

WGC2010

The World Gears Up to Spur Geothermal Industry



Norio Sugimaru of Mitsubishi Heavy Industries explaining geothermal technology



PARTICIPANTS of the WGC2010 exhibition apparently show their optimism and readiness to accelerate the geothermal industry.

The WGC2010 exhibition hall features some of the cutting-edge technology currently applied in and offered to the most demanding markets.

According to president director of Indonesian Pertamina Geothermal Energy (PGE), Abadi Purnomo, Indonesia is not left behind in terms of expertise. "We are capable of mastering the technology. We also have competent human resources, whose expertise is

on the same level with other countries," he said.

Japanese heavy industry giant, Mitsubishi (www.mhi.co.jp), comes up with the improvement of its turbine technology with a system called Integral Shroud Coupling (ISB). The new approach to the system offers a higher load and smoother, less vibrating machine which in theory results in higher yield.

"Our machine is capable to produce one and a half time more load than the conventional machine. Thanks to the advanced engineering system, it has less vibration and therefore offers a more reliable and long lasting operation," said Norio Sugimaru, Mitsubishi Steam Turbine De-

signing system Manager.

Another Japanese giant industry, Toshiba Corp. (www.toshiba.co.jp/power), offers its Japanese state-of-the-art technology that enables the company to acquire a substantial share in the global geothermal market. "Among our approach is the smooth and more reliable thus high-yielding machine, famous all over the world," said Akihiro Taniguchi, manager of the Toshiba Geothermal Plant engineering.

France-based Cryostar SAS (www.cryostar.com), a company focusing on the newly developed system called the super-critical binary technology, offers a cutting-edge engineering expertise. The binary is suitable for low temperature wells. "Normally it works well where the temperature is or less than 200o Celcius," said Frederic Marcuccilli, Ph.D, manager of Cryostar Power Plant Engineering & Development.

"The advanced system, instead of applying direct steam, utilizes circulating propane at high pressure, giving overall a better power production," said Mr. Marcuccilli.

Baker Hughes (www.bakerhughes.com), one among leading geothermal companies, promotes its newly developed high-power Electrical Submersible Pumping (ESP) system. The ESP is capable of surpassing 1,000-day run times in a well with 315oF (157oC) temperature.

"The system will artificially help to lift more liquid to increase more production," said Paul Reid, Director of Sales Baker Hughes Indonesia.

Unlike other pumping systems, the ESP is

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capable of maintaining stable performance at high well temperature at greater depth.

Managing Director of the Asia Renewable Pte. Ltd., Edward McCartin, said that many companies still rely on the nodding donkey (traditional beam pump system) widely used in many countries aside from the current turbine technology.

According to Edward McCartin, although theoretically the nodding donkey produces only fifty percent of the turbine (due to the simple pump's simple up and down movable system), the traditional machine is still widely used in many areas, like in China.

In certain circumstances, advanced technologies don't always meet the markets due to technical or cost issue. "For example in Indonesia, the newly developed binary system rarely is suitable with. Most Indonesian geothermal wells produce very high temperatures suitable only with conventional turbine.

"For example the Dieng (geothermal) wells produce a very high temperature," said McCartin. The British engineer who has been working for various geothermal and electrical companies in Indonesia since 1997 said that for Indonesia a conventional turbine system make more sense.

French geothermal steam engineering giant, Alstom, which has more than 100 years of experience in the steam turbine industry, offers high-performance solutions for the geothermal environment, combining efficient designs and advanced blade, robust coatings and controlling system



Alstom's steam turbin



Abadi Purnomo, President Director of Pertamina Geothermal Energy



Paul Reid, Director of Sales Baker Hughes Indonesia.

WGC2010 DAILY NEWS

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architectures to deliver optimum performance and extend its component's life.

Alstom geothermal steam turbine is known for its special steel alloys, heat-treated to protect against the corrosive effects of

dissolved gases, impurities and water droplets. Induction hardening or stellite shielding can be employed to extend the lifetime of the last-stage blades where lower temperatures increase the risk of water droplet erosion.

AGENDA | April 27, 2010

08.30am – 10.10am	Panel Discussion on Global Geothermal Development.	Room A
10.40am – 12.20pm	Technical Session	Room A-J
12.20pm – 01.20pm	Lunch Break	
01.20pm – 03.00pm	Technical Session	Room A
03.30pm – 05.10pm	Poster Session	Lobby

NOTIFICATION:

THE MEMBER OF WESTERN PACIFIC REGIONAL BRANCH OF IGA ARE INVITED TO ATTEND THE ANNUAL GENERAL MEETING AT HIBISCUS ROOM OF BICC ON WEDNESDAY, APRIL 28 AT 5-6 P.M. PLEASE BE THERE.

WGC2010

Miscellaneous things about Bali



Balinese religious rituals attract global holidaymakers.

Balinese family is holding a *Ngaben* ceremony.

Architecture is also very typical in Bali, and become the island's unique object. The ornaments on Balinese buildings symbolize various ritual meanings and become a means of communication.

It is such miscellaneous uniqueness and variety of culture that makes tourists feel Bali is their second home. 🌺



BALI boasts a lot of interesting places that have been very familiar among tourists worldwide—with Kuta, Legian, Sanur, Nusa Dua, Bedugul, Ubud, Sukawati art market, Uluwatu temple, and Lovina being the most popular destinations.

Not only does it offer naturally wonderful spots, the island of Gods is also distinctive for its cultural tourist objects. In fact, the exotic and unique culture of Bali is the main reason for global holiday makers visit the island, which is dominated by Hindu followers.

Cultural objects that attract tourists are mainly religious ceremonies or rituals, traditional dances, historical buildings, cultural sites, museums, local customs, traditional hand-woven textiles and cultural festivals and performances. Certainly you can expect to find flowers of offerings, people praying on the side of the streets, in front of houses and offices, in the markets, and also in the junctions.

The island has many cultural-themed festivals throughout the year that often attract crowds of foreign tourists. Various traditional dance performances have always become major agendas in tourists' itineraries during their holidays in Bali.

Many rituals have been objects of tourism, such as tooth cutting ceremony for Balinese people. The ritual is performed to work the transition of one's life from adolescence to adult. Another popular religious ritual is *Ngaben* or cremation for Hindu adherents in Bali. You can see the gathering of thousands people when a



PT PLN (Persero)

PT PLN (Persero) is a company that controls the electricity business in Indonesia consists of electricity generation, distribution and transmission. PLN has worked and gave its dedication without ever stopping in enhancing itself to deliver the best services to fulfill the electricity needs of Indonesian community that continues to increase significantly.

As Indonesia's economy is speeding up to recovery, it has a positive impact to the electricity business. Hence with the good economy, the society's need of electricity is increased. This means that there is an increase need in power supply that generators has to produce, thus made the Indonesian electricity business more promising.



WGC2010

Geothermal Training at the University of Auckland —JULIET NEWSON



New Zealand is a beautiful country in the South Pacific that has more than 25 high temperature geothermal systems, and many warm water springs. The Wairakei system in New Zealand was the first liquid-dominated high temperature geothermal system to be used for power generation, and since then New Zealanders have been at the forefront of geothermal research and training. More than 700 students graduated from the University of Auckland Geothermal Institute with a Diploma in Geothermal Energy Technology between 1978 and 2002, including more than 150 Indonesians; many of whom are now leaders in the Indonesian geothermal industry. Former students from Indonesia, and all over the world, spent an enjoyable evening catching up with old friends at a University of Auckland Alumni function on Tuesday evening.

The University of Auckland now offers the Post Graduate Certificate in Geothermal Energy Technology (PGCertGeothermTech) and geothermal research leading to ME, MSc or PhD degrees in the Faculties of Engineering and Science.

The PGCertGeothermTech is a one-semester program aimed at giving engineering and science graduates training in geothermal science and engineering, available through the Faculty of Engineering at the University of Auckland. The course is taught in Semester 2 (19th July – 12th November in 2010). Lecturers are from University



of Auckland and from the New Zealand geothermal industry.

The first five weeks of the course include geothermal science and geothermal engineering. For the following five weeks there is a choice between a geoscience elective or an engineering elective, with the last week of study spent on a feasibility assessment. The aim is for the students to work in groups of four to five people, and apply everything they have learned to a real project. In the last five weeks of the course all students carry out a five-week industry-focused research project.

Highlights of the PGCertGeothermTech are the two six-day field trips to the Central

North Island of New Zealand. All students visit geothermal power stations and associated bore-fields, direct use projects, and undeveloped geothermal systems with many natural geothermal springs. 🌋

For more information about the PGCert or the ME, MSc and PhD degrees please email:

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EXHIBITION CORNER

WGC2010

AECOM Keeps Supporting Geothermal Business



ONE of the most visited booths in the WGC2010 exhibition is AECOM. AECOM is a global provider of professional technical and management support service to a broad range of markets, including transportation, facilities, environmental energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. According to Andy North- South East Asia operations director, AECOM has been operating in Indonesia since the very first project was started here. "We have been expanding our projects



Two of AECOM executives are ready to participate in geothermal business

here in Indonesia for over 25 years. We are one of the leading companies in the field,

working in collaboration with many other companies to complete geothermal projects within the region. In the future we look forward to growth of geothermal in Indonesia and hopefully we can increase our current capabilities." In line with that, John Lorentz, the Southern Pacific director of power and energy, said that since the last WGC five years ago in Turkey, AECOM has become more involved in binary cycles whereas before most of the geothermal power systems were using conventional systems. 🌋

Lo-C Cryostar: Low Carbon Technology for a cleaner World



Come and visit us at our
Booth Nr. HB11 in Exhibition Hall (ground floor)



We design, manufacture and service high efficiency radial inflow expansion turbines able to produce electricity with zero carbon emission for different applications:

- ★ Pressure let down station : Cryostar Radial Turbines in parallel of existing expansion valves (Joule Thomson valve) on distribution gas networks pressure reduction stations.
- ★ Geothermal application with ORC (Organic Ranking Cycle) binary cycle or Kalina closed cycle using ammonia/water mixture.
- ★ Cryostar Turbines can also be integrated in waste heat based energy recovery cycles.



Goddess Njung Asti raises symbolizing the earth power

WGC2010

Bayu Pertiwi, a Dance of the Earth Power



FOR Balinese, dance is a part of their daily routine. If you have explored the island's village life, you will learn that children and teenagers practice dance routinely in their village's meeting halls, (bale banjar). blol

The WGC2010 cultural night, held at the famous Garuda Wisnu Kencana (GWK) last night, feature one of the island's vast arrays of dance creation. Bayu Pertiwi (the force of nature) is a dance specially created for the World Geothermal Congress 2010.

According to the conceptor of the dance, as well as script writer, Dr. Herman Darnel Ibrahim, who is also the chairman of the OC WGC2010 he idea of the dance emerged from the need to portray geothermal as a clean energy capable of creating happiness and prosperity without changing Bali's strong culture. The process of creating this marvelous work of art took a long time. "Since I got the idea to combine geothermal and the art of dance last year, there were several meetings with the dance's choreographer and composer, as well as lighting engineer. The result is a colossal dance involving more than 200 dancers. I do hope that this work will get positive appreciation," said Herman Darnel Ibrahim.

The dance is divided into four scenes, starting from the scene picturing an impoverished society, followed by the breaking through scene where the society finds geothermal steam beneficial and less pollutive, and ended by the happiness of the society who has lived in happiness and

prosperity. This happiness is portrayed through the expression of spiritual gratitude on their prosperity and prolonged culture.

The dance, choreographed by Dr. Ni Made Ruastiti, a senior lecturer at the island's most famous dance institution, in Denpasar, highlights the force of nature as the source of creation, featuring hundreds of dancers representing the powerful energy of the earth.

The words Bayu (force) and Pertiwi (earth) suggest that the dance represents the earth's energy which is turned into electrical power for the brighter world for the human prosperity.

It is told that one day a powerful Hindu priest, Ida Padanda Wawu Rauh, visited Bali and he was said to learn Bali in a dark atmosphere, no lighting is available especially in remote villages. He then thrust down his magical stick until the light came out from the earth. The energy out from the earth took the form of hundreds of dancers, led by a beautiful goddess known as Ni Dewi Njung Asti, symbolizing the energy as a good force for human being.

The epic dance performance lasts for about 30 minutes. 🌟



Ni Made Ruastiti

DEDICATED TO DANCE CREATION

NI MADE RUASTITI, 45, the creator and choreographer of Bayu Pertiwi (the force of nature) dance, is one among the few Balinese choreographers who successfully develops a number of traditional Balinese dances harmoniously combined with fusion and modern dances. "The classic, indigenous Balinese dances are beautiful in themselves. However, such dances have been regularly featured in the many performances. For a special occasion like the geothermal conference, we should develop and combine them with the related theme," DR Ruastiti said.

The calm mother of two, who is going to hold a professor title by the end of this year from the Bali's Institute of Arts (ISI), has created various dances related to various international issues such as global warming, travel and tourism, environmental awareness, safety and prosperity, to mention a few.

CDs OF GEOTHERMAL DANCE "BAYU PERTIWI" NOW ON SALE!

You could purchase the CD of geothermal dance "Bayu Pertiwi" performed at the WGC2010 Indonesian Cultural Night for only IDR 75,000/pc. Sale counter is at Registration desk, BICC Lobby.

Clockwise from top left, Wardiyatmo (Secretary General of Indonesian Ministry of Culture & Tourism) greets the congress participants, thousands enjoying Indonesian Cultural Night at GWK Park, the VIP corner, the dance performance.



RAIN CAUSES HAVOC AT INDONESIAN CULTURAL NIGHT

LIGHT drizzle that soon turned into relatively heavy rain caused hundreds of WGC2010 participants abandoned their dinner tables soon as the function commenced.

Most of the delegates, including IGA President Ladislaus Rybach and Secretary General of Ministry of Culture & Tourism Wardiyatmo, were forced to leave their seats as the Bayu Per-tiwi dance began.

However, the rain stopped as the geothermal dance over and the delegates returned to their seats to continue enjoying their dinner and the rest of the entertainments.



Comments on Indonesian President's Opening speech



LEWIS OWENS, Australia

I was very honoured that the president of Indonesia saw fit to take an interest in the WGC2010 and also in geothermal as a whole. I thought that his attendance sent a very powerful message as to where he sees geothermal in Indonesia's future.



MAGALY FLORES, Mexico

I believe that in his speech the president showed that he has strong goals for the future of geothermal power in Indonesia. This, coupled with his positive changes to the law, I believe, will result in very positive outcomes in geothermal and also for Indonesia as a whole.



JAMES WAMBUGU, Kenya

I was unable to attend the opening ceremony myself but have heard nothing but positive things from those who did attend. It is very important that the Indonesian president has shown that he whole-heartedly supports geothermal development in Indonesia.



ALI HERMAN IBRAHIM, Indonesia

It is excellent that the president of Indonesia is so interested in the development of the geothermal division in Indonesia. It was very exciting to hear the great detail of knowledge the president possessed in relation to geothermal. It was also great to hear about his intentions to create new legal regulations with regards to geothermal and also forestry.



ROMAN B. STA MARIA, Philippines

I think he emphasised the fact that Indonesia is very fortunate to have such a wealth of geothermal resources. It was magnificent that he fully supports the growth of an aggressive geothermal power program here in Indonesia



**NARWASTU CIPTAHENING
Indonesia**

I am very pleased and impressed that the Indonesian president is committed to developing Indonesia into a world leader in geothermal.



SUKKRUSUMER, Canada

I felt his speech was very well received. I was very impressed that he didn't need any notes throughout his speech, which I believe showed his knowledge and interest in geothermal.



**HREFNA KRISTMANNSDOTTIR
Iceland**

I was pleased about the positive attitude the president showed towards the development of geothermal resources in Indonesia



CASPAR ZIEGLER, New Zealand

I felt it was a very well thought out speech that covered all the priorities that the Indonesian government has towards geothermal development.



MAGDALINA SCHEK-WENDEROTH, Germany

I thought the president took a very unique approach to deliver his speech, which I enjoyed and respected. I thought that the ideas and goals that he summarised were very relevant.



Enjoying the evening at Ormat Business Dinner held on 26 April at Nusa Dua Beach Hotel

Lucien V, Bronicki and Ormat team (left), Charles Mutoria, Joyce Okoo, Marietta Mutonga, Eliud Wanyonyi, Anastasia Wanjohi of Kenya Geothermal Development Company, (center), Jorge Burgos, Napoleon Guerrero Berrios, LaGeo --El Salvador (right)

NOTIFICATION:

IGA WILL HOLD A GENERAL MEETING ON APRIL 28, 2010. THE MEETING WILL START AT 6 P.M. AT HIBISCUS ROOM AND FRANGIPANI ROOM AT THE BICC. ALL WGC2010 PARTICIPANTS ARE WELCOME TO THE MEETING WHERE INFORMATION ABOUT THE MAIN IGA ACTIVITIES IN THE PAST AS WELL AS PLANS FOR THE FUTURE WILL BE GIVEN.