



NEW ZEALAND
MINISTRY OF FOREIGN AFFAIRS & TRADE
Aid Programme



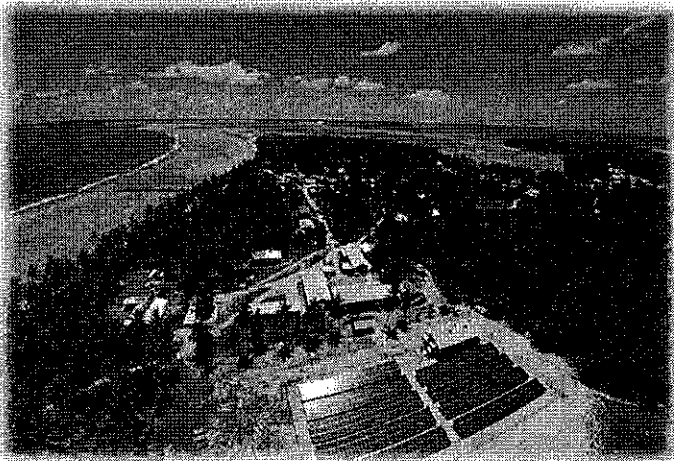
New Zealand Aid Programme Geothermal Energy

Stuart Calman, Unit Manager-Energy, SED
November 2017



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Renewable Energy



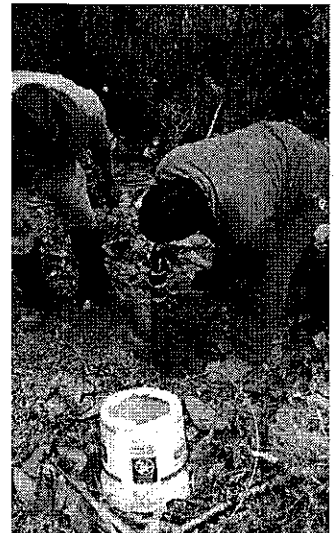
“Expand access to affordable,
reliable and clean energy”

- Renewable energy support 8% of Aid Programme budget at around \$35-40m/year

Pukapuka Solar Farm - Jan 2015 – Cook Islands

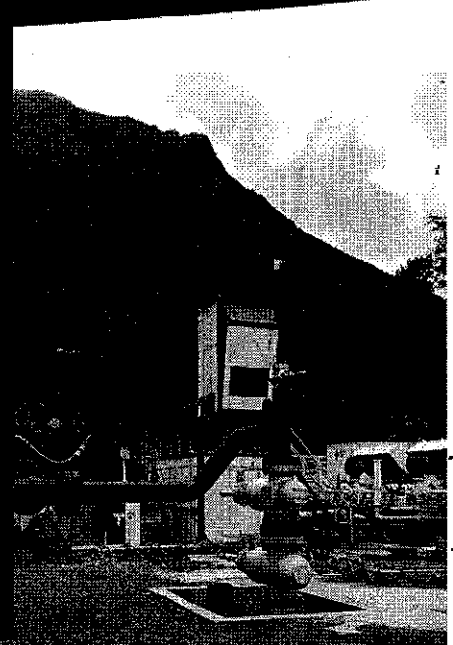
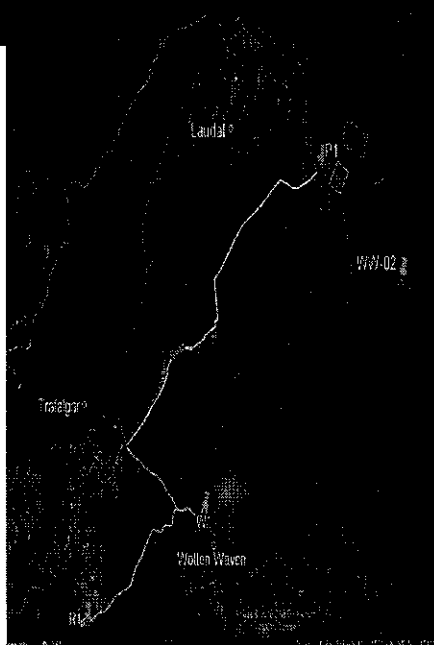
Caribbean – Recent Projects

- New Zealand geothermal adviser based in St Lucia 2014-16.
 - St Lucia : surface exploration, aerial survey work to model resource potential
 - Grenada: surface exploration, infrastructure and drilling plan
 - St Vincent and Grenadines: business case for geothermal
 - Caribbean Development Bank: Geo-smart Facility



Dominica

- Plans for 7MW plant underway.
- NZ involved in feasibility study update, ESIA, tender documentation.
- NZ Project Manager in Dominica Geothermal Development Company (DGCD).

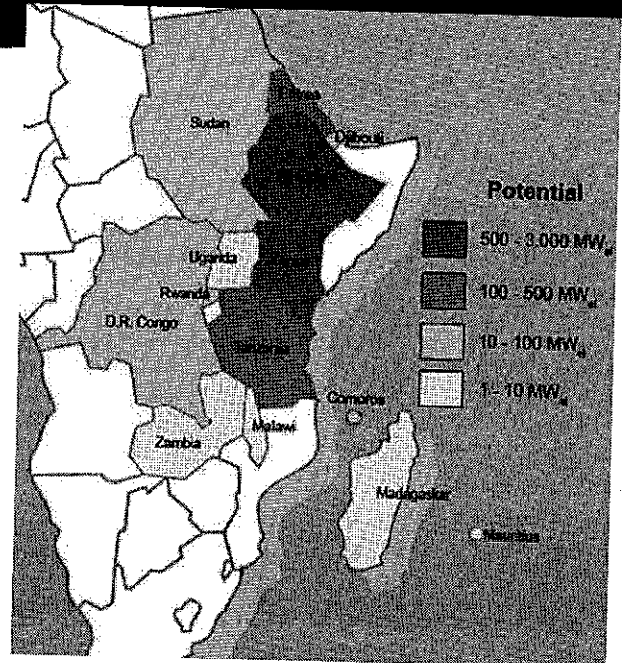




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Africa Geothermal Facility

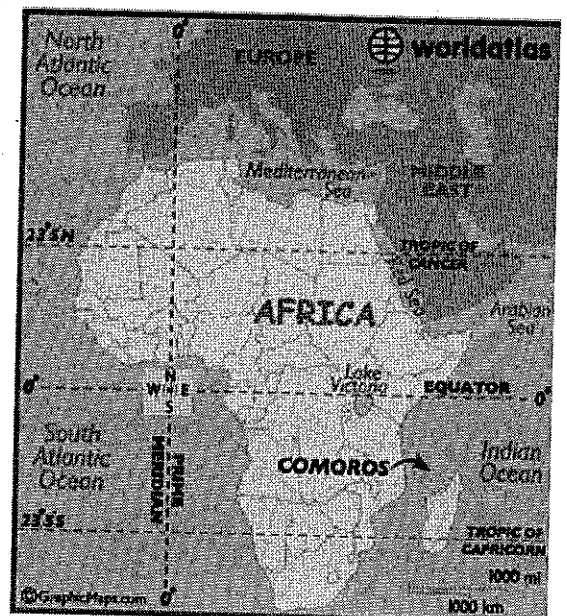
- NZ-AGF: \$10m fund over 5 years
- Demand driven portfolio of technical assistance projects drawing on NZ expertise
- Available to 11 countries in East Africa
- Under an MFAT and Africa Union Commission partnership arrangement.
- In implementation, with Facility Manager Markos Melaku, recently appointed and based in Addis.



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Africa - Comoros

- Partnership with Government of Comoros, UNDP and New Zealand
- Geothermal resource estimated 40MWe
- Successful Comoros application to Geothermal Risk Mitigation Facility (GRMF)
- To date USD18million for surface exploration and test drilling





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Pacific

- Vanuatu: technical assistance completed for ESIA and currently supporting a study on the economic and commercial potential of a geothermal project
- New Zealand has limited other engagement in geothermal in the Pacific but continues to monitor developments in Fiji, Solomon Islands and PNG.



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Geothermal Scholarships

- New Zealand Aid Programme Geothermal Scholarships
- University of Auckland, Geothermal Institute



Geothermal Institute field trip



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THANK YOU

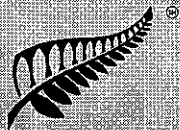


Students at Wairakei borefield, MB Century Drilling Rig

The 3rd Wave

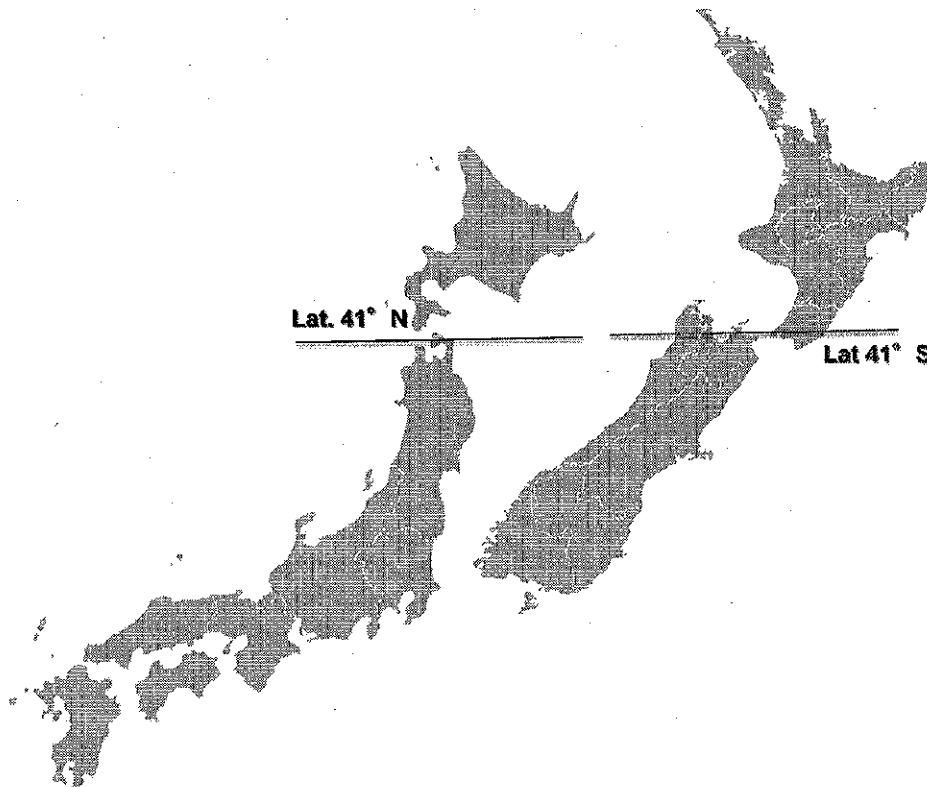
Yoshifumi
Imamura
NZTE Tokyo

NZTE Update - Japan

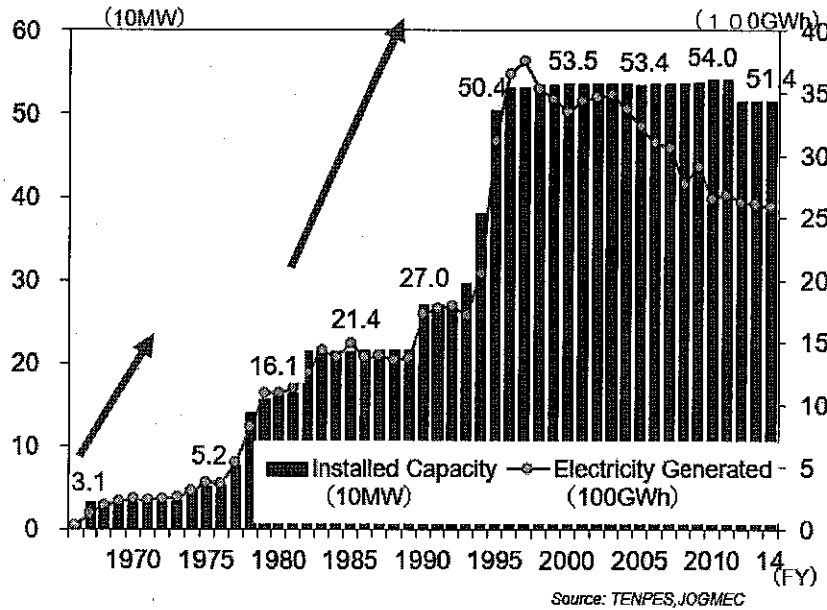


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Japan

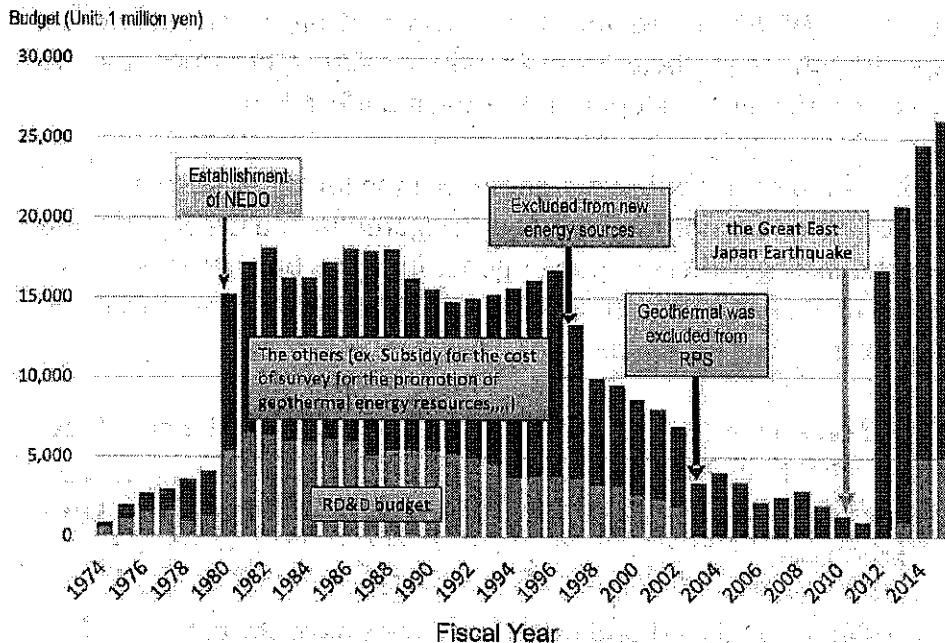


The 3rd Wave



Japanese government budget for Geothermal Industries

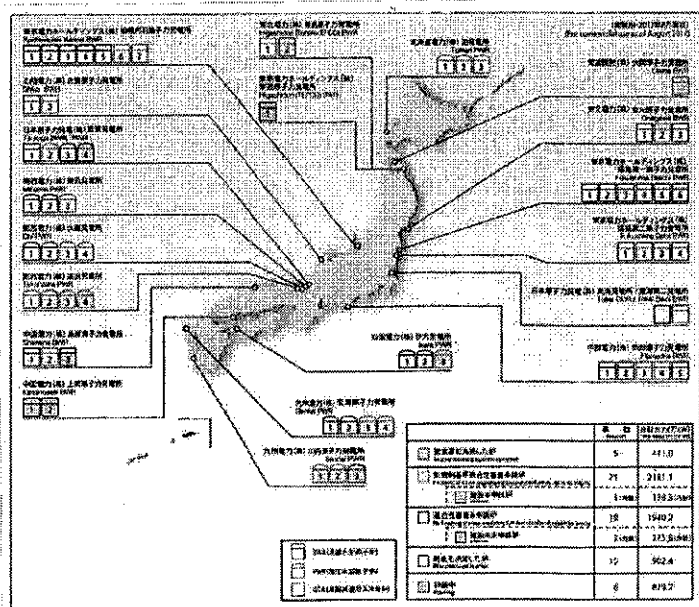
JPY 25 Billion (NZ\$ 350 Million) has been spent to boost geothermal industries in fiscal year 2016.



Nuclear Power Plants in Japan

Resumed 5 as of today.

Status	# of Reactors
Resumed	5
Conformity Claiming	40
Discontinued	15
Planning	6

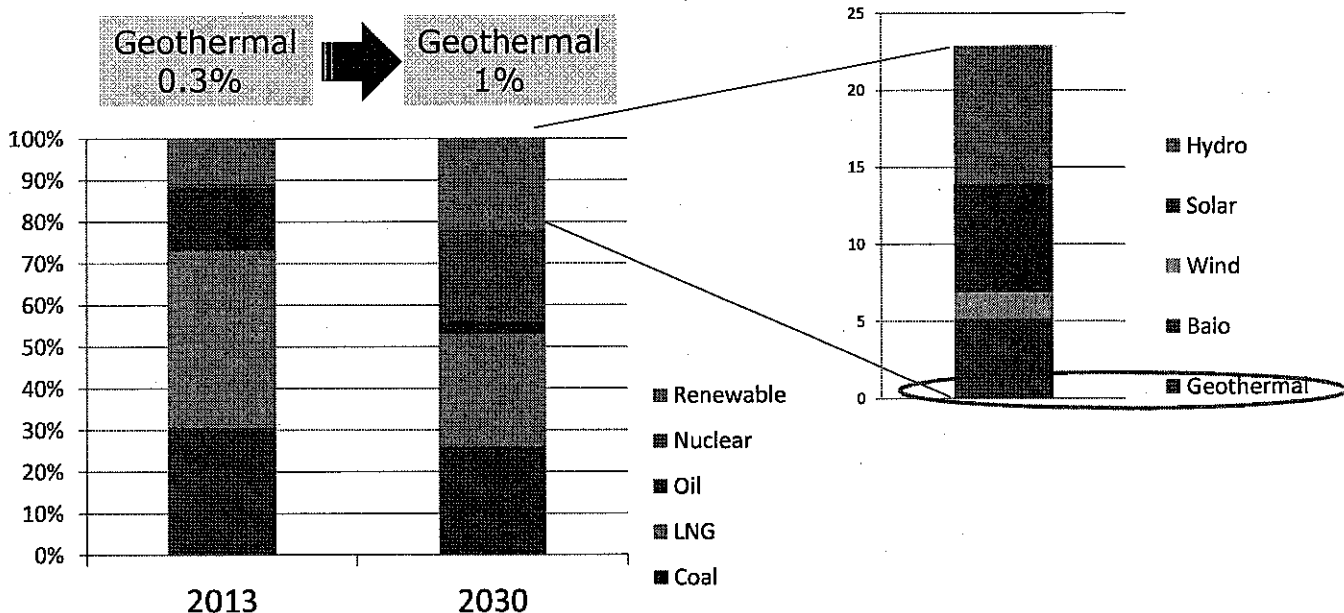


出典：一般財団法人 日本原子力文化財団「原子力文化年報」(財団法人 原子力文化財団) 一部加工
Source: Japan Atomic Energy Relations Organization. Data partially processed.



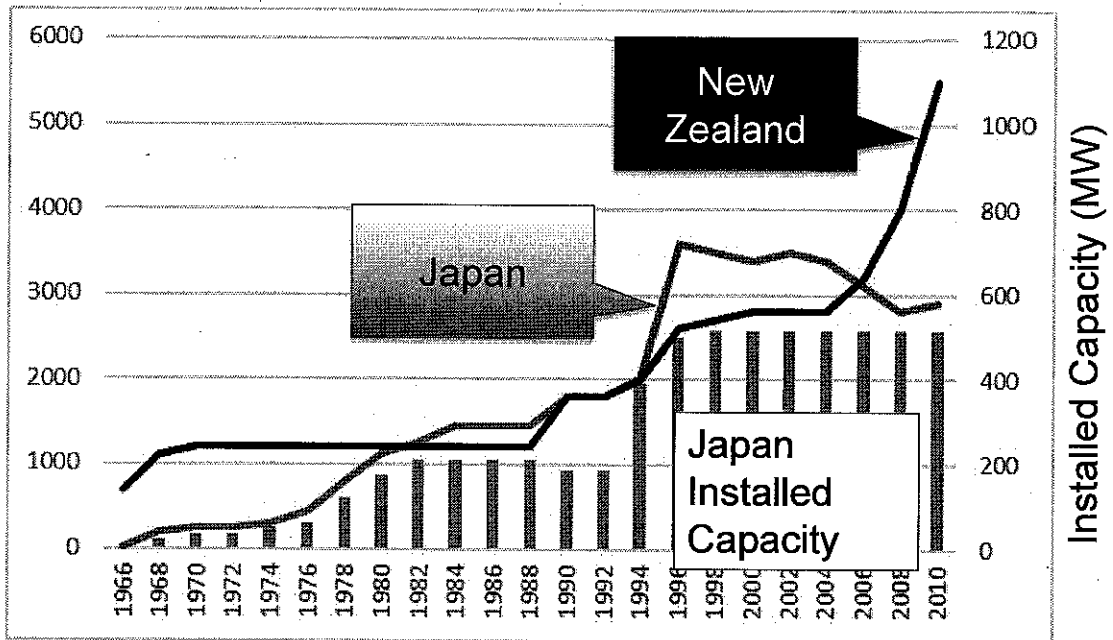
Japan "Tripling" Geothermal Capacity

Geothermal shall be 1.0-1.1% of the power supply by FY 2030.



What NZ can do for Japan?

Can NZ share experience & experts?



Partners in Japan

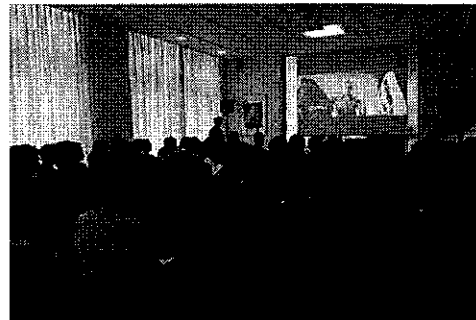
Right partner will bring you the business.



Japan Geothermal Event – Tokyo 2018

The 3rd networking event in February 2018

- New Zealand Geothermal Seminar in Tokyo, taking place at the New Zealand Embassy in Tokyo on February 2018.
- This is an opportunity for New Zealand companies to present at an exclusive seminar and engage with local industry representatives.
- There is a required cost contribution of NZ\$1000 per company to support the preparation and running of this seminar.

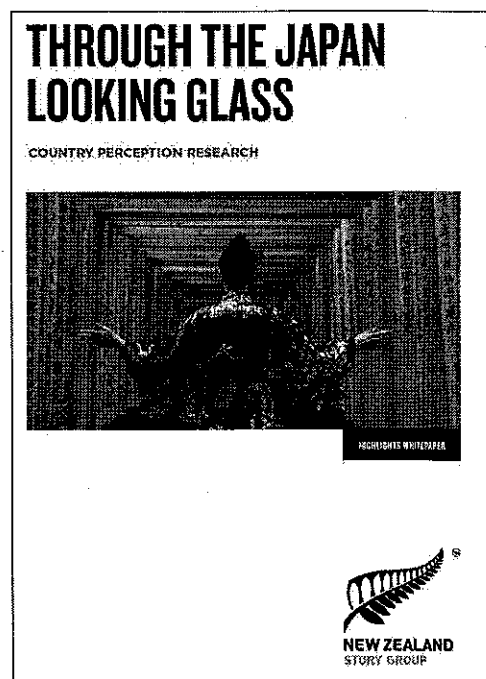


13

Country Perception Research

Through the Japan Looking Glass – Country Perception Research

- 20 pages of a research booklet available on NZ Story: <https://www.nzstory.govt.nz/>
- Contents:
- **WHAT DO WE KNOW ABOUT JAPAN?**
 - The research identified a number of distinctive Japanese characteristics which represent key cultural differences that impact business and buying decisions.
 - Exporters and their advisors should remember these aspects of Japan when they work in this market.
- **HOW DOES JAPAN PERCEIVE NEW ZEALAND?**
- **WHAT ARE KEY POINTS TO REMEMBER WHEN DOING BUSINESS IN JAPAN?**
- **HOW DO WE CREATE PERSUASIVE MESSAGING AND STORIES FOR JAPAN?**
- **MESSAGING CONCEPTS**



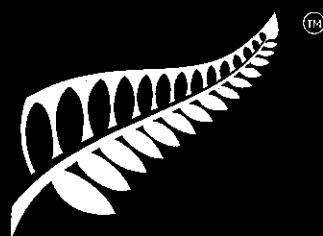
Summary

The 3rd wave is on.

- >50 geothermal projects are on going.
- Japanese government is spending >\$350mn for boosting the wave
- Improving FIT
- "Tripling" Geothermal Capacity

Find right partner(s).

Join Geothermal Seminar in Japan on February 2018.



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**NZGW
2017**



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Geothermal Development in Indonesia

Prepared by Diana Permana
Business Development Manager, NZTE Indonesia




Presentation Outline


- **Geothermal current condition**
- **Geothermal business trends**
- **Geothermal opportunities and challenges**
- **NZTE activities**
- **Questions**

Geothermal current condition

550 MW
development
each year over
10 YEARS

 *Potential*
40%
29,000MW

 *Low Utilization*
Around **10%**
1.808,5 MW; 10 producing areas

 *Target/Opportunity*
7.2GW
2025 target
71 working areas
(19 existing and 52 new areas)

Installed capacity
1,698.5 MW
Utilization 9.3%
(MEMR - August 2017)



Installed capacity
1,808.5 MW
Utilization 10.3%
(MEMR - October 2017)

**AMBITIOUS
TARGET**



The utilization of geothermal energy around the world

NO	COUNTRY	RESOURCE (MW)		INSTALLED CAPACITY (MW)		RATIO
1	UNITED STATES	30,000	24.43%	3,567	27.48%	11.89%
2	PHILIPPINES	4,000	3.26%	1,868	14.39%	46.70%
3	INDONESIA	28,579	23.27%	1,809	13.93%	6.33%
4	TURKEY	4,500	3.66%	1,005	7.74%	22.33%
5	NEW ZEALAND	3,650	2.97%	980	7.55%	26.85%
6	ITALY	3,270	2.66%	944	7.27%	28.87%
7	MEXICO	4,600	3.75%	926	7.13%	20.13%
8	KENYA	15,000	12.22%	676	5.21%	4.51%
9	ICELAND	5,800	4.72%	665	5.12%	11.47%
10	JAPAN	23,400	19.06%	542	4.18%	2.32%
TOTAL		122,799	100%	12,982	100%	10.57%

NOTES

- THE WORLD HAVE ONLY DEVELOPED 10,57 % (12,9 GW) OF ITS GEOTHERMAL RESOURCE (122,8 GW);
- INDONESIA HAS THE SECOND LARGEST OF GEOTHERMAL RESOURCES (23,27%)
- INDONESIA IS THE THIRD LARGEST PRODUCER OF GEOTHERMAL ENERGI FOR ELECTRICITY GENERATION (13,93%)
- PHILIPPINES IS THE MOST OPTIMUM GEOTHERMAL PRODUCER (46,75%) ALTHOUGH THERE ARE MANY POWER PLANTS LOCATED IN CONSERVATION FOREST
- JAPAN DEVELOPED THEIR GEOTHERMAL RESOURCES FOR DIRECT-USE

Sources: IGA Paper 2017



Geothermal business trends

The Ministry of Energy and Mineral Resources of the Republic of Indonesia (MEMR) recently issued regulation No. 12 of 2017 on the utilisation of renewable energy sources for electricity supply (Regulation 12/2017).

The trend of Indonesian mining companies start to expand their business for renewable energy development. Opportunity : 101 Geothermal training opportunities

Some industry participants have voiced concern at the way Regulation 12/2017 sets ceiling prices for the purchase of renewable energy by reference to the "average cost of generation" which, in some regions, is substantially lower than the typical generation cost of most types of renewable energy plants.

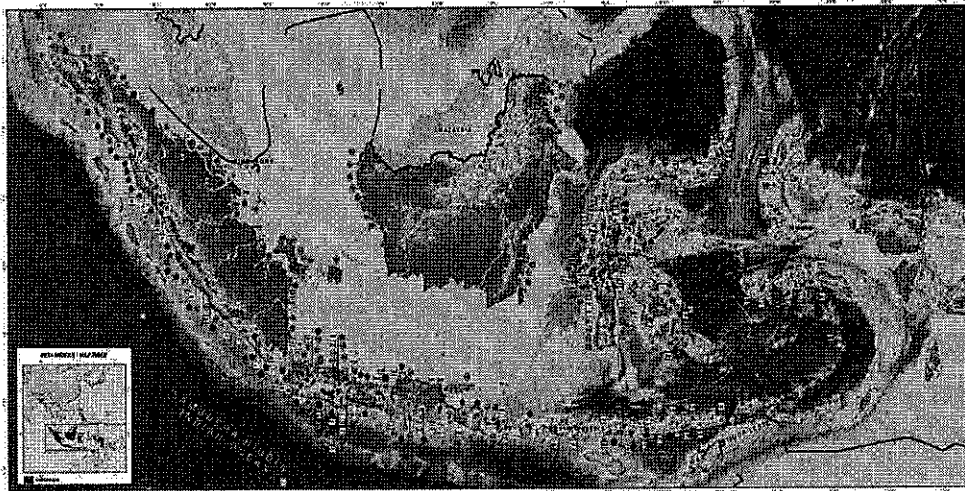
New geothermal project:
The first 110-MW unit of the Sarulla geothermal project began commercial operations in late March. When completed, the full project in Indonesia's North Sumatra will have a capacity of about 380 MW. The project combines flash and binary geothermal technologies.

New regulations on power purchase agreements
Developers to follow requirement for PLN to only purchase power in accordance with proven reserves after exploration

Additional installed capacity in 2017 from:
Ulubelu Unit 4 (55MW) – COD 25 April 2017
Sarulla Unit 2 (110 MW) – COD 2 Oct 2017
Karahua Unit 1 (30 MW)



Indonesia Geothermal Potential and Opportunities



**OPPORTUNITIES
NZ COMPANIES**

- EPC Works*
- Civil Engineering Works*
- Software for Geothermal*
- Training development*
- Consultancy Works*

No.	Location	Location Number	Potential Energy (Mwe)					Installed
			Resource		Reserve			
			Speculative	Hypotetic	Probable	Possible	Proven	
1	Sumatera	97	2,893	1,935	5,097	930	917	452
2	Java	73	1,410	1,689	3,949	1,373	1,865	1,224
3	Bali	6	70	22	122	110	30	0
4	Nusa Tenggara	27	225	409	848	-	15	12,5
5	Kalimantan	14	152	17	13	-	-	0
6	Sulawesi	78	1,221	314	1,242	80	140	120
7	Maluku	33	560	91	775	-	-	0
8	Papua	3	75	-	-	-	-	0
Total		331	6,596	4,477	12,046	2,493	2,967	1,808.5*
			11,073		17,506			



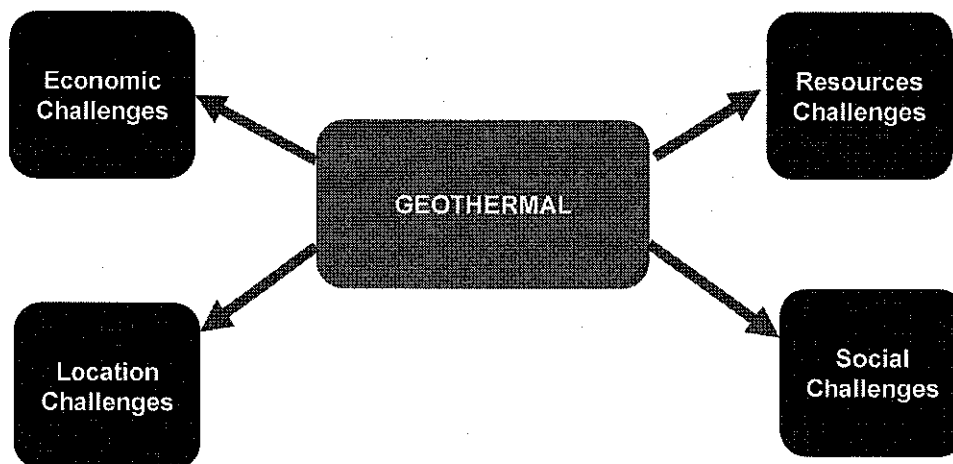
Geothermal Installed Capacity as per Oct 2017

No	Geothermal Working Area/ Location	Geothermal Plant	Developers	Capacity Turbine	Total Capacity (MW)
1	Sibayak – Sinabung, SUMUT	Sibayak	PT. Pertamina Geothermal Energy	1 x 10 MW; 2 MW(monoblok)	12
2	Cibeureum – Parabakti, JABAR	Salak	Chevron Geothermal Salak, Ltd	3 x 60 MW; 3 x 65,6 MW	377
3	Pangalengan, JABAR	Wayang Windu	Star Energy Geothermal Wayang Windu	1 x 110 MW; 1 x 117 MW	227
		Patuha	PT. Geo Dipa Energi	1 x 55 MW	55
4	Kamojang – Darajat, JABAR	Kamojang	PT. Pertamina Geothermal Energy	1 x 30 MW; 2 x 55 MW; 1 x 60 MW; 1 x 35 MW	235
		Darajat	Chevron Geothermal Indonesia, Ltd	1 x 55 MW; 1 x 94 MW; 1 x 121 MW	270
		Dieng	PT. Geo Dipa Energi	1 x 60 MW	60
5	Dataran Tinggi Dieng, JATENG	Dieng	PT. Geo Dipa Energi	1 x 60 MW	60
6	Lahendong – Tompaso, SULUT	Lahendong	PT. Pertamina Geothermal Energy	6 x 20 MW	120
7	Waypanas – LAMPUNG	Utubelu	PT. Pertamina Geothermal Energy	4 x 55 MW	220
8	Ulumbu - NTT	Ulumbu	PT. PLN (Persero)	4 x 2,5 MW	10
9	Mataloko - NTT	Mataloko	PT. PLN (Persero)	1 x 2,5 MW	2,5
10	Sibual-Buali - SUMUT	Sarulla	Sarulla Operation Ltd.	2 x 110 MW	220
TOTAL					1.808,5

Geothermal Challenges in Indonesia

Price is one of important factor for geothermal development in Indonesia

The geothermal project is very risky, with the risk of geological exploration (resource risk) as the highest risk.



Geothermal locations are located in mountainous areas. Infrastructure access and conditions become challenges

Public education on the development of geothermal activities still needs to be improved.

Indonesia Government breakthrough for geothermal development



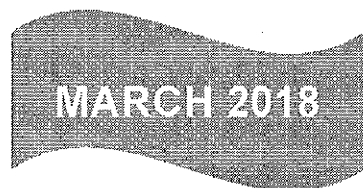
- **Focus geothermal development in Eastern Indonesia**
- **Assignment to SOE** - The Government will give particular assignment for Geothermal SOE to develop concession including upstream and downstream based on Geothermal Law No. 21/2014.
- Ideas on establishment **Indonesia Geothermal Center of Excellence** – they see GNS as one good example for Indonesia to follow.
- Simplification of **licensing** - One-Stop Service Center (PTSP) at Investment Coordinating Board (BKPM), eliminating unnecessary licences, shorten the time period
- **Preliminary Survey Assignment + Exploration** - Investors who meet the requirements allowed to have opportunity to obtain a Preliminary Survey + assignment up to exploration stage. As the incentive, concession will be tendered using direct selection mechanism.
- **Geothermal Fund** – Allocate USD 300 million on national budget for geothermal exploration currently managed by PT SMI



9

NZTE upcoming activities in Indonesia

NZ Renewable Energy Roundtable Discussion Series 2018, Jakarta, Indonesia



Annual geothermal event : NZ Geothermal mission to Indonesia in conjunction with IIGCE 2018 (International Indonesia Geothermal Convention and Exhibition) on August 2018



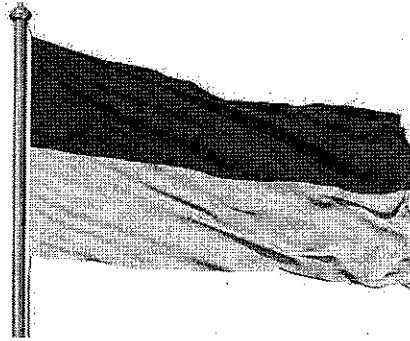
NZTE RE Resources in Indonesia



Tim Anderson
Trade Commissioner
NZTE Jakarta



Diana Permana
Business Development Manager
NZTE Jakarta



Sanusi Satar
Beachhead Advisor for
Renewable Energy
NZTE Jakarta

Sanusi Satar has more than 30 years experienced in energy sector, particularly in the oil & gas and geothermal.

Pak Sanusi formally retired from Star Energy Management in October 2008; however he speaks regularly at conferences and forums on energy matters, particularly within the geo-thermal energy space. Pak Sanusi also continues to represent Star Energy in external activities, such as meeting with the government, attending forum, seminar whether as participant or speakers both domestic and international and both in the Oil & Gas Sector and also in the geothermal / New and Renewable energy sector.

He has been serving as Board of INAGA since 2004 and focusing with some matters related to the Capacity Building, Governments Regulations, and invited speakers in the geothermal seminars, workshop or forum both Domestic and Abroad.



11

THANK YOU

ANY QUESTIONS?



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