GEOCAP
Geothermal Capacity Building Program Indonesia - Netherlands

Date: December 2017

2.06h Overview of international Geothermal, Overview of Indonesian Geothermal power

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From DNV GL and ITB

Document number: GEOCAP/2017/REP/DNV GL/WP2.06/xx

COOPERATING COMPANIES & UNIVERSITIES

GEOCAP

Geothermal Capacity Building Program Indonesia - Netherlands

INAGA

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IF technology

University of Indonesia

DNV GL

Gadjah Mada University

Technical University Bandung

Utrecht University, Faculty of Geosciences, Department of Earth Sciences

Delft University of Technology, Department of Geotechnology

Netherlands Organisation for Applied Scientific Research

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2 PARTICIPATED TEAM

Incorporated in WP 2.06, research about geothermal power plant efficiency systems development is conducted. This deliverable on the research on standards for geothermal energy is developed by ITB and other parties which consist of following members:

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3 INTRODUCTION

This document gives an overview of the standards used for geothermal energy.

4 INTERNATIONAL STANDARDISATION GUIDELINES

Geothermal energy production is a relatively old technique for renewable production of electricity, but at the moment of writing this report (2017) there is no internationally accepted standard protocol to estimate and report the potential of geothermal energy. Only two countries have adopted formal geothermal reporting codes: Australia (AGEA, 2010) and Canada (Canadian Geothermal Energy Association, 2010). Other countries as for example Denmark published best practices for geothermal projects (Danish Energy Agency, 2015).

These codes are built to provide a basis geothermal field identification in these countries in the same way that there are recognised reporting codes for petroleum fields and mineral deposits that are satisfactory to:

- Investors
- Shareholders
- Capital markets

At the end of 2016 UNECE committee on Sustainable Energy approved the 'Specifications for the application of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 to Geothermal Energy Resources' (UNECE, 2016).

Although there a now internationally accepted standard protocols there are standards available for parts of geothermal projects.

These standards are explained in Section 5.

IRENA provides technical concept guidelines for geothermal energy, their geothermal project Navigator tool. (IRENA Geothermal Navigator , 2017).

5 INTERNATIONAL STANDARDS ON GEOTHERMAL ENERGY

Standard	Edition date	Content
ASTM E957:03(2011)e1	2011-09-01	Standard Terminology Relating to Geothermal Energy
ASTM E1675:04(2012)	2012-12-01	Standard Practice for Sampling Two-Phase Geothermal Fluid for Purposes of Chemical Analysis
ASTM E947:83(2015)	2015-03-01	Standard Specification for Sampling Single-Phase Geothermal Liquid or Steam for Purposes of Chemical Analysis
ASTM E1008:03(2009)	2007-02-01	Standard Practice for Installation, Inspection, and Maintenance of Valvebody. Pressure-relief Methods for Geothermal and Other High-Temperature Liquid Applications
EN 16228-1:2014	2014-08-01	Drilling and foundation equipment - Safety - Part 1: Common requirements;Edition: 1
EN ISO 13679:2006		Petroleum and natural gas industries - Procedures for testing casing and tubing connections (ISO 13679:2002)
ISO 17628:2015	2015-07-22	Geothermal investigation and testing to determine thermal conductivity of soil and rock using a borehole heat exchanger
ASTM E1068:85(2009)	2009-04-01	Standard Test Method for Testing Nonmetallic Seal Materials by Immersion in a Simulated Geothermal Test Fluid
ASTM E1069:85(2009)	2009-04-01	Standard Test Method for Testing Polymeric Seal Materials for Geothermal and/or High Temperature Service Under Sealing Stress

6 INDONESIAN STANDARDS ON GEOTHERMAL ENERGY

SNI 6009:2017	2017-06-06	Classification of Resource and Reserve of Geothermal Energy in Indonesia
SNI 8300:2016	2016-06-25	The Identity of Geothermal Wells
SNI 7985:2015	2015-05-19	The Criteria of Geothermal Wells
SNI 13-7122-2005	2005-08-31	Implementing and Reporting Procedures of Geothermal Surveys - Detail Survey Phases
SNI 13-7123-2005	2005-08-31	The Criteria of Fluid Flow Test Equipment for Geothermal Wells
SNI 13-6983-2004	2004-04-19	Implementing and Reporting Procedures of Geothermal Preliminary and Continuation Preliminary Investigations
SNI 13-6987-2004	2004-04-19	Geothermal Well Fluid - Flow Test Procedures
SNI 13-6677-2002	2002-09-05	Reporting of Geothermal Wells Fluid Flow Test
SNI 19-6678-2002	2002-09-05	Electrical Energy Conversion in Fluid Flow Testing for Geothermal Wells
SNI 13-6605-2001	2001-09-27	Test Methods for Fluid Flow Geothermal Wells
SNI 13-6482-2000	2000-12-29	Parameter Number on Estimation of Geothermal Energy Potential
SNI 13-6169-1999	1999-12-29	Method for Estimating the Potential of Geothermal Energy

7 BIBLIOGRAPHY

AGEA. (2010, Nov). *Australian Code for Reporting of Exploration Results, Geothermal Resources and Geothermal Reserves*. http://www.geothermal.statedevelopment.sa.gov.au/ageg/geothermal_reporting_code. Retrieved May 02, 2016, from Australian Code for Reporting of Exploration Results, Geothermal Resources and Geothermal Reserves: http://www.geothermal.statedevelopment.sa.gov.au/ageg/geothermal_reporting_code

Canadian Geothermal Energy Association. (2010). *The Canadian Geothermal Code for Public Reporting*. Retrieved May 02, 2016, from http://www.cangea.ca/geothermal-code-for-public-reporting.html

Danish Energy Agency. (2015). *Rapporter om geotermi* . Retrieved from Danish Energy Agency: https://ens.dk/ansvarsomraader/geotermi/rapporter-om-geotermi

UNECE. (2016). *Specifications for the application of the United Nations Framework Classification for Fossil Energy and Mineral Reserves and resources 2009 (UNFC - 2009) to Geothermal Resources*. Geneva: https://www.unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/UNFC2009_publcom.geoth.2016/20160930UNFCGeothermalSpecsFinal.pdf.