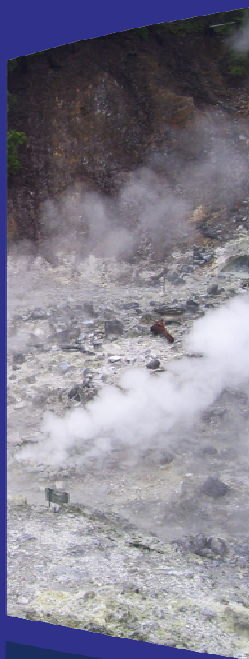


1ST ITB
GEOTHERMAL
WORKSHOP

2012

Proceeding Book

"Toward National Geothermal Capacity Building for Supporting
Geothermal in Indonesia"



Editors:
Suryantini
Nurita Putri Hardiani
Hendro Wibowo

1ST ITB GEOTHERMAL WORKSHOP

MARCH 6 - 8, 2012

East Hall, West Hall and Campus Center ITB Bandung, West Java, Indonesia



PERTAMINA

GEOHERMAL ENERGY



1ST

ITB
GEOTHERMAL
WORKSHOP

2012

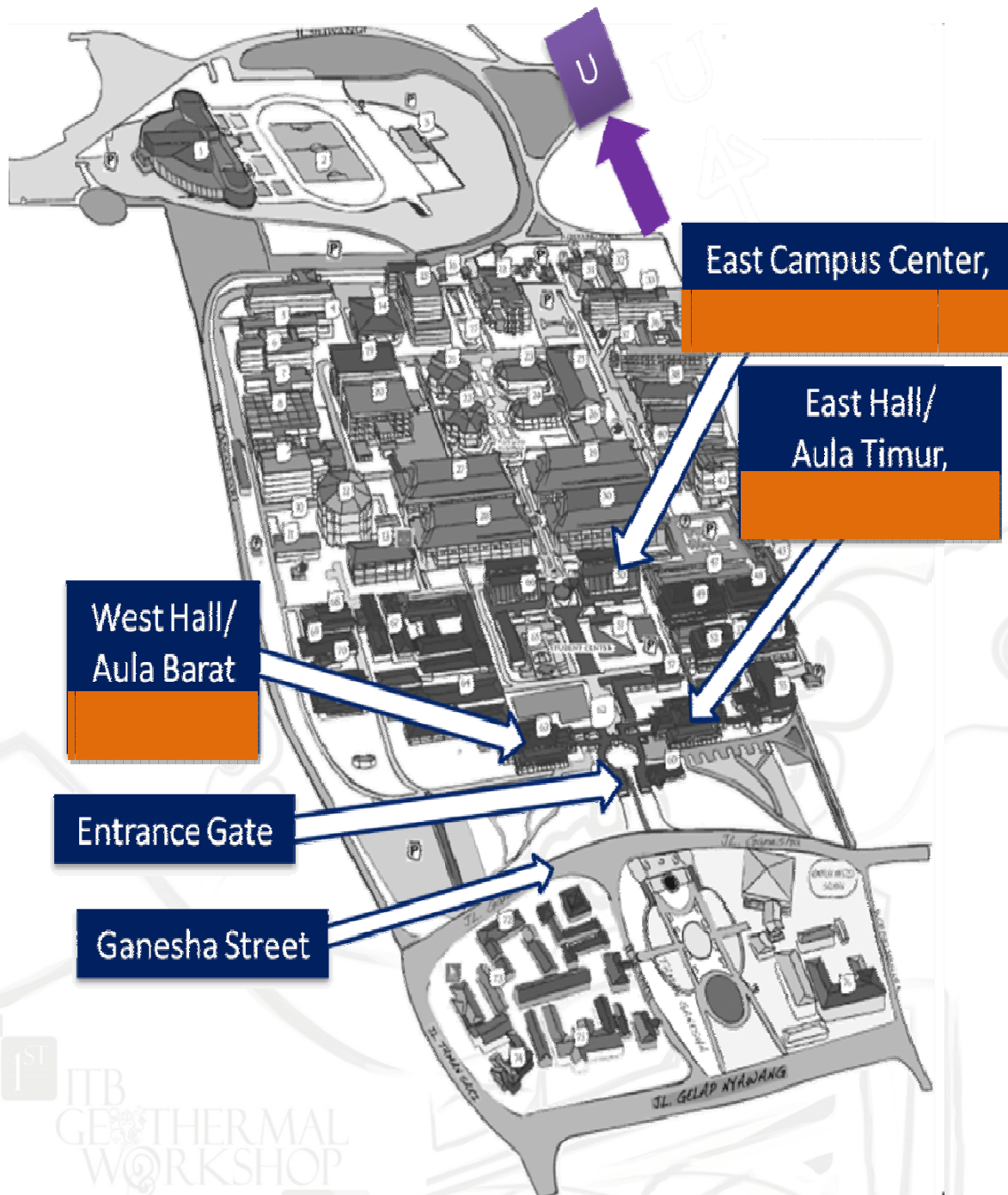
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WORKSHOP VENUE MAP

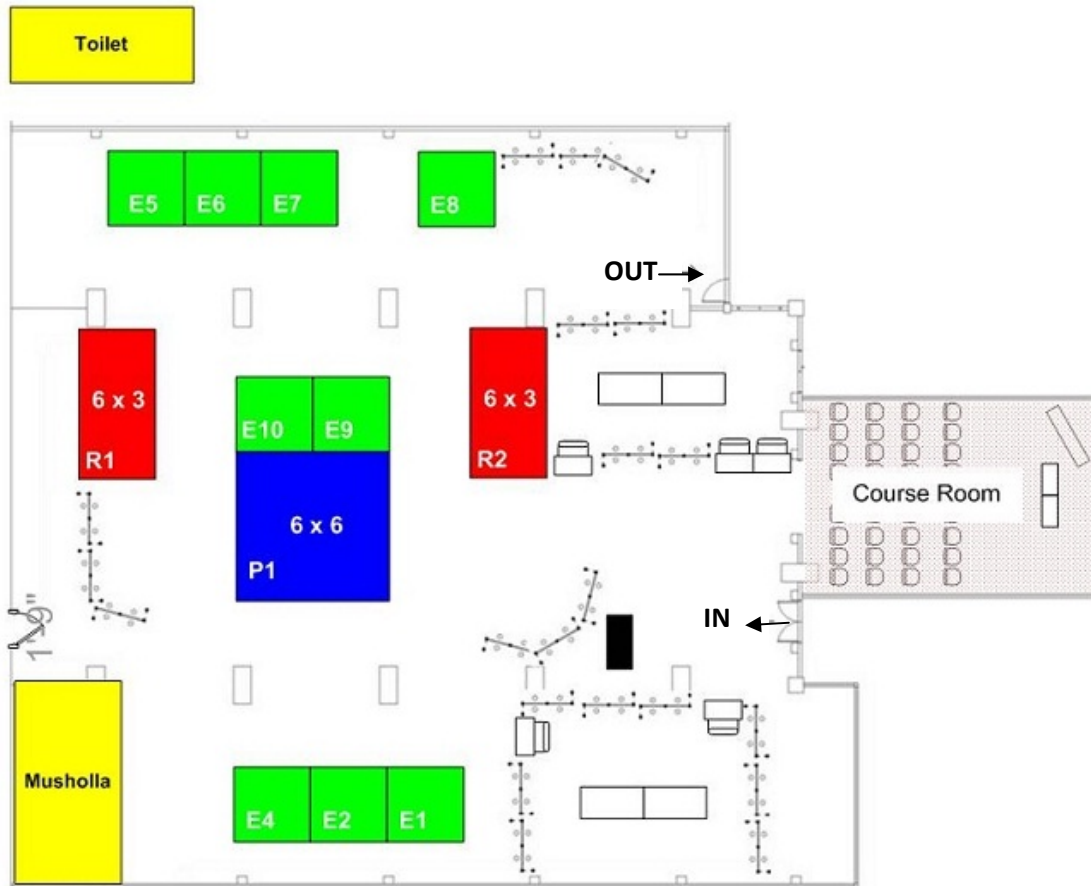
ITB CAMPUSS MAP



1ST ITB
GEOTHERMAL
WORKSHOP
6th - 8th MARCH 2012
West Hall and Campus Center ITB Bandung, West Java, Indonesia

WORKSHOP VENUE MAP

EXHIBITION LAYOUT



Explanation : Layout is still under confirmation (Date : 27/02/2012)

Remark * equal company is still under confirmation (Date : 27/02/2012)

- : Premium
- : Regular
- : Economy
- : Musholla dan Toilet
- : Mass Media

EXHIBITION LAYOUT MARCH 2012 AULA BARAT - ITB

WORKSHOP
6th - 8th MARCH 2012
West Hall and Campus Center ITB Bandung, West Java, Indonesia

- P1 : Pertamina Geothermal Energy (PGE)*
- R1 : Chevron Geothermal Indonesia
- R2 : Star Energy Geothermal (Wayang Windu)*
- E1 : Lab. Fisika Bumi ITB*
- E2 : Geofisika Geothermal ITB
- E4 : Thermochem
- E5 : Pusat Sumber Daya Geologi
- E6 : Lab. Vulkanologi dan Geothermal ITB*
- E7 : Pusdiklat Geologi
- E8 : Magister Geothermal ITB
- E9 : Araftea
- E10 : Cold Stone Creamery

WORKSHOP MESSAGE

This is the first event of annual ITB Geothermal Engineering Department workshop as an institution that concern to make geothermal expert. This workshop is held as a response from academic, government, and industrial geothermal community to accelerate geothermal development in Indonesia. The theme is chosen to show the progress activities of National Geothermal Capacity Building in Indonesia. We invite contribution of research, exploration, exploitation, business and economic papers related to geothermal development, not only in Indonesia but also in various part of the world to join this workshop. It is our contentment to invite you to participate in "1st ITB Geothermal Workshop 2012".

This workshop is held at the West Hall and Campus Centre ITB Bandung on 05 – 08 March 2012. With a fresh and exciting program planned, this workshop will feature impressive and high quality guest speakers and seminar topics of Geothermal which include themes as follow:

1. Education and Research
2. Business and Regulation
3. Exploration
4. Exploitation
5. Environmental Aspects

Ever since the Indonesian Government has announced its latest National Energy Policy which results in the concept of "energy mix", geothermal energy has been gaining momentum as more and more people become attracted to it recently. The Government's target for the nearest future, which is to have an operating geothermal generator capacity of 3,556 MW, has induced the Government to revise various regulations concerning geothermal energy, improve the investment climate in the field, and drive various financial institutions to aid the development of technologies for geothermal energy. Yet despite all those efforts, the scarcity of scientists and engineers working in the geothermal industry and the lack of research and limited knowledge on the energy in universities remain a grave challenge.



PROGRAMME DESCRIPTION

PRE-COURSE

“To introduce non-technical professional to the history of geothermal energy and the processes to utilize it directly and indirectly” is an objective of Pre-Course program with title of “Geothermal for Everyone”, held on March, 5 2012.

PANEL DISCUSSION

A specific issue in recent condition particularly about capacity building for future geothermal development planning in Indonesia becomes highly interesting to discuss with a number of knowledgeable people. Audiences are provided wide opportunities to deliver some questions or feedback at this session, on March 6, 2012, at Aula Timur-ITB.

TECHNICAL SESSION

Academicians, experts, and practitioners are strongly encouraged to share their knowledge, experience, thought, or idea in paper presentations, held on March 7, 2012 at East Campus Center-ITB. There are 36 papers to be presented in verbal presentation, separated into three main topics: exploration, engineering, and multidisciplinary. Prior to that, an opening technical session is initialized with panel discussion of a special topic called “Geothermal Collaboration”.

Parallel course is also provided for the participants who are interested in understanding the common hazards associated in thermal areas. The course of “Safety Thermal Training” is open for registration.

EXHIBITION

The exhibition is organized in two days on March 6–7, 2012. At least 10 companies and industries also take part in the exhibition. On beautiful exhibition, we will introduce you how ‘ITB Geothermal Fellowship’ excels in developing geothermal in Indonesia. The space of exhibition area is designed to give an optimum convenience for the visitors and to accommodate them in a large venue “Aula Barat-ITB”.

FIELD TRIP

One day post workshop field trip will be organized to visit Kamojang, Garut, West Java, the first steam field and power plant in Indonesia. This event will be held on March 8, 2012. More than 20 participants have committed to participate in this program.

INFORMATION FOR ORAL PRESENTERS

PANEL DISCUSSION

TIME ALLOWANCE

The time allowance for each presentation in Panel Discussion session is 10 minutes. To keep the schedule fair for all the speakers is the moderator's authorization.

TECHNICAL SESSION

POWER POINT FILE CHECK-IN

For you who have not yet sent us your ppt file via email in advance, you will be asked to give your power point file on the first day of workshop (March 6, 2012). Please visit the author check-in desk in Aula Timur on March 6, 2012.

TIME ALLOWANCE

The time allowance for each presentation in Technical Session is 15 minutes followed with a 5-minute of Question and Answer, which means that the total time you will have is 20 minutes. The speakers will be announced when the time lapse. Please follow the bell signal:

First bell : You will have 5 minutes to finish your presentation (10 minutes passed)

Second bell : Your time is up (15 minutes passed)

The chairpersons will be instructed to ensure smooth session therefore please strictly keep speakers to the time allocated.

Note for the speakers:

Please be present in the room where you will give presentation 15 minutes before your session starts.

PAPER CODE

Each paper has a paper code. For example:

101 :1 → Room 1 (The paper will be presented in room 1: Exploration Room)

01 → Paper Number

PROGRAMME AT A GLANCE

DAY 1 – TUESDAY, MARCH 6, 2012

07.30 - 08.30	Registration & Morning Coffee
	Opening Session
08.30 - 08.40	Suryantini, Chairman of the 1st ITB Geothermal Workshop: Welcoming Remark and Report from the Committee
08.40 - 08.50	Prof. Akhmaloka, PhD, Rector of Institut Teknologi Bandung (ITB): Opening Remarks
08.50 - 09.00	Art Performance
09.00 - 09.15	Head of Geothermal Study Program :Nenny Saptadji ITB Update : Geothermal Capacity Building Program
09.15 - 09.30	Invited Speaker : Kardaya Warnika (Director General of New and Renewable Energy and Energy Conservation)
09.30 - 09.45	Invited Speaker: Herman Darnel Ibrahim (Member of Indonesian National Energy Council and Board of IGA)
09.45 - 10.00	Invited Speaker: Antonie de Wilde (Former Lead Energy Advisor of BAPPENAS)
10.00 - 10.15	The Signing of MoU between Star Energy and Institut Teknologi Bandung lead by the Dean of the Faculty of Mining and Petroleum Engineering of ITB
	The Signing of MoU between Pertamina Geothermal Energy and Institut Teknologi Bandung lead by the Dean of the Faculty of Mining and Petroleum Engineering of ITB
10.15 - 10.45	Opening Exhibition
10.45 - 12.15	Panel Discussion - 1: Capacity Building in Human Resources Moderator : Benyamin Sapiie Speaker :
	<ul style="list-style-type: none"> - Slamet Riyadi (President Director of PT Pertamina Geothermal Energy) : HRD for supporting geothermal development in PT Pertamina Geothermal Energy - Abadi Poernomo (President of API - Indonesian Geothermal Association) : Role of API in Geothermal Capacity Building - Doddy Astra (Manager of Geoscience of Chevron Geothermal Indonesia) : Geothermal Training and Mentoring Program in Chevron Geothermal of Indonesia
12.15 - 13.15	Lunch

PROGRAMME AT A GLANCE

13.15 - 15.15	<p>Panel Discussion - 2: Encouraging Geothermal Development in Indonesia</p> <p>Moderator : Hamdan Handoko</p> <p>Speaker :</p> <ul style="list-style-type: none"> - Madjedi Hasan (PENConsulting) : The Need For Energy Legal Policy to Accelerate Indonesia's Geothermal Resources Development - Udibowo Ciptomulyono (PT PLN Geothermal) : The Cancellation of Unicitrals' Arbitration Awards Through Debt Settlement Scheme; Dieng and Patuha Cases Geothermal Plants - Agus Danar (Smart Solution Center) : Is the Geothermal Electricity Price More Expensive than Coal Fired Electricity Price Based on Long Run Comparison? - Junaedy Ganie (PENConsulting) : Risks Mitigation Through Insurance Scheme in The Geothermal Energy Development Project
15.15 - 15.45	Coffee Break at Exhibition Hall
15.45 - 16.45	<p>Panel Discussion - 3: Capacity Building in Research and Technology Development</p> <p>Moderator : Hendra Grandis</p> <p>Speaker :</p> <ul style="list-style-type: none"> - Suryadarma (Member of National Research Agency) : The Leading Research of The National Research Agenda to Support The Acceleration of Geothermal Development in Indonesia - Ninik Rina Herdianita (ITB) : Capacity Building in Geothermal Exploration - Ali Ashat and Zuher Syihab(ITB) : Capacity Building in Software Development
16.45 - 17.00	End of Panel Discussions

PROGRAMME AT A GLANCE

DAY 2 – WEDNESDAY, MARCH 7, 2012

08.15-08.30	Day-2: Opening of Technical Session by Zuher Syihab
08.30-10.00	Panel Discussion: Geothermal Collaboration (Moderator: NennySaptadji) Speaker : <ul style="list-style-type: none"> - Kemal Erbas: Collaboration in Geothermal Capacity Building with GFZ-Potsdam - Antonie de Wilde: Development of Geothermal Collaboration with NL Consorsium - SanusiSatar/Alex Smiley: Geothermal Collaboration Among ITB, USC and Star Energy under USAID Program - Tom Loran: Geothermal Collaboration with ITC - Ryuichi Itoi: Kyushu University Experiences in Geothermal Collaboration
10.00-11.00	Exhibition, Photo Contest, Coffee Break (Exhibition Hall)

SAFETY THERMAL TRAINING (March, 7, 2012) (with the instructor from Chevron Geothermal Indonesia)

Time	Topic
11.00 – 11.45	Introduction to Thermal Manifestation Areas and Potential Hazards Associated
11.45 – 12.30	Thermal Manifestation Hazard Identification (HAZID) and Mitigation
12.30 – 13.30	LUNCH
13.30 – 14.15	Entering Thermal Areas

AUTHOR LIST

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102	Clay Mineralogy of Cuttings from Wells LHD-27 dan LHD-30, Tompaso Geothermal Field, Sulawesi, Indonesia	Imam M Prasetyo, Sigit Suryanto, Hary Koestono, Sardiyanto (PERTAMINA GEOTHERMAL ENERGY)	49
103	Identification Tuffaceous Siltstone for Mitigation on Drilling Program, Case Study Wayang Windu Geothermal Field	Yuris Ramadhan, Ali Auza Rusetadi, Lukman Sutrisno, Ian Bogie (STAR ENERGY)	59
104	Petrophysic and Petrographic of Geothermal Reservoir Rock Properties	Benny F. Dictus (P3TKEBT ESDM)	Not available
105	Fault And Fracture Assessment at Wayang Windu Geothermal Field, Indonesia	Shanti R. A. Sugiono, Ali Auza Rusetadi (STAR ENERGY)	69
106	Application of Interferometry Radar Technique to Determine Recharge Area of Wayang Windu Geothermal Field, Pangalengan, West Java	Fajar Hendrasto, Agustan, Lambok M. Hutasoit, Benyamin Sapiie (ITB)	77
107	The Application of Remote Sensing in Geothermal Field of Lahendong Using Public Domain Data	Julian Ambassador Shiddiq, Suryantini, Lambok M. Hutasoit, Asnawir Nasution, Prihadi Sumintadiredja (ITB)	85
108	Spatial Priority Assessment of Geothermal Potentials using Multi-Sensor Remote Sensing Data and Applications	Asep Saepuloh, Minoru Urai, Suryantini, Prihadi Sumintadireja (AIST)	95
109	Integrated Imaging of The Hengill Geothermal Volcanic Complex, Iceland	Philippe Jousset, Christian Haberland, Klaus Bauer and Knutur Arnason (GFZ)	105
110	Fracture Modeling Using Azimuthal Resistivity Sounding Method in Geothermal Manifestations of Gunung Lamongan, East Java	Tri Martha Kusuma Putra, Widya Utama (ITS)	127
111	Application of The Gravity Method For Exploration And Monitoring Geothermal Field	Agung Wahyu Saputro, Johnnedy Situmorang (ITB)	135
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203	Reliability Analysis and Remaining Life of Steam Pipeline Transmission in One of the PLTP West Java	Cukup Mulyana, Ahmad Taufik, Ardian Fadhli (UNPAD)	155
204	Operational Procedure of Drilling with Gaseated Mud in Geothermal Well	Lamdamatra Arliyanto, Bonar Tua Halomoan Marbun, Samuel Zulkhifly (ITB)	163
205	Contribution of the National EPC Company in the Ulubelu 1&2 Geothermal Field Development Project	Deni Syarif (REKAYASA INDUSTRI)	173
206	Potential Utilization of Weak Wells in Salak Geothermal Field, Indonesia	Riza Pasikki, Peter, Colin Peters, Veronika Cita (CHEVRON GEOTHERMAL INDONESIA)	185
207	Implementing Geothermal Power Plants & Individual Performance Monitoring To Improve Plant Maintenance Scheme	Koesnorahardjo, Ruly Husnie Ridwan (GEO DIPA ENERGI)	Not available
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209	Turbine Performance Analysis of PLTP as First Step Process of Energy Audit Policy	Cukup Mulyana, Nurma Mahendra Sani (UNPAD)	197
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211	Developing Geothermal Power Plants For Geothermal Fields In Patuha	Koesnorahardjo, Ruly Husnie Ridwan (GEO DIPA ENERGI)	209
212	Selection of Best Drilling and Completion Design for Geothermal Drilling - Case Studies Indonesia	Bonar Tua Halomoan Marbun, Samuel Zulkhifly, Sandro Priatmojo Mulyono (ITB)	Not available
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302	Evolution of Hydrothermal System of Kanan Dede, Luwu (South Sulawesi) Based on Hydrothermal Alteration Study	Dikdik Risdianto, Ninik Rina Herdianita (ITB)	225
303	Geothermal Prospect in the Region Lampung	Fitri Purwanti (UNDIP)	237
304	Green Field Geothermal Systems in Java, Indonesia	Andika Putera Utama, Ariya Dwinanto, Mulkanul Hikmi, Robi Irsamukhti, Johnnedy Situmorang (ITB)	243
305	Geothermal Energy Combined with CO ₂ Sequestration: An Additional Benefit	Hamidreza Salimi, Karl-Heinz Wolf (DELFT UNIVERSITY)	255
306	Fluids Chemistry of Mt. Slamet Volcanic Hydrothermal Systems: How Guci and Baturaden Prospects are Different	Wildan Mussofan, Niniek Rina Herdianita, Brenda Ariesty Kusumasari (ITB)	269
307	Environmental Aspects of Geothermal Energy Resources Utilization	Bella Dinna Safitri (UNIBRAW)	275
308	A Web-Based Software for Supporting Analytical Hierarchy Process (AHP) Method in Geothermal Prospect Selection	Suryantini, Hendro Wibowo, Awan Gunawan (ITB)	281
309	Development of MEMS-Based Borehole Seismometer Prototype for Micro-earthquake Monitoring in Geothermal Field	Ihsan Imaduddin, Yosep Kusnadi, Risky M. Antosia, Rahcmat Sule, and Tedy Setiawan (ITB)	291
310	Geostatistics Approach for Estimating Mercury (Hg) Distribution In The Mangolo Area , Kolaka Regency, Southeast Sulawesi	Faizal Al Marawi, Syaifullah Mangantjo, Suryantini (ITB)	297
311	Seismic Tomography Imaging In the Geothermal Area by Applying Double Difference Tomography and Waveform Cross Correlation Data	Andri Dian Nugraha, Asep Nur Rachman, M. Rahmat Sule, Yudi Indrinanto, Wahyudin Diningrat (ITB and STAR ENERGY)	305
312	The Occurrence of Hyrdothermal Alteration at Wells LW-1 and LW-2 to Understand the Near-surface Water-rock Interaction at Lawu Geothermal System	Lano Aditya, Niniek Rina Herdianita (ITB)	309

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Reserved Paper	A Computer Program "PTS3" to Characterize Permeable Zones and Fluid Flow Mechanism in Geothermal Wells by Interpreting PTS Survey Data	Jantiur Situmorang (ITB)	Not available
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Poster Presentation	Analysis and Calculation and Presure Drop on Pipeline Transmission Steam Geothermal Power Plant, Well X, Indonesia	Dede Irama (UNPAD)	

WORKSHOP ORGANIZERS

Steering Committees	: Nenny Miryani Saptadji Niniek Rina Herdianita
Chairman	: Suryantini
Vice Chairman	: Muhammad Rachmat Sule
Secretary General	: Mayang Seruni and Natalia Oetama
Treasurer	: Tria Selvi Rustina
Sponsorship	: Dede Agung Suharjo and Annetta Jeane N.
PR and Promotion	: Riostantieka Mayandari S and Billy S. Prabowo Jeferson Polii and As'adul M. R. Fuad Satrio Ajie and Rizal H M S
Technical Program	: Sutopo Zuher Syihab Hendro Wibowo Mulkanul Hikmi Nurita Putri Hardiani Lina Agustina
Panel Discussion	: Ali Ashat and Jantiur Situmorang Rudi Siburian and Stefanus Kusuma Adityawan
Exhibition	: Prihadi Sumintadiredja and Ariya Dwinanto Ali Fahrurrozie and Harry Nurulfuad Yosep Kusnadi and Dimas Taha Maulana Mahesa Pradana Saputra
Photo Contest	: Winahyu Setyo Utami
Field Trip Kamojang	: Rezki Windarta and Robi Irsamukti Vega Amazona Muchlis and Ardianto

WORKSHOP ORGANIZERS

Field Camp

: Niniek Rina Herdianita

Johnnedy Situmorang

Andhika Putera Utama

Documentation

: Akbari and Agus Manggala

Johnnedy Situmorang and Heri

Registration Team

: Dewi Permatasari, Mia Uswatun Hasanah and

Yosi Amelia

General Affair

: Supremlehaq Taqwim and Ridha

Agung Wahyu Saputro, Luthfi Abdul Qohar



Title		Geothermal Energy for Everyone
Objectives		To introduce non-technical professional to the history of geothermal energy and the processes to utilize it directly and indirectly
Participants		This course is designed for local government officials who are responsible on geothermal field development in their area, university staff members, bank staff members, and other non-technical personnel who will be involved with geothermal development project
Language		Indonesian Language (Bahasa)
Syllabus		Type of geothermal system, surface manifestation, geothermal business, exploration techniques (geological, geochemical, geophysical techniques), exploratory drillings, well testing, production and utilization, cost and environmental aspects
Results/Outcomes		The participants will gain a basic understanding of geothermal energy include the processes that create geothermal resources, how to assess resources and how to utilize it

Time	Topic	Instructor
08.00 – 10.00	Geothermal System	Suryantini
10.00 – 10.15	BREAK	
10.15 – 12.00	Geothermal Exploration	Ninik Rina Herdianita
12.00 – 13.00	Lunch	
13.00 – 15.00	Geothermal Production and Utilization	Nenny Saptadji
15.00 – 15.15	BREAK	
15.15 – 16.00	Environment Aspects	Ali Ashat
16.00 – 17.00	Geothermal Economics	

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

ITB UPDATE: GEOTHERMAL CAPACITY BUILDING PROGRAM

Nenny Miryani Saptadji

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ABSTRACT

Over the past years Indonesia has been known to have the largest geothermal plan of development in the world. It was planned that by the year of 2014 the capacity of geothermal power plants in Indonesia will be increased about threetimes today's capacity, and by 2025 will be increased almost eight times of the current capacity. To meet the national target, PT Pertamina Geothermal Energy (PGE), which manages fifteen geothermal concession areas (*WKP/Wilayah Kerja Pertambangan*), is expected to give the largest contribution. Additional capacity is expected to be generated from eight other geothermal concession areas which have been proved by exploration drilling. As within the period of 2007-2010 the government had awarded '*IUP (Izin Usaha Pertambangan)*', or business licenses to nineteen geothermal companies, then additional capacity is also expected to be generated from those geothermal concession areas. To meet the national target, various efforts have been made by central and local governments, universities, state-owned and private enterprises in developing and utilizing geothermal-based power. This paper discusses update of geothermal capacity building program at ITB.

For supporting geothermal development in Indonesia, geothermal capacity building have been carried out at ITB in the area of human resources development, researches and development of database and software. Geothermal human resources development has been conducted through academic program and trainings/short courses. ITB founded Master Degree Program in Geothermal Technology at the end of 2007. The program put strong emphasis on technical and practical aspects of geothermal energy exploration, exploitation and utilization. At present two options are offered to the students, namely (1) exploration program and (2) engineering program. The program will be extended by adding another option, namely business and management. Since our program started four years ago, there have been 24 students graduated. In 2011, there were 36 students enrolled in our program. The number of our current student body is 62. For accelerating human resources development in geothermal technology, starting 2011 the Ministry of Education (Biro Kerjasama Luar Negeri KEMENDIKNAS) provides Excellent Scholarship (*Beasiswa Unggulan*) for twenty students enrolled in Magister Program of Geothermal Technology ITB per year.

To support the academic program, geothermal seminar has also been conducted regularly to enable students to take up knowledge from geothermal experts, either from geothermal companies, geothermal service companies, EPC Companies, government, other universities, research institution. The seminars help ITB to improve networking, partnership, acquiring knowledges on current geothermal technology. To enable students to take up knowledge from geothermal experts as well as to present their works, students were also participated in the World Geothermal Congress 2010 (WGC2010) and Annual Meeting and Conference of Indonesia Geothermal Association 2011 in Lampung.

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

Besides the academic activities, ITB provides training/short courses of basic knowledge, basic skills or deepening skills in the area of geology, geochemistry, geophysics, reservoir engineering, production engineering, power plant technology, feasibility analysis and project analysis. To meet request from industries, in 2011 we have conducted fourteen trainings.

As part of collaboration between ITB and International Centre for Geothermal Research (ICGR) of the German Centre of Geosciences (GFZ), in July 2011 a Geothermal Field Camp (GFC) program was conducted near the Tangkuban Perahu geothermal field. Topic of this 1st Geothermal field camp was "Field Based Geothermal Exploration in Green Field Area". On the 1st day, the course was started with a lecture and continued from the 2nd day to 5th day with practical work, including geological mapping (in particular structural geology) and geochemical survey. The collected field data was processed and analyzed daily every evening, after field work. On the last day, each group of participants gave a presentation. GFC program was attended by 10 participants from a number of universities in Indonesia, among other faculty members from UNILA (University of Lampung), UNIMA (University of Manado), UPI (Universitas Pendidikan Indonesia), ITS (Institut Teknologi Surabaya), UNPAD (University of Padjadjaran) and PSDG (Pusat Survey dan Data Geologi).

Following the success of 1st Geothermal Field Camp, on November 2011 the Magister Program on Geothermal Technology held ITB Geothermal Field Camp in Tangkuban Perahu area. This time all participants were the first year geothermal master students. This five days activities representing work commonly carried out during field reconnaissance geothermal exploration. Field work was conducted in the first three days, consisting of geology and manifestation mapping. The collected field data was processed and analyzed daily every evening, after field work. Activities on the 4th and 5th days were class activities with objectives to construct conceptual model of Tangkuban Perahu Geothermal system, to determine speculative resource based on the natural heat source and to give recommendation on the future exploration strategy. On the last day, each group of participants gave a presentation.

Under the collaboration framework between ITB and University of Manado (UNIMA) at Manado (North Sulawesi), in 2011 ITB supported UNIMA in built-in a number of geothermal related courses in the curriculum of the study program of Physics. It is hoped that UNIMA will participate in the preparation a workforce/personnel to support geothermal development in the nearby geothermal working areas such as Lahendong, Tompaso and Kotamobagu.

A number of ITB's faculty also supported the Ministry of Energy through "Pusat Pendidikan dan Pelatihan Geologi, Badan Pendidikan dan Pelatihan Energi dan Sumber daya Mineral" in developing a training curriculum for technicians in support of geothermal exploration and a training curriculum for technicians in support of geothermal geochemistry survey.

In 2010 ITB and Netherlands Consortium which consists of several Netherlands companies and universities, discussed the possibility to establish a collaboration in geothermal capacity building program. As part of the program, two geothermal workshops titled "Katwe Geothermal Workshop" have been conducted at Arnhem, the Netherlands in 2010 and 2011, for supporting geothermal exploration and development in Uganda. During the workshops ITB's faculty presented and discussed works that have been done for geothermal prospecting and surveying in Indonesia, and suggest geothermal survey and exploration programs which can be applied for Katwe geothermal prospect. The workshop was led by IF Technology and attended by the member of NL consortium, among other representatives from ITC, DIAS, Utrecht University, 360plus Consult Germany, Frankfurt

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

University (Germany), Drilling company from Netherlands, and also representatives from Conzumel Uganda, and Geological Survey of Uganda. Currently future collaboration works is being discussed.

Within this coming two years, ITB in collaboration with Star Energy Geothermal (Wayang Windu) Limited and University of Southern California (USC), will participate in the project of "US-Indonesia Geothermal Education Capacity Building" which will be arranged and funded by United States Agency for International Development ("USAID"), with cost sharing supported by the Star Energy Geothermal (Wayang Windu) Limited. The Goal of this project is to build capacity for the geothermal educational program at ITB which will expand the number of graduates who focus on geothermal energy development and broaden the exposure of students and faculty to the global geothermal power business. It is expected that operational experience of Star Energy will help ITB to make educational activities more relevant to the real life challenges and requirements of geothermal operators. Program covers scholarships for ten students per year and other program such as geothermal trainings, joint geothermal seminars and sabbatical program from ITB to USC. Under this program, effort will also be made to strengthen geothermal stakeholders at the province where geothermal concession areas to be developed. To start the project, in the present workshop, ITB and Star Energy Geothermal (Wayang Windu) Limited are intended to sign MoU and MoA.

For many years ITB, through PT LAPI ITB, has conducted joint research with PT Pertamina Geothermal Energy, mostly in the area of geothermal resources assesment and reservoir modelling. In the present workshop, ITB and PT Pertamina Geothermal Energy are intended to sign MoU in geothermal capacity building, particularly in the area of geoscience.

Mid of this year International Office of ITB will launch "Geothermal Tropical Camp". The theme is "Expanding the Insight into an Integration of Geothermal Business Process through Practical Orientation at ITB Geothermal Tropical Camp". The program is a three weeks program which is designed to accommodate the need of an integral knowledge of geothermal business process starting from preliminary survey, exploration, development and utilization, and project economic evaluation. There will be three separated sub-programs. They are Exploration Program (1st Week), Exploitation (Development) Program (2nd Week) and Project Evaluation Program (3rd Week). The participants are expected to enlarge their vision about the whole process in running geothermal business. Of the participants, there will be three separated groups in which each group will consist of geoscientists and engineers. They will be given task to evaluate Tangkuban Perahu Geothermal Prospect both technically and economically. They will be directed to yield analysis which will be produced in the standardized evaluation document. This document will be presented to the examiners consist of expert and professional practitioner in geothermal industry. The participants will be challenged to give the best effort they can in the evaluation document competition. The best group will be awarded to experience two days visit to geothermal power plant in West Java, Indonesia.

A national capacity building program is obviously need to be designed and implemented continuously for supporting geothermal development in Indonesia. In the World Geothermal Congress 2010 (WGC2010), the President of the Republic of Indonesia, stated that "Indonesia will invest in a network of Geothermal Center of Excellence, to develop the know-how and expertise required to accelerate the exploitation of geothermal resource" as it will contribute significantly in mitigating the risk of lack of human resources to develop, manage and operate this new capacity. In respons to the president's statement, at the nd of 2010 ITB had submitted a proposal toward geothermal center of excellence through National Planning agency or BAPPENAS. Program covers (1) Education and Trainings, (2) Research, (3) Data Management, (4) Geothermal Disaster Mitigation, (4) DataSystem

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

Development and (5) Direct Use. The centre is expected to bring together experts from Indonesia and other countries. In addition, in 2011 ITB's faculty also involved in the preparation of document for National Geothermal Capacity Building Program (NGCBP).

Last but not least, the 1st ITB Geothermal Workshop 2012, convened by the Master Program on Geothermal Technology ITB is another effort in capacity building. We are pleased to extend our thanks and appreciation to all persons, companies and institutions that have contributed time, services and sponsorship to help make this workshop possible.



ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

THE INDONESIAN ENERGY TO 2050: FUNDAMENTAL ENERGY POLICY, THE ROLE AND THE CHALLENGES OF GEOTHERMAL DEVELOPMENT

Herman Darnel Ibrahim

[Dr., ITB, Indonesia, M.Sc., UMIST Manchester, UK, Ir., ITB]

Committee Member of Indonesian National Energy Council [DEN]

IGA Board Member and Chairman of IGA Western Pacific Regional Branch

ABSTRACT

Indonesian primary energy consumption in 2010 is 160 MTOE. With about 240 million populations the consumption per capita is only 0.65 TOE. Mean while the world primary energy consumption per capita is 1.6 TOE and the OECD countries average consumption per capita is 4.7 TOE. To grow its economy and to be one of the emerging economy country Indonesian primary energy consumption will be about 500 MTOE by 2030. And to be at the present position of OECD by year 2050, the primary energy consumption will be about 1000 MTOE. To secure the future energy supply and to combat the climate change, Indonesian energy policy is to maximize the renewable and low carbon energy use, to minimize the use of oil and to secure the whole supply by gas and coal as well as to provide the economy of production cost. The priority of renewable energy development is in geothermal, hydro power, biomass energy, solar energy and ocean energy.

The Indonesian renewable energy resources potential is approximately over 600 MTOE per year. They are geothermal over 90 MTOE per year, hydro power over 40 MTOE per year, biomass over 240 MTOE per year, solar energy over 170 MTOE per year and ocean energy over 100 MTOE per year. With the ongoing and more intensive research and development on renewable energy all over the world and with the scarcity and depletion of fossil energy sources, Indonesia share the belief of energy experts that the economy of renewable energy will continue to increase and will be better off [of the economy of fossil energy] by 2030. The approximate national renewable energy supply capacity by 2050 will be about 290 MTOE per year, and almost one third of them are expected from the geothermal energy sources.

Among all the renewable energy sources the specific superiority of geothermal energy is its base load capability. Besides that in term of investment and production cost geothermal is not so expensive compare to other renewable sources. These put geothermal development as the first priority for Indonesia. At present government and the state owned energy companies has just launched the 10000 MW acceleration power project. Among this 10000 MW project, 4000 MW is geothermal power projects which are located in 43 locations all over the country. This is part of the implementation of geothermal development roadmap which has projected the geothermal capacity of 15000 MW by 2025. The National Energy Council has projected the geothermal utilization of 25000 MW by 2050 out of about 29000 MWe geothermal potential, as has been identified in 276 locations.

This presentation covers the Indonesian energy projection to 2030 and 2050, the energy and renewable energy resource potential and its characteristic, the Indonesian fundamental energy strategy and policy, the specific policy for renewable and geothermal, and the role and the challenge of geothermal development toward 2050.

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

THE NEED FOR ENERGY LEGAL POLICY TO ACCELERATING INDONESIA'S GEOTHERMAL RESOURCES DEVELOPMENT

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ABSTRACT

One of the challenges facing by Indonesia's economic development is energy supply. At present, the energy mix is still dominated by the fossil based resources, which will be depleted and therefore it must be replaced by new energy and renewable energy resources. One of the renewable resources is geothermal, which has not been developed to maximum extent for various reasons, including the conflicting law and regulations.

The following paper discusses as to how the legal policy related to energy should be developed in the formulation of the law? The legal policy in the energy provides guidance in formulating the law and regulations relating the formulation of National Energy Policy, which consists of three main objectives, namely energy intensification, diversification and conversion.

The paper concluded that the legal policy which has a dimension as basic policy and instrument for the Government to achieve its objectives and goals of energy independent and security has not been applied in the formulation of laws and regulations pertaining to the development of energy resources. Such situation recommends the need for restructuring the management and utilization of energy resources, involving legal substance, structure and culture. It would require new paradigm that accommodates the present reality and clear vision for the future in integrating and synchronizing the laws and regulations. The goal is to avoid the conflicting interest in the execution of the laws that have inhibited the execution of the program.

The legal policy will be formulated on the basis of Article 33 of 1945 Constitution; specifically the paragraphs (2) and (3), which will be directed towards obtaining a common perception on the terms 'Controlled by the State'. Specifically, how should be the roles of the Central Government, Regional Government and the State Owned Enterprise in managing the energy resources. In this era of globalization and liberalization the energy supply would require well thought and integrated planning including its implementation. Also, as energy resources to be developed vary widely, it would then be necessary to determine the impact, development priority and management system for each resource.

For Indonesia's energy development, energy legal policy will be required for providing basic philosophy for the government to formulate the better public policy and also to lay down the foundation for modern welfare state, as mandated by the 1945 Constitution. What it has been accomplished today is the result of the past and what we will do today shall determine the future (quoted from Prof Djokosutono, 1950).

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

THE CANCELLATION OF UNCITRAL'S ARBITRATION AWARDS THROUGH DEBT SETTLEMENT SCHEME, DIENG AND PATUHA CASES GEOTHERMAL PLANTS

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ABSTRACT

The arbitration proceeding through UNCITRAL'S Rule among Himpurna California Energy Ltd(HCE) and Patuha Power Limited (PPL) as Claimants versus State Owned Electricity Corporation-PLN as Respondent have been awarded unanimously to Claimants; PLN is ordered immediately to pay of USD 572,281,794 during 60 days from the awarded date of May 4, 1999, however PLN could not follow to do so. The following second arbitration against to the Government of Republic Indonesia, for as its approval and guarantee letter of Energy Sales Contract (ESC) of geothermal developments. Nevertheless it did not work neither, Furthermore the Claimants claimed political insurance of USD 290 millions to Overseas Private Investment Cooperation OPIC), the insurance company under Government of United States of America.

The OPIC through Government of United States of America demanded insurance claim to the Government of Indonesia under Investment Guarantee Agreement 1967. Finally the Government of Indonesia settled this arbitration process through a Global Settlement Scheme which's to include assets of restructuring, payment to OPIC under Paris Club arrangement, payment to lenders (European Bank Consortium) of USD 144 millions through PT GeoDipa Energy establishment, a vehicle company as subsidiary company of PLN and PERTAMINA, to operate of 60 MW geothermal power plant and to develop further several units of geothermal plants.

The Government of Indonesia assigned PLN in relation with the restructuring measures including debt settlement as a part of Global Settlement with its objective to operate the existing plant of 60 MW (after its re-commissioning works) and further development of units of Dieng and Patuha Geothermal Fields. The revenue of its operation should cover its debts reliability to the European Bank Consortium.

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

IS THE GEOTHERMAL ELECTRICITY PRICE IS MORE EXPENSIVE THAN COAL FIRED ELECTRICITY PRICE BASED ON LONG RUN COMPARISON?

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ABSTRACT

Indonesia that has the biggest geothermal potential in the world, it's about 29,000 MW, began the geothermal exploration and development in Kamojang in 1972 to generate the 140 MW electricity and so far had been generated 1189 MW electricity (only 4% of the total potential).

The geothermal development had been making some progress after the Government had been applied the Joint Operation Contract (JOC) between Pertamina and geothermal investor since 1981 to 2003. In this era there are 8 geothermal companies signed the JOC and the contribution between Pertamina and JOC companies are about 1049 MW of geothermal electricity installed capacities.

When Indonesia had been under heavy monetary crisis in 1998, the geothermal electricity base price under Energy Sales Contract (ESC) of JOC decreased by Government from around US\$ 8 cents per kWh to below US\$ 5 cents per kWh. After this event, there is no more investment in the new geothermal working area (green field), because the new price is not attractive to the investor. After that, the geothermal investment climate couldn't be better because PLN as the buyer doesn't agree with the geothermal electricity price that offered by geothermal investor. That is what we call "price gap", it's mean there is a significant different between long run geothermal electricity price and "today" coal fired electricity cost of goods produced. It's not fairly comparison!

The coal price in the market will increase each time, so the coal fired electricity price will increase each time too, but the geothermal and other renewable electricity price can be determined fix payment per kWh for a long time (usually called as feed-in tariff payment) because they don't have the fuel market.

I will use the Internal Rate of Return (IRR) and levelized costs calculation method to compare the geothermal electricity price and the coal fired electricity price for the long run to make fairly comparison.

Finally, I express my thanks to the First International ITB Geothermal Work Shop Committee that give me the chance to participate in this work shop, and I hope my paper can be the useful input to the Government of Indonesia to encourage the geothermal investment climate.

Keywords : price gap, feed-in tariff payment, internal rate of return, levelized price, fairly comparison

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

RISKS MITIGATION THROUGH INSURANCE SCHEME IN THE GEOTHERMAL ENERGY DEVELOPMENT PROJECT

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ABSTRACT

Geothermal exploration, development and operations are subject to uncertainties which vary among different geothermal reservoirs. Insurers and reinsurers have been providing many of the traditional risk management products for the petroleum industry to the geothermal industry, such as property damage, business interruption, machinery breakdown and construction – all risks.

Another insurance scheme that has been developed in the other part of the world deals with the resource supply risk associated with the drilling of geothermal wells. For example, in order to promote the development of geothermal energy sources World Bank has introduced Geothermal Energy Development Fund (GeoFund) for the Europe and Central Asia (ECA) region. As part of the program the World Bank-GEF has created Partial Risk Guarantee Facilities (PRGF), which are intended to partially insure geothermal energy project promoters/investors against (1) the short-term, up-front geological risk of exploration drilling, and/or (2) the long-term geological risk of developing and producing a geothermal reservoir with a lower than estimated temperature, higher than estimated mineralization, or difficulty with injection of geothermal fluids back into the subsurface.

This paper discusses the possibility of setting up in Indonesia a similar insurance scheme in conjunction with third party to cover risks in initial exploratory drilling. This may involve private as well as SOE to provide an extra layer of coverage within the insurance scheme. The insurance coverage would cover multiple parties that have different tasks in the process. Subsequently, there would be a need to define the criteria or parameter to determine the indemnified loss, extent of the guarantee, scope of coverage, amount of liability limit of risk carrier, types of risk carriers and risk transfer model. Also, various incentives may be developed to make the program attractive for the insurer. If successful, the insurance scheme may stimulate other business activities in supporting Indonesia's geothermal development.

ABSTRACT FOR ORAL PRESENTATION

(PANEL DISCUSSION)

THE LEADING RESEARCH OF THE NATIONAL RESEARCH AGENDA TO SUPPORT THE ACCELERATION OF GEOTHERMAL DEVELOPMENT IN INDONESIA

Surya Darma*

*Chair of The National Research Council of Indonesia – Dewan Riset Nasional 2009-2011

*Former President of Indonesian Geothermal Association (API)

ABSTRACT

The National Research Agenda is issued by the National Research Council of Indonesia (DRN) as a formal document based on the Law No.18 Year 2002 regarding the National Science and Technology System and Law No. 17 Year 2007 regarding the Long Term National Development Planning 2005-2025.

In the last few years, geothermal research is put in a low priority by any institution or even government R&D body. But, since Indonesia facing the energy crisis, Government of Indonesia through Ministry of Energy and Mineral Resources who take responsibility for national energy supply, increase their activities to diversify the use of energy from fossil fuel to the use of renewable energy. It could be seen from the issuing the Law No.30 Year 2007 concerning on Energy and of course when the Law No.27 Year 2003 about Geothermal is established indicating the intention to accelerate utilize renewable energy mainly geothermal.

After 30 years geothermal development and utilization in Indonesia, its only installed since 1209 MW Power Plant respectively. It is caused by the unattractiveness of the use of geothermal rather than diesel, and other sources of energy due to subsidize policy on the primary energy use. Since the new rule is launched, no much additional power plant is operated, except the upgrading of the existing combined installed capacity from 807 MW installed in 1997 and a few additional capacity commissioned in 2000, and 2007 to 2011 which is increasing its capacity to 1209 MW.

By maintaining success campaign through the success of World Geothermal Congress held by INAGA in 2010 in Bali, so many international institution and agency have been attracted to support geothermal development in Indonesia to solve the energy crisis in Indonesia and also for the green world concern.

Now, so many multinational companies and countries from over the world, would invest and use Indonesian geothermal field for R&D as well as for new technology and scientific application. The acceleration of the development of geothermal to achieve 9500 MW installed capacities in the year 2025 is used for aggressive investment reason. In accordance with this program, DRN has launched its National Research Agenda for 2010-2014 and even for 2025 to support national research including geothermal. From this agenda, geothermal research is tend to be the leading research from energy sector to support the realisation of the acceleration use of geothermal in the near future. This research also support Indonesia as a *center of excellence* in geothermal and HRD for geothermal in the world.



MAGISTER PROGRAM IN GEOTHERMAL TECHNOLOGY

Empowering Geothermal Community

PROGRAM STUDI MAGISTER BERORIENTASI TERAPAN TEKNIK PANAS BUMI

Fakultas Teknik Pertambangan dan Perminyakan (FTTM)

MENGAPA MEMPELAJARI PANAS BUMI ?

Indonesia dianugrahi dengan $\pm 40\%$ (± 28 GW) potensi energi panas bumi dunia, yang tersebar di Sumatera, Jawa, Kep. Nusatenggara, Sulawesi dan Kep. Maluku, serta Papua. Energi ini akan dimanfaatkan untuk pembangkit listrik dalam mengatasi krisis energi di Indonesia dan untuk menyelamatkan lingkungan di bumi dengan menggunakan energi yang bersih dan ramah lingkungan.

Dari 265 prospek panas bumi yang telah diidentifikasi, baru 7 lapangan yang dikembangkan untuk pembangkit listrik, dengan total kapasitas terpasang 1189 MWe (atau baru sekitar $\pm 4.2\%$). Dengan demikian, masih sangat banyak yang belum dimanfaatkan. Adalah tanggung jawab kita semua untuk mengembangkan energi ini dimasa mendatang.

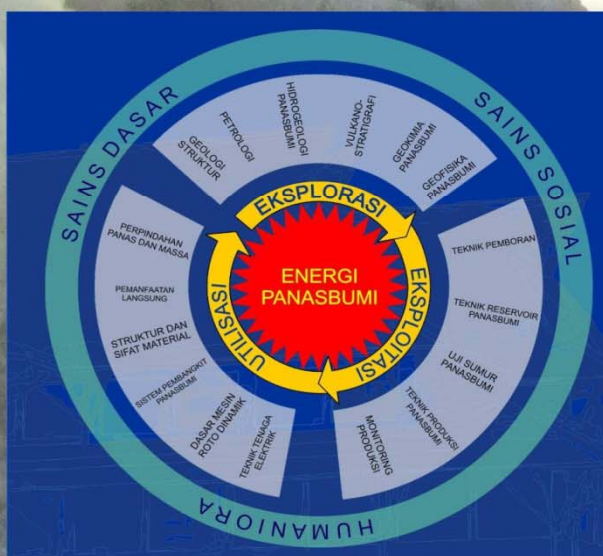
Institut Teknologi Bandung (ITB) dengan komitmennya telah menjawab tantangan ini dengan didirikannya Program Studi Magister Berorientasi Terapan Teknik Panas Bumi,

TARGET PENGEMBANGAN LISTRIK ENERGI PANAS BUMI

GOAL



BODY OF KNOWLEDGE



Dibutuhkan 50 hingga 70 tenaga ahli per tahun untuk setiap pengembangan 1000 Mwe

APA YANG AKAN ANDA PELAJARI DI PROGRAM STUDI TEKNIK PANAS BUMI?

TUJUAN PENDIDIKAN

Menyelenggarakan program pendidikan panas-bumi terpadu mulai dari eksplorasi, pengembangan lapangan uap (eksploitasi), hingga pemanfaatan (utilisasi) energi panas bumi, baik untuk sektor listrik, maupun untuk pemanfaatan langsung (non-listrik), untuk menghasilkan lulusan yang dapat memenuhi kebutuhan dan tuntutan industri panas bumi dan lembaga atau institusi pemerintah pusat maupun daerah.

Pengetahuan yang diberikan bersifat spesialisasi dan aplikatif. Jenjang Magister Teknik Panas Bumi dibagi dalam dua bidang,

STAF PENGAJAR

Dosen tetap dari 4 fakultas:

Fakultas Teknik Pertambangan dan Perminyakan (FTTM)

Fakultas Ilmu dan Teknologi Kebumihan (FITB)

Fakultas Teknik Mesin dan Dirgantara (FTMD)

Fakultas Teknik Sipil dan Lingkungan (FTSL)

Semuanya lulusan dari universitas luar negeri seperti Selandia Baru, Jerman, Jepang, Amerika dan Perancis

Dosen luar biasa dan dosen tamu baik dari perusahaan asing, institusi pemerintah, maupun institusi luar negeri.

Kuliah dari: Abadi Poemomo - Direktur Utama PT Pertamina Geothermal Energy



KURIKULUM

Kurikulum dapat ditempuh dengan waktu normal 4 semester maupun dengan jalur fast track berdurasi 3 semester

No	Semester-1		SKS	
	Bidang Teknik Eksplorasi	Bidang Rekayasa	Normal	Fast
1	PB5001 Sistim dan Teknologi Panas Bumi		3	3
2	PB5002 Vulkanologi dan Panas Bumi	PB5005 Perpindahan Panas dan Massa	2	2
3	PB5003 Eksplorasi Geologi Panas Bumi	PB5006 Teknik Reservoir Panas Bumi	3	3
4	PB5004 Analisis Lingkungan Panas Bumi		2	2
5	PB6009 Manajemen dan Ekonomi Panas Bumi			2
	Jumlah normal/fast track		10	12

No	Semester-2		SKS	
	Bidang Teknik Eksplorasi	Bidang Rekayasa	Normal	Fast
5	PB6021 Alterasi Hidrotermal	PB5010 Perencanaan Pemboran	3	3
6	PB5007 Geokimia Panas Bumi	PB5011 Teknik Produksi Panas Bumi	3	3
7	PB5008 Eksplorasi Geofisika Panas Bumi	PB5012 Utilisasi Panas Bumi	3	3
8	XXxxxx Pilihan	XXxxxx Pilihan		3
Jumlah normal/fast track			9	12

No	Semester-3		SKS	
	Bidang Teknik Eksplorasi	Bidang Rekayasa	Normal	Fast
8	PB6009 Manajemen dan Ekonomi Panas Bumi		2	
9	XXxxxx Pilihan	XXxxxx Pilihan	6	3
10	PB6013 Evaluasi Prospek Panas Bumi			3
11	PB6099 Proyek Akhir			6
Jumlah normal/fast track			8	12

No	Semester-4		SKS	
	Bidang Teknik Eksplorasi	Bidang Rekayasa	Normal	Fast
10	PB6013 Evaluasi Prospek Panas Bumi		3	
11	PB6099 Proyek Akhir		6	
Jumlah normal/fast track			9	0

PROGRAM REKAYASA

Program Rekayasa meliputi Teknik Eksploitasi dan Utilisasi Panas Bumi.

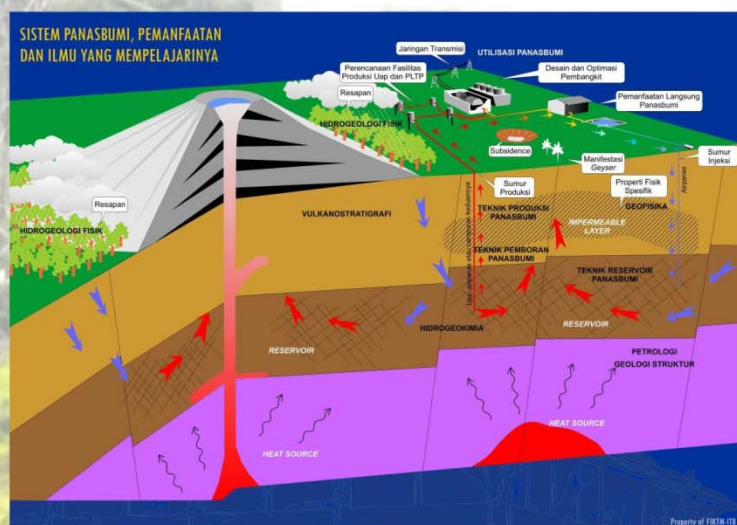
Teknik Eksploitasi meliputi Teknik Reservoir, Teknik Pemboran, Pengujian Sumur, Teknik Produksi dan Monitoring Produksi Panas Bumi.

Utilisasi Panas Bumi meliputi Perpindahan Panas dan Massa, Teknik Tenaga Elektrik, Dasar Mesin Rotor Dinamik, Sistem Pembangkit Panas Bumi, Struktur dan Sifat Material, serta Pemanfaatan Langsung.



PROGRAM TEKNIK EKSPLORASI

Teknik Eksplorasi Panas Bumi meliputi bidang Petrologi, Geologi Struktur, Hidrologi Panas Bumi, Vulkano Stratigrafi, Penginderaan Jauh, Geokimia dan Geofisika



PEMBANGKIT LISTRIK PANAS BUMI DI INDONESIA



Kamojang - Jawa Barat



Darajat - Jawa Barat



Awibengkok - Jawa Barat



Wayang Windu
Jawa Barat



Lahendong
Sulawesi Utara



Dieng - Jawa Tengah

Sarjana (S1) dari sains atau rekayasa, termasuk geologi, geofisika, perminyakan, pertambangan, fisika, kimia, mesin, teknik kimia, atau lainnya tetapi memiliki pengalaman di eksplorasi atau eksploitasi sumberdaya bumi.

Minimum TOEFL ITP > 475 atau ELPT > 77 dan TPA Bappenas > 475.

Lulus wawancara dan seleksi dari Prodi Teknik Panas bumi.

Biaya pendaftaran sebesar Rp. 350.000,- yang dikirim melalui

Mengisi pendaftaran online secara lengkap dan dikembalikan rangkap 2(dua) dengan melampirkan:

- Salinan ijazah S1 yang telah dilegalisasi
- Salinan transkrip akademik yang telah dilegalisasi
- Surat Keterangan Nilai TOEFL ITP atau ELPT ITB
- Surat Keterangan Nilai TPA BAPPENAS
- Surat keterangan sehat dari Dokter
- Foto berwarna 4cm x 6cm, 3 lembar, klise terbaru

Tersedia Beasiswa Unggulan dari Kemendiknas.

Kriteria:

1. Bidang Eksplorasi: S1 bidang Geologi, Geofisika, Tambang Eksplorasi, Kimia dan Fisika. Khusus lulusan Kimia dan Fisika disyaratkan telah memiliki pengalaman minimal 1 (satu) tahun pada bidang eksplorasi sumberdaya bumi.
2. Bidang Rekayasa: S1 bidang Teknik Pertambangan, Teknik Perminyakan, Teknik Mesin, Teknik Fisika, Teknik Kimia, Teknik Elektro, Teknik Sipil, Fisika, Lingkungan dan bidang teknik terkait.
3. IP S1 ≥ 3.0 , Nilai TOEFL ≥ 500 , ELPT ≥ 100
4. Lulus TPA ≥ 475
5. Lulus wawancara
6. Beasiswa diberikan untuk jangka waktu maksimal 2 (dua) tahun dan wajib mengikuti pendidikan secara penuh hingga lulus.

Mekanisme pendaftaran

1. Calon mengisi FORMULIR PENDAFTARAN PROGRAM BEASISWA UNGGULAN KEMENTERIAN PENDIDIKAN NASIONAL
2. Mengisi SURAT PERNYATAAN MENGIKUTI PROGRAM BEASISWA UNGGULAN yang ditandatangani oleh calon dan diberi materai Rp. 6000,-
3. Melakukan pendaftaran ke Sekolah Pasca Sarjana ITB dengan segala persyaratan dan kelengkapannya
4. Seluruh berkas diatas (point 1,2, dan 3) dicetak dan dikirim melalui pos atau diserahkan langsung ke alamat di bawah ini.
5. Berkas diterima sebelum akhir Mei setiap tahunnya.

INFORMASI LEBIH LANJUT:
<http://www.geothermal.itb.ac.id/>

HUBUNGI:

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GEOHERMAL COLLABORATION (PLENARY DISCUSSION)

AN INTEGRATED APPROACH TO CAPACITY BUILDING FOR THE NATIONAL GEOTHERMAL CAPACITY BUILDING PROGRAM

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ABSTRACT

Indonesia has a tremendous potential for geothermal energy. Turning this potential into productive systems requires investment in the development of human capacity for a trained and skilled workforce. This paper considers capacity building as a long-term investment. Based on a number of basic points of departure and the experience of ITC in the field a case is made for geothermal capacity building in Indonesia.

The National Geothermal Capacity Building Program (NGCBP) is described and a sketch is made of possible future development of the program into a broad academic partnership with national as well as international linkages.

CAPACITY BUILDING IN GEOTHERMAL AND ENGINEERING FIELDS THROUGH INTERNATIONAL PROGRAMS - EXPERIENCES OF KYUSHU UNIVERSITY, JAPAN -

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ABSTRACT

Kyushu University has a long history of international programs in the field of geothermal energy, mining and geological fields. The program ranges from training to engineers and scientists to higher education in graduate school. This paper introduces these activities as well as present status.

ACKNOWLEDGEMENT LIST

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CHEVRON GEOTHERMAL INDONESIA

GEOSERVICES



BRONZE SPONSORS

SUPREME ENERGY

INDONESIA POWER

REKAYASA INDUSTRI

PUSDIKLAT GEOLOGI

API (ASOSIASI PANAS BUMI INDONESIA)

GEO DIPA ENERGI

KEMENTERIAN ESDM



PT REKAYASA INDUSTRI



GEO DIPA ENERGI

6th - 8th MARCH
West Hall and Campus Center ITB Bandung, West Java, Indonesia

2012

ACKNOWLEDGEMENT LIST

OTHER PARTNERS

BNI 1946



COLD STONE CREMERY

ARAFA TEA

LABORATORIUM ANALISIS DAN PEMODELAN GEOLOGI (LAPG)

MEDIA PARTNERS

PIKIRAN RAKYAT



KCBL FM

PR FM

RASE FM





TROPICAL CAMP

INSTITUT TEKNOLOGI BANDUNG



GEOHERMAL TROPICAL CAMP

The course will run from
2 July 2012 - 20 July 2012

Register on-line through
<http://international.itb.ac.id> or
<http://tropicalcamp.itb.ac.id>

Administrative assessment not later than
May 21st, 2012

Successful participants will be given notice by
email and requested to pay registration fee not
later than **June 2nd, 2012.**



Expanding the Insight into an Integration of Geothermal Business Process through Practical Orientation

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