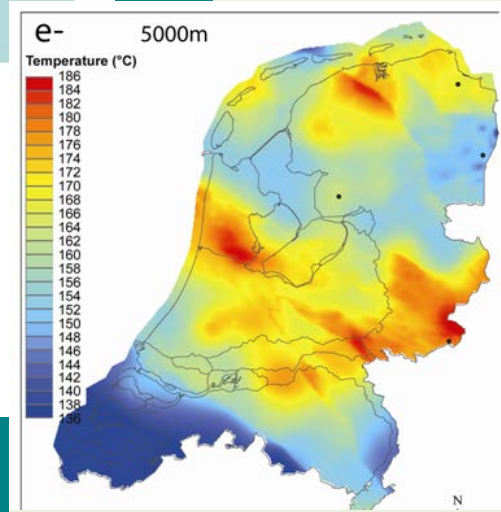
- [Salt production](#)
- [Underground gas storage](#)



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



mechanical models



temperature models

Source: TNO, UU

March 27, 2015













Exploration success

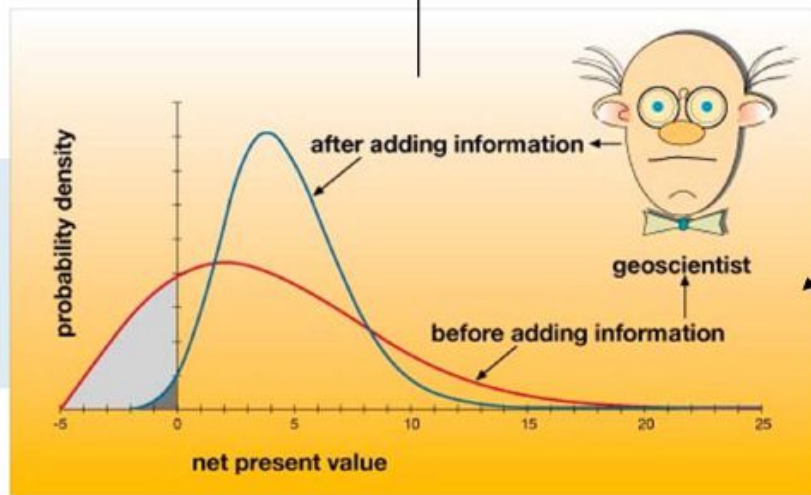
WP 2.01: Techno-economic Risk Assessment

TNO innovation
for life

Understanding
subsurface
uncertainties in risk
and reward
(tornados)

Parameter	Uncertainty	Impact on NPV	Example Action
Flowrate			Deep exploration
Temperature			Surface&deep exploration
Depth			Surface&deep exploration
Public acceptance			Involve public
Market Price			Hedge risk

decisions and
actions to
mitigate risks
and increase
reward

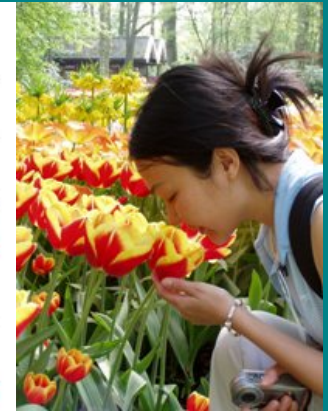
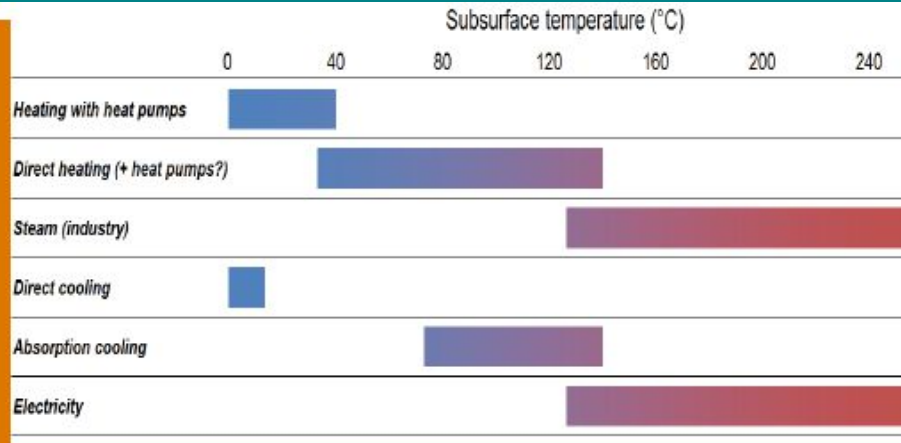


Adapt Exploration
workflow

Source:TNO

Direct use

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



GOAL: Develop potential of medium and low enthalpy resources in Indonesia by

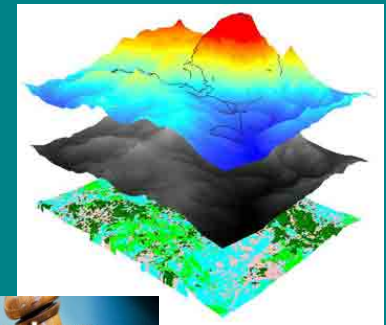
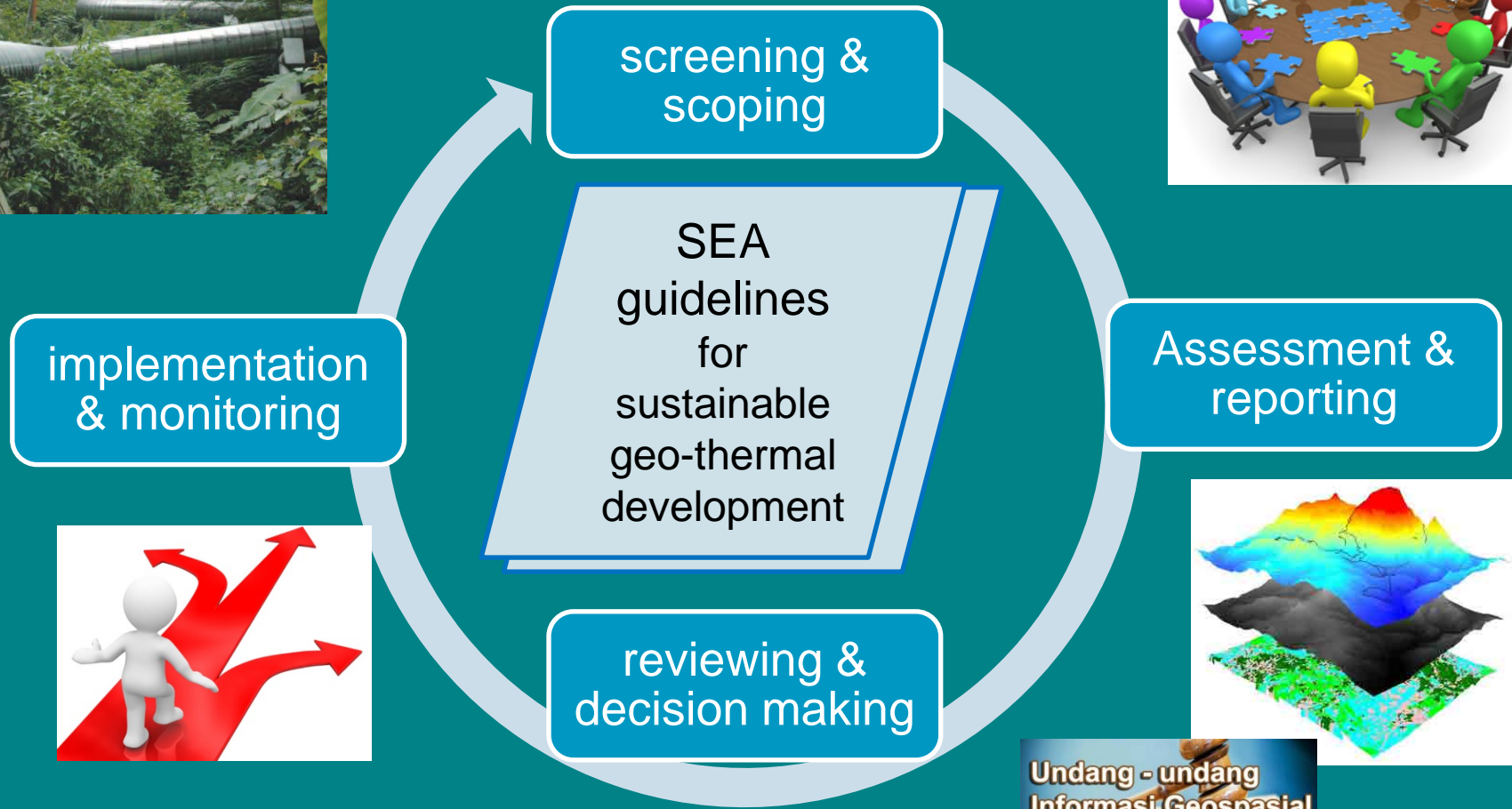
- ✓ Mapping of subsurface and market potential
- ✓ Demonstrate potential in feasibility case studies
- ✓ Make plan of approach for market development by IND stakeholders in cooperation with NL partners



Source: IF Technology



Impact of changing policy



Source: ITC

March 27, 2015

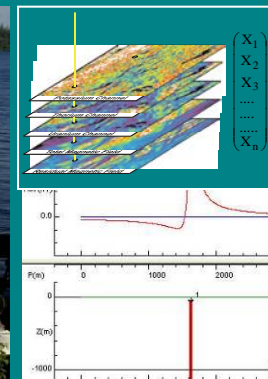


New geothermal law

Previous geothermal law No. 27/2003	New geothermal law No.21/2014
<p>National government: gives permits and monitor geothermal mining in inter-provincial regions</p> <p>Provincial government: gives permits and monitor geothermal mining in inter-municipalities/inter-cities regions</p> <p>Municipalities/Cities government: gives permits and monitor geothermal mining in municipalities/cities</p>	<p>Geothermal activities are under the management of national government, provincial government, and municipalities/cities government based on the authority and the uses.</p> <p>National government manages: Direct use of geothermal energy that are located in:</p> <ol style="list-style-type: none"> 1. Inter-provincial regions including production forest area and protected forest area 2. Conservation forest area 3. Water conservation area and 4. Marine area 12 mil calculated from the base line to the open water <p>Indirect use that are located in the whole regions in Indonesia including production forest area and protected forest area, conservation forest area and marine area.</p>

GEOCAP overview

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



PhD research – example topics

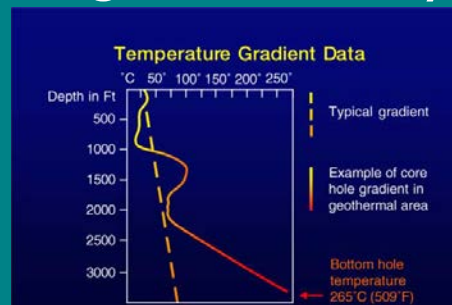
Integrating surface and subsurface information for an improved geologic understanding (wp2.04)

A regional tectonics based approach for geothermal resources assessment: integrating numerical and analogue modelling (wp2.07)

A tectonics based approach for resources assessment: classification of geothermal plays beyond magmatic (WVP 2.07)

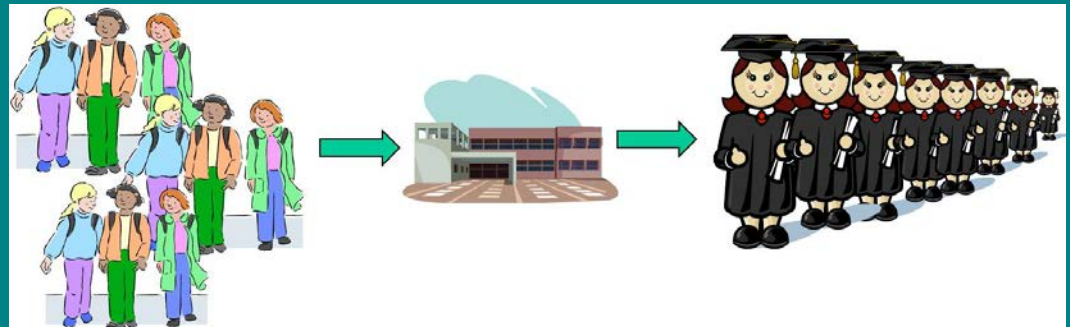
Remote sensing of geothermal systems (Wp 2.08)

Disaster risk reduction and geothermal systems (Wp2.08)



PhD research

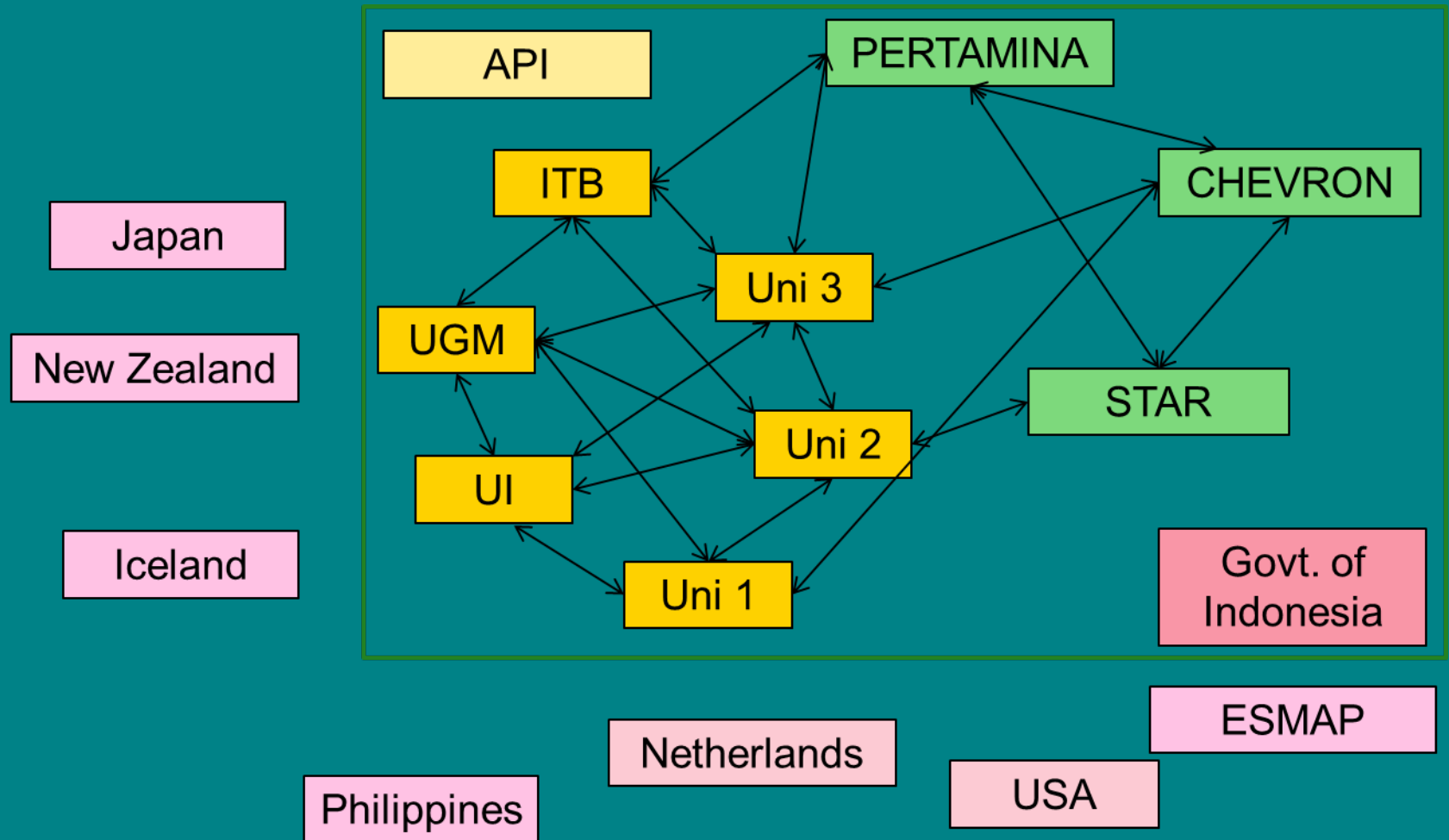
- Partial financial support available (in addition to fellowship from LPDP, DIKTI...Industry)
- Single degree or Double degree (one NL and one IND university partner)
- Sandwich constructions
- Possibility to engage with IND and NL industry and knowledge institutions
- Real world problems and data sets encouraged



CAPACITY BUILDING FOR GEOINFORMATICS	PURPOSE	FOCUS
	Human resources development	Supply of technical and professional personnel
	Organisational strengthening	Strengthen the management capacity of organisations
	Institutional strengthening	Strengthen the capacity for inter-agency coordination

“International Higher Education is not Capacity Development but it is the most important instrument for Capacity Development; focus is on both Individuals and organizations” M. Molenaar, Former Rector ITC

Long term strategic network



Trilateral collaboration



TECHNICAL REPORT 002/12

GEOHERMAL HANDBOOK: PLANNING AND FINANCING POWER GENERATION



Source: World Bank - ESMAP

March 27, 2015



More info



- ITB workshop IIGW, 19-20 March
- WGC, Melbourne, 19-24 April
- IIGCE, Jakarta, 19-21 Aug.



Visit us: www.geocap.nl
Email us: geocap-itc@utwente.nl

Bandung, 19 March 2015

Geocap Overview, Research and Education Opportunities

Presented at the IIGW 2015, ITB, Bandung

Freek van der Meer, Abadi Poernomo, Sanusi Satar, Nenny Saptadji, Suryantini, Pri Utami, Khasani, Yunus Daud, Chris Hecker, David Bruhn, Fred Beekman, Guus Willemsen, Henny Cornelissen, Jan Diederik van Wees, Manfred van Bergen, Kees van den Ende

