

Hitachi Zosen Corporation

Green Waste-to-Energy Project

Green bond eligibility pre-issue assessment report

DNV GL second party opinion



Aug. 2018

DNV GL Business Assurance Japan K.K.

Contents

I	Introduction (About issuer and green bond)	3
II	Scope and Objectives	5
III	Responsibilities of the Issuer(Hitz) and the assurance providers, DNV GL	7
IV	Basis of DNV GL's opinion	8
V	Work undertaken	9
VI	Findings and DNV GL's opinion (eligibility against for GB criteria)	10
1.	Schedule-1 Nominated assets & Green bond project outline	13

Hitachi Zosen Corporation Green Bond DNV GL Second Party Opinion

I Introduction (About issuer and green bond)

Hitachi Zosen Corporation (here after Hitz or the issuer) is a plant engineering company rooted in Osaka Tekkosho (Osaka Iron Works) founded in 1881 by E.H.Hunter. Hitz's global enterprises, "Environment and Plant Engineering", "Mechanical Engineering" and "Infrastructure", has expanded in order to provide the values for society through engineering and manufacturing technologies developed by shipbuilding technology (after shipbuilding business division was divested in 2002). Its head office is located at Osaka in Japan. The global enterprise activity is executed with 10,377 employees and 114 branch companies in 19 countries (as of March 31, 2018).

Hitz established its policy "Basic Environmental Protection Policies"¹ for its employees in 1992, and established its environmental management organization which is responsible for environmental issues in order to work actively for resolution of environmental issues, as well. Hitz technologies and trust established in Japan can provide solution for social issues aligned with social communities globally.

1: "Environmental Data book 2017" (Hitachi Zosen) http://www.hitachizosen.co.jp/ir/data/pdf/DB2017_J.pdf

Hitz has also established strategy and policy for concrete activity the "Hitachi Zosen Environmental Protection Promotion Plan" in 1993, which intends to protect ozone layer, global warming and waste reduction, recycling and mitigation as well as activity for regional environment protection.

Hitz's activity has achieved as below results in FY 2016.

- 18.4% CO₂ emission reduction (compared with 2005 fiscal year)
- 17.4% wastes reduction (compared with 2000 fiscal year)
- 66.4% landfill waste reduction (compared with 2000 fiscal year)

Hitz would issue Green Bond as for providing Hitz's environmental solution technology and service (facilities and management) to achieve Hitz's mission.

In this paper, no assurance is provided regarding the financial performance of the BOND, the value of any investments in the BONDS, or the long term environmental benefits of the transaction. DNV GL's objective has been to provide an assessment that the BOND has met the criteria of the Green Bond Principle and the associated Technical Criteria on the basis set out after the next page.

II Scope and Objectives

Hitz intends to finance the projects of specific categories, including:

- "Pollution prevention and control" (energy/emission-efficient waste to energy)
- As some secondary benefit, "CO₂ emission reduction" is prospected.
- According to the Hitz green project plan, the total fund of 5 billion JPY intended to be allocated to green activity in full.
- Hitz would allocate green bond to the project whose benefit of CO₂ emission reduction exceed the negative effect.
- In this green bond project activity, environmental impact was evaluated by the issuer according to the Japanese environmental evaluation methodology required by the relevant laws which includes environmental investigation, estimation and assessment in order to mitigate detrimental effects.
- Table-1 shows the nominated projects and assets

Table-1 nominated projects and assets(energy/emission-efficient waste to energy) details are described in schedule-1

Project Site	Power generation output	Commercial operation
Kyoto (Kyoto)	14.0MW	Mar. 2019
Kikuchi (Kumamoto)	2.8MW	Mar. 2021

*Waste-to-Energy Facility

Waste-to-Energy facility can utilize waste as important resource of energy by burning hygienically. Waste itself is undesirable materials though at the same time is unavoidable by human activities. However, it can be an important energy resource, as well. Hitz can simultaneously realize 'energy generation' and waste treatment of useless, not reusable and not recyclable wastes. Hitz's activities contribute/provide effective solution of energy problem for global future.

DNV GL holds no other engagements with Hitz, including its direct shareholders, for which we foresee conflict of interest to carry out the Scope of Work as defined in the Request for Proposal.

Hitz intends to distribute any unallocated proceeds in line with the Use of Proceeds and Management of Proceeds sections set out in the Hitz Green Bond Framework.

DNV GL Business Assurance Japan.K.K. (henceforth referred to as "DNV GL") has been commissioned by Hitz to provide a Green Bond pre-issue second party opinion. Our methodology to achieve this is described under 'Work Undertaken' below. We were not commissioned to provide independent assurance or other audit activities.

No assurance is provided regarding the financial performance of the issuer, the value of any investments in the BONDS, or the long term environmental benefits of the transaction. Our objective has been to provide an assessment that the BOND has met the criteria established on the basis set out below.

The scope of this DNV GL opinion is limited to the Green Bond Principles 2018 (GBP2018). DNV GL also considered the requirements of the Green bond guideline (MOE, Japan 2017) and Climate Bond Standard Version 2.1 during its assessment, however at the time of review, no Technical Criteria for Waste to Energy was available for Issuer use. No opinion of conformance with the Standard is provided here and no Certification has been applied for at this time. Any future application for Certification under the Climate Bond Standard would be at the discretion of the Issuer, Hitz .

III Responsibilities of the Issuer(Hitz) and the assurance providers, DNV GL

Hitz has provided the information and data used by DNV GL during the delivery of this review. Our statement represents an independent opinion and is intended to inform Hitz management and other interested stakeholders in the BOND as to whether the established criteria have been met, based on the information provided to us. In our work we have relied on the information and the facts presented to us by Hitz. DNV GL is not responsible for any aspect of the nominated assets referred to in this opinion and cannot be held liable if estimates, findings, opinions, or conclusions are incorrect. Thus, DNV GL shall not be held liable if any of the information or data provided by Hitz used as a basis for this assessment were not correct or complete.

IV Basis of DNV GL's opinion

To provide as much flexibility for the issuer, Hitz as possible, we have adapted our Green Bond Principles^{*1}, Green Bond guideline^{*2}, and Climate Bond Standard^{*3} assessment methodologies, which incorporates the requirements of the GBP, to create a Hitz -specific Green Bond Eligibility Assessment Protocol (henceforth referred to as "Protocol") for each project. Our Protocol includes a set of suitable criteria that can be used to underpin DNV GL's opinion. The overarching principle behind the criteria is that a green bond should "enable capital-raising and investment for new and existing projects with environmental benefits".

Our Protocol, the criteria against which the BOND has been reviewed are grouped under the four Principles:

- **Principle One: Use of Proceeds.** The Use of Proceeds criteria are guided by the requirement that an issuer of a green bond must use the funds raised to finance eligible activities.
- **Principle Two: Process for Project Evaluation and Selection.** The Project Evaluation and Selection criteria are guided by the requirements that an issuer of a green bond should outline the process it follows when determining eligibility of an investment using Green Bond proceeds, and outline any impact objectives it will consider.
- **Principle Three: Management of Proceeds.** The Management of Proceeds criteria are guided by the requirements that a green bond should be tracked within the issuing organization, that separate portfolios should be created when necessary to disclose how unallocated funds will be handled.
- **Principle Four: Reporting.** The Reporting criteria are guided by the recommendation that at least Sustainability Reporting to the bond investors should be made of the use of bond proceeds and that quantitative and/or qualitative performance indicators should be used, where feasible.

*1:Green bond principle (June 2018, International Capital Market Association)

*2:Green Bond Guidelines, 2017 (March 2017, Ministry of the Environment)

*3:Climate Bond Standard | version 2.1 (Climate Bonds Initiative)

V Work undertaken

Our work constituted a high level review of the available information, based on the understanding that this information was provided to us by Hitz in good faith. We have not performed an audit or other tests to check the veracity of the information provided to us. The work undertaken to form our opinion included:

- Creation of a Hitz -specific Protocol, adapted to the purpose of the BOND.
- Assessment of documentary evidence provided by Hitz on the BOND and supplemented assessment by a high-level desktop research. These checks refer to current assessment best practices and standards methodology;
- Discussions with Hitz, and review of relevant documentation;
- Documentation of findings against each element of the criteria. Our opinion as detailed below is a summary of these findings.

VI Findings and DNV GL's opinion (eligibility against for GB criteria)

1. Principle One, Use of Proceed

DNV GL has confirmed that the proceeds from the bond issued by Hitz will be allocated to the two waste to energy plant projects which meet the green bond criteria below;

Eligibility Criteria of Green Bond: Pollution prevention and control

All the proceeds will be allocated to the construction and related work/business of "the energy/emission-efficient waste to energy" (GBP 2018) which are proposed in the Schedule-1 (two projects; Kyoto-Nambu and Kikuchi). The outline of the projects is as follows; using thermal energy generated in the process of incinerating general waste, generate steam by the boiler. Generated steam rotates the steam turbine and the electric generator connected to the steam turbine. Finally, thermal energy is converted into electric energy and providing electric power.

In order to achieve this process more effective, Hitz will install a high-efficiency boiler developed by their original technology which improve the power generation efficiency by high temperature and high pressure steam. At the same time, Hitz plans to install the multiple exhaust gas clean up systems to reduce harmful material emission as required, to realize "the energy/emission-efficient waste to energy"

The implementation of the project resulted to provide the electricity without additional CO₂ emissions. It was evaluated that these projects can contribute to mitigate CO₂ emissions from energy sources.

DNV GL evaluates and concludes that Hitz's nominated projects and assets fall within the green bond criteria.

2. Principle Two, Process for Project Evaluation and Selection

DNV GL has confirmed that the two projects described in the Schedule-1, were evaluated and selected through the appropriate process by the relevant department of Hitz based on the policy of the contribution to the environment including "Basic Environmental Protection Policies" and "Hitachi Zosen Environmental Protection Promotion Plan". DNV GL has reviewed evidence that demonstrates that Hitz regularly assesses opportunities for improvement and devises action plans and initiatives to mitigate negative environmental and social impacts from its operation.

Specifically, as for the negative impact caused by construction of waste to energy plant, based on the environment assessment report, appropriate countermeasures were taken after the evaluation (e.g. selection of environmental elements). Secondary CO₂ emission by operation of waste to energy plant (CO₂ emission from the pre-treatment process of waste segregation) was also considered/evaluated. DNV GL confirmed that the amount of these CO₂ emissions were estimated to be immaterial compared to the estimated reduction benefit of CO₂ emission by operation of the waste to energy plant.

3. Principle Three, Management of Proceeds

DNV GL has reviewed and confirmed Hitz' plan to trace/manage the proceeds from the Bond, from the time of issuance to the time of disbursement, as well as the appropriateness and clarity of their plan to manage total amount of the proceeds. Hitz will manage the cash or cash equivalents which equals to fund, until decision of the proceed allocation. DNV GL has confirmed that Hitz will periodically review the outstanding balance of the Bond.

As stated above, DNV GL provides no assurance regarding the financial performance of the Bond, the value of any investments in the Bond, or the effects of the transaction.

4. Principle Four, Reporting

DNV GL has confirmed that Hitz has plans to report/disclose the specific information required by the Green Bond periodically in its company website or Integrated Report. These will include description of the project and its progress, allocation and management of the proceeds invested, as well as the associated qualitative and quantitative environmental impacts (reduction of CO₂ emission).

As for evaluation of CO₂ emission, DNV GL has confirmed that Hitz plans to evaluate/calculate in the appropriate method based on the operation performance of each project (such as operation record). DNV GL will conduct periodic ongoing reviews and state that quantified CO₂ emissions reductions will be reported in those reviews.

Considering all of the above assessment, DNV GL has confirmed that the waste to energy projects of Hitz are designed and are planned to be executed in accordance with related criteria of the green bond (Green Bond Principles and Green Bond Guideline by Ministry of the Environment).

DNV GL Business Assurance Japan K.K.

31st. Aug. 2018



Mark Robinson

Manager, Sustainability Services
DNV GL – Business Assurance, AUS



Naoki Maeda

Managing Director
DNV GL – Business Assurance Japan K.K.



Masato Kanedome

Project leader
DNV GL – Business Assurance Japan K.K.

About DNV GL

Driven by our purpose of safeguarding life, property and the environment, DNV GL enables organisations to advance the safety and sustainability of their business. Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, we empower our customers' decisions and actions with trust and confidence. We continuously invest in research and collaborative innovation to provide customers and society with operational and technological foresight.

With our origins stretching back to 1864, our reach today is global. Operating in more than 100 countries, our 16,000 professionals are dedicated to helping customers make the world safer, smarter and greener.

1. Schedule-1 Nominated assets & Green bond project outline

Ref.	Nominated projects and assets 対象プロジェクト及び資産	GBP category GBP分類	GBP Sub category GBPサブ分類	Amount Fund (Plan) 充当額(計画時)	Remarks 特記事項
01	Waste to Energy (Kyoto-city, Kyoto)	Pollution prevention and control	energy/emission-efficient waste to energy waste to energy	5 billion JPY (for 2 projects total)	14.0MW, general waste Commercial operation(plan):Mar.2019
02	Waste to Energy (Kikuchi, Kumamoto)	Pollution prevention and control	energy/emission-efficient waste to energy waste to energy		2.8MW, general waste Commercial operation(plan):Mar.2021