Star Energy Geothermal (Wayang Windu) Green Bond Framework

February 2018

1. Introduction

1.1 General background

Star Energy Geothermal (Wayang Windu) Ltd ("**Wayang Windu" / "Company"**) is a leading geothermal energy company operating a geothermal power plant with a gross installed capacity of 227 MW[1], situated in the Wayang Windu contract area near the town of Pangalengan in West Java, Indonesia. The Company is a wholly owned direct subsidiary of Star Energy Geothermal Pte. Ltd. (Singapore) and an indirect subsidiary of Star Energy Group Holdings Pte. Ltd., one of the leading energy producers in Indonesia. Wayang Windu intends to explore its potential growth by expanding its installed capacity to achieve the Star Energy's group mission to become a 1,200 MW geothermal power plant operator by 2028.

Wayang Windu was established in 1994 under the laws of British Virgin Island and is registered as a permanent business establishment in Indonesia for taxation purposes. The Company operates its geothermal operations through a joint operation contract with PT Pertamina Geothermal Energy and sell the electricity produced from the geothermal operations under a long-term energy sales contract to PT PLN (Persero), a state-owned utility company. The electricity from the Wayang Windu power plant supplies part of the power network's needs in Java-Bali-Madura.

Wayang Windu's electricity production activities began in 2000 with the commercial operation of Unit 1 generator, with a capacity of 110 MW. The capacity was then increased in 2009 with the commercial operation of Unit 2 generator, with a capacity of additional 117 MW. Both generators are supported by 27 steam production wells and 5 injection wells. In the future, Wayang Windu may expand its power generation capacity by striving to obtain steam for a potential development of Unit 3.

The Wayang Windu geothermal power plant helps to reduce Indonesia's overall carbon emissions. Indonesia's energy mix shows that the national electricity grid is still heavily reliant on carbon-intensive electricity. For 2015, the U.S. Energy Information Administration (EIA) shows the following national grid-mix breakdown:[2]

- Fossil fuels: 88%
- Hydroelectric: 6.8%
- Geothermal: 5.1%
- Other: 0.1%

1.2 Wayang Windu's green engagement

Wayang Windu is an active supporter of various programmes in the environmental sector, as well as of the economic development of the community in its operational area. The company was awarded and certified many times for its environmental management and community empowerment, nationally and internationally. Latest awards and certifications include among others:

[1] This represents 13.73% of Indonesia's geothermal power market share in 2016.

[2] 2015 numbers were the latest published figures by the EIA. The numbers can be retrieved on: https://www.eia.gov/beta/international/data/browser/#/?pa=0000000000000000000000000000fvu&c=00000000000000000001&ct=0&tl_id=2-A&vs=INTL.2-12-IDN-BKWH.A&vo=0&v=H&end=2015&showdm=y

- PROPER Gold Award from the Indonesian Ministry of Environment and Forestry[3]
- Energy Efficiency Award from the Indonesian Ministry of Energy and Mineral Resources
- ISO 14001:2015 Environmental Management System (EMS) Certification from Lloyds Register Quality Assurance (LRQA)
- Implementation of Integrated Management System (IMS) and Certification of Environmental Management System, Quality, and OSH ISO 14001:2015, OH SAS 18001:2007 and ISO 9001:2008 in 2006, 2007, and 2014 from Lloyds Register Quality Assurance (LRQA), ISO 50001:2011, ISO 55001:2014 and ISO/IEC 17025:2008

As an operator of geothermal power plants, Wayang Windu contributes to reducing global carbon emissions[4]. The company was among the first geothermal power plant operators in Indonesia to implement an integrated control system with a zero venting concept[5], as well as real-time monitoring of exhaust emissions through cooling towers. Moreover, with its efforts to reduce CO2 emissions, Wayang Windu is in line with the Indonesian government's sustainability strategy, which includes the commitment to decrease greenhouse gas emissions by 26% by 2020, relative to a "business-as-usual" baseline[6].

In addition, Wayang Windu regularly monitors the emissions of cooling towers at Unit 1 and Unit 2 power plants to maintain and improve the performance. The monitoring takes place twice a year, involving independent third parties. The parameters measured include non-condensed gas emission levels such as CO2, H2S, and NH3, which have all been measured to be substantially below the provisions of the quality standards established by the Indonesian government in the past.

Furthermore, as geothermal projects can have different negative environmental impacts, Wayang Windu established a variety of programmes to demonstrate its high commitment to environmental protection. These programmes mainly cover the areas of water conservation[7], energy efficiency, waste reduction[8], and re-vegetation and help to eliminate or minimise unwanted side effects.

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[3] PROPER is mandatory for all Indonesian companies whose production/operational processes impact the environment. In 2017, only 19 companies out of 1,819 evaluated received the "Gold Award". For further information please see: http://proper.menlhk.go.id/portal/?view=x&desc=0&collps=226

[4] Wayang Windu uses the carbon emission of the local energy grid "Jamali" as a baseline to evaluate its carbon saving performance. According to the latest publications by the Indonesian Government, the emission factor of the grid was 903 gCO2/kWh which is significantly above the less than 100gCO2/kWh emissions of the Wayang Windu plant. *(http://www.djk.esdm.go.id/pdf/Faktor%20Emisi%20Gas%20Rumah%20Kaca/Faktor%20Emisi%20GRK%20Tahun%202015.pdf)*

[5] As an eco-friendly power plant, Wayang Windu mainly emits greenhouse gases (CO2) from NCG (Non Condensable Gas) contained in steam from the generation process. To minimize the formation of NCGs, the company strives to prevent excess steam supply in the steam distribution pipeline system from production wells. The method is to apply the "Integrated Control" with zero venting concept during normal operation. The excess steam from the fluctuation in the source (from the well or plant output) was arranged through the auto-trimming valve system, so that there was no excess steam supply resulting in steam venting. Minimization of steam venting through the implementation of integrated Control on Units 1 and 2 can reduce the greenhouse gas emissions. Wayang Windu is the first geothermal power plant operator in the world to be using this system. *Source: Wayang Windu Sustainability Report 2016*

[6] FIRST NATIONALLY DETERMINED CONTRIBUTION REPUBLIC OF INDONESIA. *Source: http://www4.unfccc.int/ndcregistry/PublishedDocuments/Indonesia%20First/First%20NDC%20Indonesia_submitted%20to%20UNFCCC%20Set_November%20%202016.pdft*

[7] Injection of water into the earth uses brine water and condensate water, which is water produced from the operation of the steam field and power plant. All of the produced water condensate can be reused, without the use of surface water in drilling operations. Surface water collection and utilization is under strict supervision to meet domestic needs, as well as to ensure a well-balanced usage of shallow groundwater around the operational area.

[8] Before sending the treated waste water back to the water body, which is Cisangkuy River, we perform domestic waste water treatment process at the sewage treatment plant (STP) in accordance with the provisions of the Decree of the Regent of Bandung

For further explanations on Wayang Windu's green strategy, commitment and various environmental impact programmes, the company refers to its comprehensive Sustainability Report, which is available on Star Energy's corporate website: www.starenergy.co.id

2. Green Bond Framework

The ICMA Green Bond Principles ("GBP") are a set of voluntary process guidelines recommending transparency and disclosure to promote integrity in the development of the Green Bond market by clarifying the approach for Green Bond issuances. In addition, the ASEAN Capital Markets Forum ("ACMF") published its own guidelines in November 2017 (ASEAN Green Bond Standards, "ASEAN GBS"). Compared to GBP, the ASEAN standard provides more detailed guidance on how the GBP are to be applied across ASEAN. The following Wayang Windu's Green Bond Framework ("**the Green Bond Framework**") is in alignment with both, the Green Bond Principles 2017[9], as well as the ASEAN GBS and consists of the following five key pillars:

- Use of Proceeds
- Process for Project Evaluation and Selection
- Management of Proceeds
- Reporting
- External review

2.1 Use of Proceeds

For Wayang Windu's inaugural Green Bond transaction in February 2018, the net proceeds from the issuance of the Bonds (the **"Green Bond Proceeds"**), after deducting fees, commissions and other estimated offering expenses, are expected to fund the Debt Service Account and repay all outstanding indebtedness under the Bond Issuer's 'Existing Senior Debt Facilities' and pay associated repayment expenses, and for general working capital purposes of eligible geothermal energy generation facilities based in West Java, Indonesia.

In case there should be any further Green Bond issuances under Wayang Windu's Green Bond Framework in the future, the proceeds of those bonds will be only used to finance or refinance assets that fall under the following general category of eligible assets (the "**Green Assets**"):

- *Geothermal Energy:* Development, construction and operation of geothermal energy generation facilities. To reduce the direct emissions of carbon dioxide resulting from the operational production of geothermal power plants, Wayang Windu commits itself to the highest industry standards by financing or refinancing only assets with direct emissions of less than 100 gCO2/kWh and 35 mgH2S/Nm3.

No. 666/Kep.005/IPBL/BPMP- 2015. Water processing aims to eliminate or minimize the presence of substances that are harmful to the environment, to meet the approved quality standards, in cooperation with experienced independent parties.

[9] Green Bond Principles 2017 full publication: https://www.icmagroup.org/assets/documents/Regulatory/Green-Bonds/GreenBondsBrochure-JUNE2017.pdf

The existing geothermal field in the Wayang Windu area with a total installed capacity of 227 MW yields direct emissions of less than 100 gCO2/kWh[10] and 35 mgH2S/Nm3[11]. The plant can be considered a good low carbon alternative, in particular in Indonesia's still highly carbon intensive grid.

Other asset categories that are complimentary to geothermal energy generation, or are of comparable environmental benefit, might be added within the scope of future amendments to the Green Bond Framework, however, only after prior approval by Wayang Windu's Environmental and Social Impact Committee (as described under *2.2. Process for Project Evaluation and Selection*).

Assets that are involved in the following operations will be in any case ineligible as Use of Proceeds of a Wayang Windu Green Bond issue:

- Oil and gas power plants
- Clean coal or any other fossil fuel-related technologies
- Nuclear and nuclear related technologies
- Large-scale hydropower plants
- Infrastructure that facilitates the above forms of energy generation

2.2 Process for Project Evaluation and Selection

As described in *2.1 Use of Proceeds*, the proceeds of the 2018 inaugural Green Bond will be fully and entirely used for refinancing of the Wayang Windu geothermal power plant, pay associated repayment expenses, and for general working capital purposes.

Any potential future Green Bond transactions, projects, acquisitions or other assets that are aligned with the Use of Proceeds are generally eligible for Green Bond proceeds allocation and can be proposed by Wayang Windu's Treasury Department to be considered as eligible to Green Bond financing. Wayang Windu will be responsible for verifying requirements set out in the Use of Proceeds, as well as collecting relevant data and evidence to facilitate external review.

To underline its strong commitment, Wayang Windu will establish an Environmental and Social Impact Committee ("ESIC"). For any following transactions, after initial project evaluation and selection, the ESIC will validate the selection decision, or, by the use of its veto power, decline final selection in case mismatches between chosen projects and the Use of Proceeds are identified. Going forward, the ESIC will consist of the following members:

- Head of Treasury
- Two members of the technical team responsible for the Wayang Windu geothermal power plant
- One member responsible for Wayang Windu's Annual Sustainability Report

[10] In order to develop its geothermal energy standard, the Climate Bond Initiative („CBI") has made extensive research in this area and determined 100 gCO2/kWh as a first threshold in its decision tree for certification. According to their analysis, the international weighted average of emission from geothermal power plants is 122 gCO2/kWh. Further, they calculated a combined margin emission factor as the baseline carbon intensity of the national electricity system against which geothermal facilities should be compared. For Indonesia this margin has been 791 gCO2/kWh given the grid still relies heavily on carbon-intensive fossil fuels. (https://www.climatebonds.net/files/files/Geothermal%20Energy%20and%20the%20Climate%20Bond%20Standard%20online%20final%281%29.pdf)

[11] Referring to the Indonesian Minister of Environment Regulation No.21 (2008) concerning the Standard of Unmoved Source of Emissions for Businesses and / or Thermal Power Plant Activities, the standard value/ threshold of H2S is 35 mg/Nm3.

The ESIC will also be responsible for any potential future updates of the issuer's Green Bond Framework and, if there is no extraordinary reason, meet on a semi-annual basis to discuss any potential environmental and social impact issues related to the company's outstanding Green Bond(s).

2.3 Management of Proceeds

Wayang Windu will ensure through its strong governance structure that the proceeds of the issuance will be used toward refinancing eligible green/renewable energy assets. For potential future Green Bonds after the inaugural transaction, Wayang Windu shall allocate the Green Bond Proceeds to unencumbered[12] Green Assets within 12 months after the issuance of such Green Bonds. Wayang Windu will establish systems to monitor and account for the allocation of the proceeds.

The proceeds of each Wayang Windu Green Bond issue will be credited to the general funding account of the issuing entity. In order to keep track of the use of proceeds for each Wayang Windu issuance, the company will maintain a Green Bond Register (the **"Register"**) and earmark the respective assets. The Register will be maintained by Wayang Windu and contains - for each Wayang Windu Green Bond issued - the following information:

- Details about the respective Wayang Windu Green Bond such as:
  - Notional and amount outstanding
  - Issue and maturity date
  - ISIN
- Use of Proceeds:
  - Brief overview of project refinanced
  - Estimate of the assets' beneficial environmental impact

Wayang Windu has set up the respective systems and governance rules that ensure a technical implementation of the management of the Register under this Green Bond Framework.

In general, Wayang Windu will aim for the balance of eligible assets to exceed the total balance of outstanding Green Bonds at any time. Unallocated proceeds, if they should arise in any future transaction, will be earmarked and kept as liquidity reserves until they are reinvested in Green Assets. In any case, the unallocated proceeds are not allowed to be invested in carbon-intensive investments or companies that do not meet the requirements of low-carbon and climate-adaptive economies.

2.4 Reporting

Wayang Windu is committed to publish information in a dedicated Green Bond Report, which shall be made available, on the company's corporate website (www.starenergy.co.id) on an annual basis.

The Green Bond Report will be written on the basis of the company's Green Bond Register and provide the following information:

- The total amount of outstanding Green Bonds

[12] In general, assets are not allowed to be linked to Green Bonds multiple times

- The amount of net proceeds allocated within each Green Bond Asset category, as well as the balance of net proceeds not yet allocated to Green Bond Assets
- Where relevant additional information on type, number, and location of Green Bond assets within each category
- Examples of Green Bond assets financed with Green Bond net proceeds subject to confidentiality arrangements

With regards to environmental impact, Wayang Windu will report the following indicators, subject to data availability, in its Green Bond Report:

- *Geothermal Energy:* Installed geothermal energy production capacity (MW) and estimation of avoided carbon dioxide emissions versus baseline which is the carbon emission of the local energy grid "Jamali"[13]

In addition to the Green Bond Report, Investors should also refer to Wayang Windu's comprehensive Sustainability Report that discloses various other metrics (i.e. amount of water used, energy reduction achievements, etc.) and sustainability efforts on an annual basis.

2.5 External Review

Wayang Windu has mandated Carbon Trust Assurance Limited as external pre-issuance verifier of its Green Bond Framework and Green Assets. The resulting Second Party Opinion is publically available on Star Energy's corporate website. Carbon Trust Assurance Limited will separately carry out post-issuance verification of Wayang Windu's Green Bond Report.

[13] According to the latest publications by the Indonesian Government, the emission factor of the grid was 903 gCO2/kWh (http://www.djk.esdm.go.id/pdf/Faktor%20Emisi%20Gas%20Rumah%20Kaca/Faktor%20Emisi%20GRK%20Tahun%202015.pdf)

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