

Dr. Kees van den Ende, DNV GL-Energy (former "KEMA")

Course: Operators of Geothermal Powerplants

UI, Jakarta, 5,6 & 7 August 2017

Hosting by: PPSDM EBTKE, Jakarta

Cooperating companies & universities



INAGA



IF Technology



DNV GL



Institut Teknologi Bandung



Delft University of Technology
Department of Geo-Technology



University of Twente
Faculty ITC



Universitas Gadjah Mada



Universitas Indonesia



Utrecht University
Faculty of Geosciences – Department of Earth Sciences



Netherlands Organisation for Applied Scientific Research

IND coordinator:

INAGA

NL coordinator:

ITC

Advisory board:

BAPPENAS (chair)

MEMR

RISTEK DIKTI

Min. Foreign Affairs NL

Rector ITB

Rector UGM

Rector UI

INAGA

Funded by



Program of the course (1) Saturday

I. Introduction

Kees van den Ende - DNV GL Energy (former KEMA)

- Introduction to the program of the course
- Introduction of trainers and participants

II. Regulation

..... - Geothermal Directorate and Electricity Directorate, Ministry of Energy and Mineral Resources

- Overview of Geothermal Regulation
- Overview of Electricity Regulation

Program of the course (2) Saturday

III. Overview Power Plant Design

Yusuf Nasruddin - UI

- List of Geothermal Power Plant in Indonesia
- Methodology of power plant development
- Dry steam cycle
- Flash steam cycle (double and single)
- Binary cycle: Organic Rankine Cycle (ORC)

Program of the course (3) Sunday

IV. Introduction of Power Plant

Yusuf Nasruddin - UI

- Main component: Steam turbine
- Main component: Condenser
- Main component: Steam Ejector
- Main component: Cooling Tower
- Other components

Program of the course (4) Sunday

V. Standard of Geothermal Power Plant design -

Hanifah B Sulistiyardi – Pertamina Geothermal Energy

- Overview of relevant standards for geothermal power plant design
- Overview of material use, prescribed by these standards
- Overview of other requirements for inspections and maintenance in geothermal power plants Tools in power plant operations

Program of the course (5) Sunday

VI. Geothermal Power Plant Safety

Ardila J Erdiansyah – Pertamina Geothermal Energy

- General safety issues and measures during operation.
- Risk assessment, mitigation & control

Program of the course (6) Monday

VII. Basic of operation, maintenance and reliability in Geothermal Power Plant

Nanang Kurniawan – Pertamina Geothermal Energy

- Basic of Operation
- Maintenance and Reliability (Definition, Maintenance Type, Reliability Centered Maintenance)
- Maintenance of main equipment in geothermal power plant
- Power Plant Status & Performance index
- Asset Integrity Managment in Geothermal Power Plant

Program of the course (7) Monday

VIII. Inspection techniques, Sampling and reporting

Kees van den Ende & Tom Geurink- DNV GL-Energy
(former KEMA)

- Failure mode (general introduction)
- General guidelines for inspection:
 - Non-destructive and destructive techniques
- Operation and failure reporting

IX. Day closure

All participants

• **TEST!**

Certificate?

Kees van den Ende - DNV-GL (KEMA):

- Innovation manager KEMA (Energy); since 2010 one of the 5 'founding partners' of the GeoCap-program
- Teammanager of "New Energy Technologies" (KEMA)
- NNI (Standardization Institute of The Netherlands)
- Professor of " Instituto Industrial de Maputo" in Mozambique
- Thesis at the University of Leiden (research at the IRI-Delft)
- Study at the University of Leiden
- Participant at the Olympic Games of Munchen (1972) (rowing)

Tom Geurink– DNV GL



Tom Geurink M.Sc

Studied Sustainable Energy Technology
University of Twente

Consultant (2016 – present)

DNV GL Energy

Working on the following topics

- Geothermal energy
- Energy storage

Tom.Geurink@dnvgl.com

+31 26 356 6090



DNV GL Global reach – local competence



150

years

350

offices

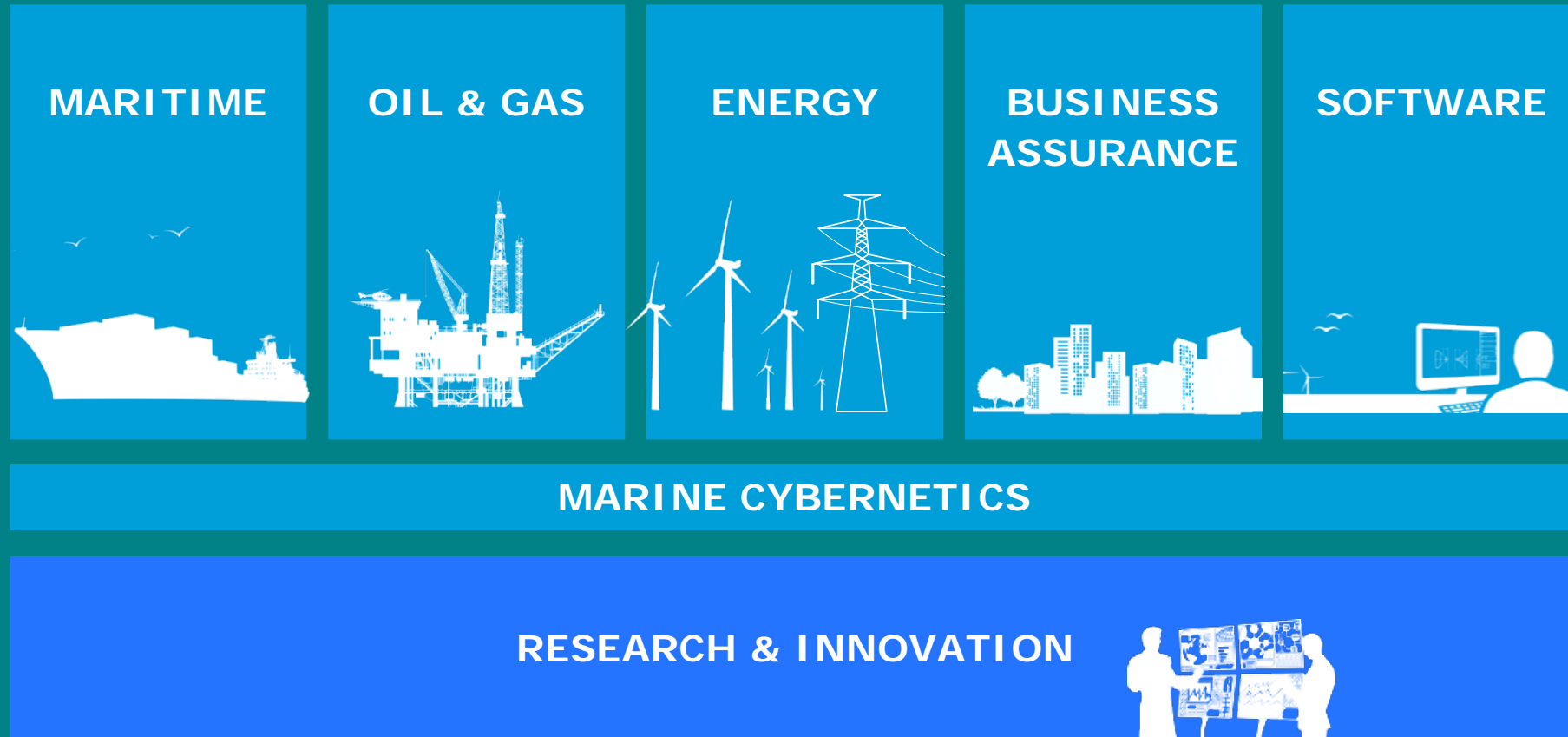
100

countries

14,000

employees

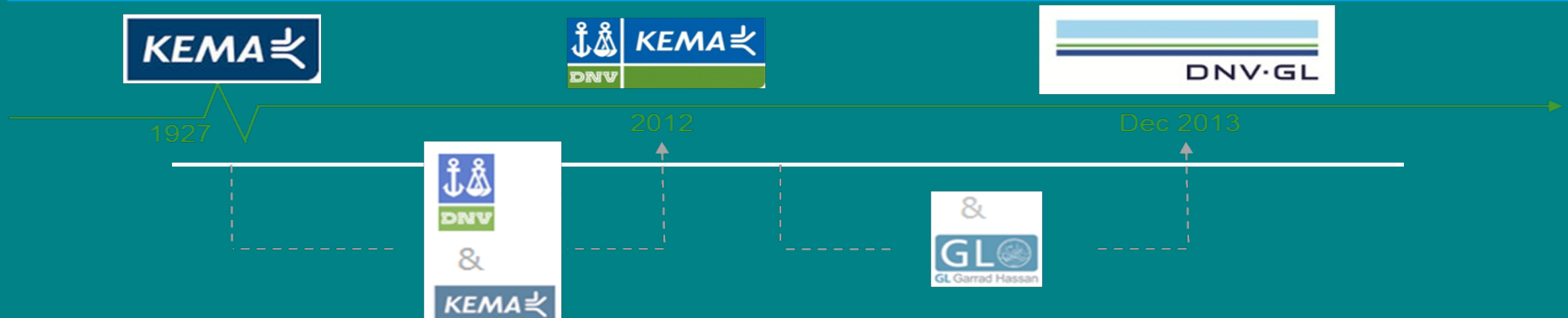
Our vision: global impact for a safe and sustainable future



DNV GL – Energy: An Energy Power House

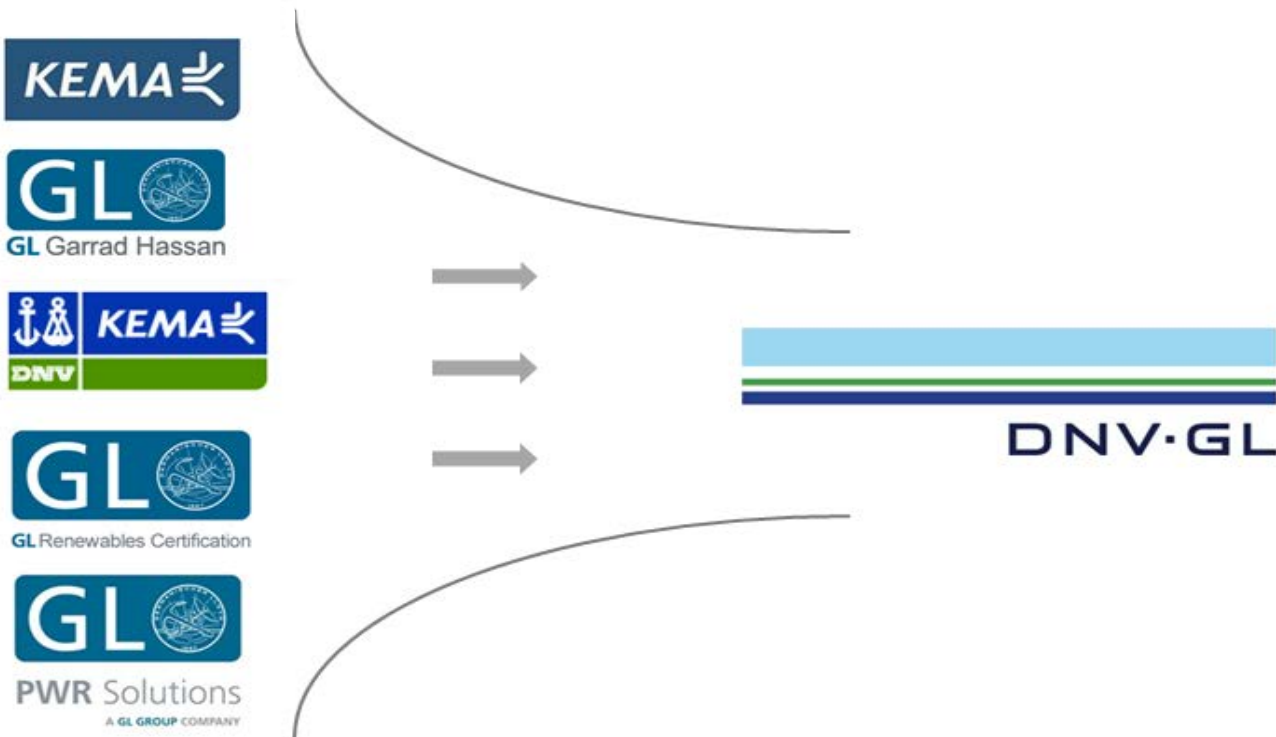


2,500 energy expert help customers throughout the electrical power industry realize efficient, reliable and clean energy for today and the future



COMBINING THE STRENGTH OF WELL-KNOWN BRANDS

DNV GL - Energy combines the strengths and rich heritage of a couple well-known brands in energy, **KEMA**, **GL Garrad Hassan** and **GL**



2500 energy experts help customers throughout the electrical power industry realise efficient, reliable and clean energy for today and the future



Dr.-Ing. Ir. Nasruddin, M.Eng

Head of Mechanical Eng. Department
Faculty of Engineering, Universitas Indonesia



- 2001 - 2005 **RWTH AACHEN – GERMANY**
Lehrstuhl für Technische Thermodynamik
Mechanical Engineering
- 1997 - 1999 **K.U. LEUVEN – BELGIUM**
Toegepaste Mechanica en Energieconversie
Mechanical Engineering
- 1990 - 1995 **UNIVERSITY OF INDONESIA**
Mechanical Engineering



FAKULTAS TEKNIK
UNIVERSITAS INDONESIA

HISTORY

- Established on 17 July 1964.
- The first three departments:
Civil, Mechanical, and
Electrical Engineering
- 1965: Dept. Metallurgy and
Dept. Architecture.
- 2000: Metallurgy and Materials Eng.
- 1985: Dept. Chemical Eng.
- 1999: Dept. Industrial Eng.



ACADEMIC PROGRAMMES

Faculty of Engineering consists of seven departments with twelve Undergraduate Programmes, seven Master Programmes, six Doctoral Programmes, and one Professional Programme for Architect.



Undergraduate Programmes:

1. Civil Engineering,
2. Environmental Engineering,
3. Mechanical Engineering,
4. Naval Architecture and Marine Engineering,
5. Electrical Engineering,
6. Computer Engineering,
7. Metallurgical and Materials Engineering,
8. Architecture,
9. Interior Architecture,
10. Chemical Engineering,
11. Bioprocess Engineering,
12. Industrial Engineering;

Graduate Programmes:

Master Programmes:

1. Civil Engineering,
2. Mechanical Engineering,
3. Electrical Engineering,
4. Metallurgy and Materials Engineering,
5. Architecture,
6. Chemical Engineering,
7. Industrial Engineering;

Doctoral Programmes:

1. Civil Engineering,
2. Mechanical Engineering,
3. Electrical Engineering,
4. Metallurgy and Materials Engineering,
5. Architecture,
6. Chemical Engineering
7. Industrial Engineering

Accreditation of Education Programs

S1

Civil Engineering	A
Environmental Engineering	B
Mechanical Engineering	A
Marine Engineering & Naval Architecture	A
Electrical Engineering	A
Computer Engineering	B
Metallurgy & Materials Engineering	A
Architecture	A
Interior Architecture	A
Chemical Engineering	A
Bioprocess Engineering	A
Industrial Engineering	A

S2

Civil Engineering	A
Mechanical Engineering	A
Electrical Engineering	A
Metallurgy & Materials Engineering	A
Architecture	A
Chemical Engineering	A
Industrial Engineering	A

S3

Civil Engineering	A
Mechanical Engineering	A
Electrical Engineering	A
Metallurgy & Materials Engineering	A
Architecture	B
Chemical Engineering	A
Industrial Engineering	in the process of accreditation

AUN Assessment (since 2008 – now)

Dept. of Mechanical Engineering

Dept. of Civil Engineering

Dept. of Electrical Engineering

Dept. of Metallurgy and Materials Engineering

Dept. of Chemical Engineering

Dept. of Architecture

Dept. of Industrial

have been assessed by Asean University Network (AUN)

Advanced Manufacturing Technology and Automation:

Micro-fabrication and intelligent manufacturing systems.

Thermal and Fire Safety Engineering:

Fundamental study of lifted flames;

Downdraft biomass gasification;

Biofuel for automotive applications; and

Fire safety engineering such as spontaneous combustion, fire calorimetry, smoke detection, flame spread and development of water-mist technology.

Advanced Refrigeration Systems and Technology:

Design and construction for high efficiency refrigeration and air conditioning including the works for green building, cold storage, vacuum and freeze drying, methane storage, low temperature cascade and green building technology.

High Efficiency Fluid Engineering:

Advanced turbulent control for manufacturing processes and vehicle aerodynamics, micro-bubbles application, advanced drag reduction techniques, and micro-turbo machinery.

Advanced Heat Transfer Technology:

Heat and relevant mass transfer in spray drying, forced and natural convection of nanofluids. thermophoretic force, thermal measurement techniques, thermoacoustics, evaporation in small tubes and (some applications in heat exchanger, thermoelectric cooler, and cryosurgery).

Naval Architecture and Marine Engineering:

Ship resistance and power effectiveness for small ship; ship structural design; novel ship materials; and marine transportation.

MECHANICAL ENGINEERING

“Energy Conservation through Efficient Design and Manufacturing”

More information:

Phone: +62-21-727-0032

Email: mesin@eng.ui.ac.id

Web: <http://mech.eng.ui.ac.id>

Nanang Kurniawan (Pertamina Geothermal Energy)



Senior Engineer Reliability

Studied Master Degree in Geothermal Engineering, Institut Teknologi Bandung

Studied Postgraduated Program in Geothermal Energy Technology, The University of Auckland

Studied GE Oil & Gas University Full Program, GE University

Studied Bachelor Degree in Electrical Engineering, Universitas Gadjah Mada

Hanifah Bagus S (Pertamina Geothermal Energy)



- Engineer Mechanical & Piping
- Studied Master Degree in Geothermal Engineering, Institut Teknologi Bandung
- Studied Geothermal Training Programme, United Nation University
- Studied Bachelor Degree in Mechanical Engineering, Institut Teknologi Bandung

Ardila Johan Erdiansyah (Pertamina Geothermal Energy):

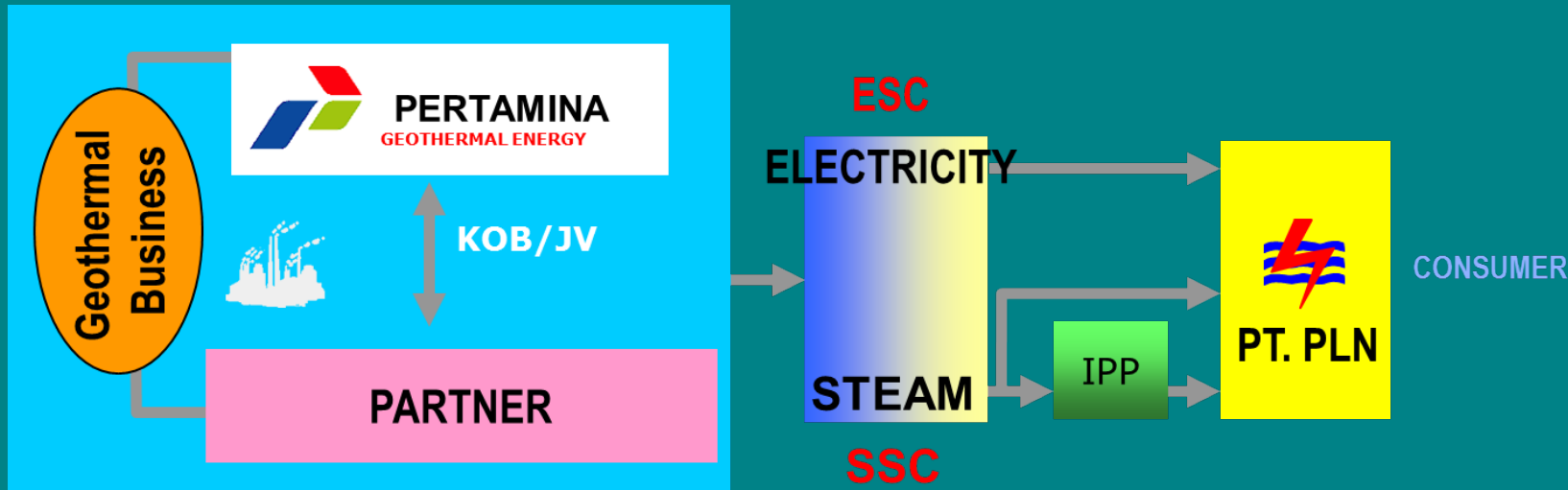


Engineer of Operational Excellence

New Zealand Scholarship Awardee, Master Degree in Electrical and Electronic Engineering, The University of Auckland

Studied Bachelor Degree in Electrical Engineering, Sepuluh November Institute of Technology

Pertamina Geothermal Energy



VISION

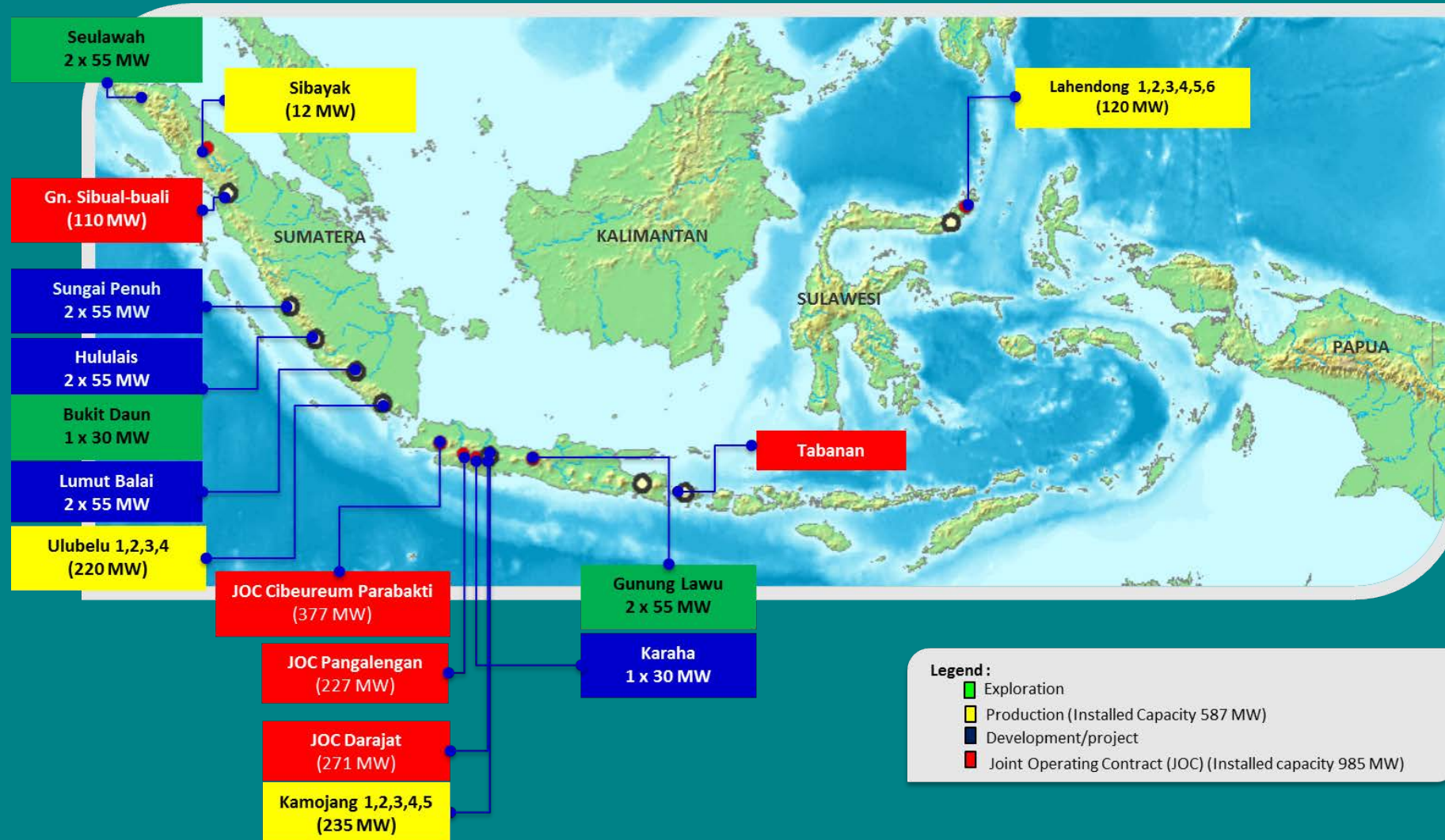
- 2014 : #1 Geothermal Entity in Indonesia
- 2017 : Leading Geothermal Company in Indonesia
- 2021 : Leading Geothermal Company in Asia
- 2025 : World Class Geothermal Energy Enterprise

MISSION

"To professionally manage environmentally sound geothermal operations and business portfolio and provides added values to the stakeholders."



Pertamina Geothermal Energy



Participants of the “Operators of Geothermal Power Plants” course, Jakarta 2017

- Please give your:
 - Name
 - Origin/country
 - Background
 - Study
 - Occupation and company

