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ASSESSMENT
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Hanwha Solutions

Second Party Opinion – Green Financing Framework Assigned SQS1 Sustainability Quality Score

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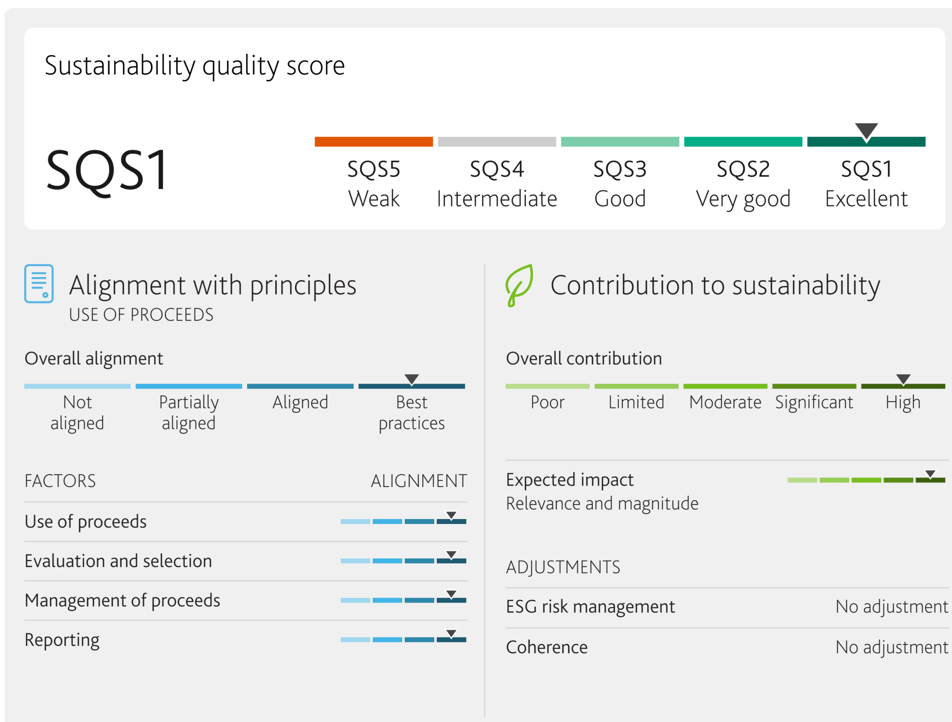
Summary

We have assigned an SQS1 Sustainability Quality Score (Excellent) to the Hanwha Solutions' green financing framework dated June 2023. The company has established its use-of-proceeds framework to finance one eligible green category. Hanwha Solutions has described the main characteristics of the green financing instruments within a formalized framework that covers the four core components of the International Capital Market Association's (ICMA) Green Bond Principles (GBP) 2021 (including June 2022 Appendix 1), and the Loan Market Association, the Asia Pacific Loan Market Association and the Loan Syndications & Trading Association's (LMA/APLMA/LSTA) Green Loan Principles (GLP) 2023. Furthermore, the framework demonstrates a high contribution to sustainability.



Scope

We have provided a Second Party Opinion (SPO) on the green credentials of Hanwha Solutions' green financing framework, including the framework's alignment with the ICMA's GBP 2021 (including the June 2022 Appendix 1) and the LMA/APLMA/LSTA's GLP 2023. Under its framework, the company plans to finance one green category of renewable energy, as outlined in Appendix 2 of this report, using use-of-proceeds green bonds, loans and other debt instruments.

Our assessment is based on Hanwha Solutions' framework dated June 2023, and our opinion reflects our point-in-time assessment of the details contained in this version of the framework, as well as other public and nonpublic information provided by the company.

We produced this SPO based on our Framework to Provide Second Party Opinions on Sustainable Debt, published in October 2022.

Issuer profile

Established in 1965, Hanwha Solutions operates in three business areas including chemicals, total energy solutions, and advanced materials after the merger of Hanwha Chemical, Hanwha Q CELLS and Hanwha Advanced Materials in January 2020. The company's Q CELLS division is a total energy solutions provider and one of the largest producers of solar cells and modules globally. Its current production networks span across China, Malaysia, Korea and the US. The company's subsidiaries include Hanwha Q CELLS Malaysia, which focuses on photovoltaic (PV) module production for solar power generation.

Under its "Sustainable Solutions for All" vision, Hanwha Solutions established environmental, social and governance (ESG) management strategies. In 2021, the company established its 2050 Net Zero road map, which includes the target to reduce its greenhouse gas (GHG) emissions to 35% below 2018 emissions by 2030, and 100% by 2050. The company plans to achieve the targets by joining RE100 for renewable energy transition, replacing fossil fuels with hydrogen-based fuels, and actively developing carbon capture, utilization and storage (CCUS) technologies.

Strengths

» The eligible category intends to finance activities that potentially contribute to a significant reduction of GHG emissions and accelerate net-zero energy transition

» The eligible projects have clearly defined and relevant environmental benefits

» Comprehensive and transparent project evaluation and selection processes are in place and include relevant expertise

» External verification is carried out on the allocation of funds and the reported environmental benefits

Challenges

» Manufacturing of solar components can lead to short-term negative environmental impacts via its energy intensive production process

Alignment with principles

Hanwha Solutions' green financing framework is aligned with the four core components of the ICMA's GBP 2021 (including the June 2022 Appendix 1) and the LMA/APLMA/LSTA's GLP 2023, and incorporates Moody's-identified best practices for all four components:

- ☑ Green Bond Principles (GBP)
- ○ Social Bond Principles (SBP)
- ☑ Green Loan Principles (GLP)
- ○ Social Loan Principles (SLP)
- ○ Sustainability-Linked Bond Principles (SLBP)
- ○ Sustainability Linked Loan Principles (SLLP)

Use of proceeds

Not aligned | Partially aligned | Aligned | Best practices ▼

Clarity of the eligible categories – BEST PRACTICES

Hanwha Solutions has clearly communicated the nature of the expenditures, and has detailed the eligibility criteria and the exclusion criteria for the eligible category. The company has identified the location of eligible projects as within Korea, Malaysia, China, United States, and Europe. The eligible expenditures include those for the production of its solar components, investment in downstream energy distribution including solar and wind power generation, and investment in the Battery Energy Solution System (BESS) businesses.

Clarity of the environmental and social objectives – BEST PRACTICES

The environmental objectives associated with the eligible category are clear and relevant. In addition, the objectives are coherent with international standards, including the United Nations' (UN) Sustainable Development Goals (SDGs).

Clarity of expected benefits – BEST PRACTICES

The expected benefits identified are clear and relevant for the renewable energy category. These benefits are measurable and the company plans to report them in its ongoing reporting. The company has communicated to us that it will commit to disclosing the estimated share of refinancing to investors prior to each issuance. The company has committed to limit the lookback period for refinanced projects to three years.

Best practices identified

- » Eligibility criteria are clearly defined for all project categories
- » Objectives set are defined, relevant and coherent for all project categories
- » Relevant benefits are identified for all project categories
- » Benefits are measurable and quantified for most projects, either ex-ante with clear baselines or with a commitment to do so in future reporting
- » Commitment to transparently disclose the share of proceeds used for refinancing where feasible
- » Commitment to transparently communicate the associated lookback period(s) where feasible

Process for project evaluation and selection

Not aligned | Partially aligned | Aligned | Best practices ▼

Transparency and quality of the process for defining eligible projects – BEST PRACTICES

Hanwha Solutions has established a clear process for verifying the selection and monitoring of eligible projects, which is formalized in its publicly available framework. The Green Financing Working Group (GFWG) is responsible for the verification, approval, regular monitoring and reporting of eligible projects, as well as governing and implementing the initiatives set out in the framework. The GFWG is composed of the accounting, planning, legal, and environment and safety teams with relevant expertise, and is coordinated by the finance team.

Environmental and social risk mitigation process – BEST PRACTICES

Hanwha Solutions will ensure that environmental and social risks are monitored, identified, and managed appropriately through its internal policies and guidelines. The company has established a Safety, Health and Environment governance system to actively monitor and minimize environmental and social risks, which is independently led by the chief safety officer (CSO). In addition, the company operates a Safety and Health Management Committee to establish a company-wide management system. Significant environmental and social risks are assessed against various internal policies and international standards such as ISO certifications. The GFWG will closely monitor the eligibility of green projects on a regular basis, including for identification of potential controversies.

Best practices identified

- The roles and responsibilities for project evaluation and selection are clearly defined and include relevant expertise
- There is evidence of continuity in the selection and evaluation process through the life of the financial instrument(s), including compliance verification and procedures to undertake mitigating actions when needed
- The process for project evaluation and selection is traceable
- Material environmental and social risks for most project categories are identified
- Presence of corrective measures to address environmental and social risks across projects
- ESG controversies are monitored

Management of proceeds

Not aligned	Partially aligned	Aligned	Best practices ▼

Allocation and tracking of proceeds – BEST PRACTICES

Hanwha Solutions has set a clear and detailed process for the management and allocation of bond proceeds in its framework. The company will establish a dedicated ledger, which will contain relevant information of the allocation of proceeds, and the eligible businesses and projects financed. Tracked net proceeds will be periodically adjusted to match allocations to eligible green projects. The company aims to allocate the proceeds within 12 months from each issuance.

Management of unallocated proceeds – BEST PRACTICES

Any temporary unallocated proceeds will be invested in short-term liquid money instruments such as cash and market securities according to the company's investment guidelines. The company has confirmed in internal documents that temporary placements will not include GHG-intensive or controversial activities. In the event that a project is postponed, canceled or otherwise becomes ineligible, the company commits to reallocate the proceeds to another eligible green project.

Best practices identified

- Broad disclosure of a clearly articulated and comprehensive management of proceeds policy to external stakeholders; bondholders or lenders at a minimum
- Short allocation period, for example typically less than 24 months
- Disclosure on temporary placement and presence of exclusion criteria toward environmentally or socially harmful activities
- Commitment to reallocate proceeds to projects that are compliant with the framework

Reporting

Not aligned	Partially aligned	Aligned	Best practices
			▼

Transparency of reporting – BEST PRACTICES
Hanwha Solutions will report annually on the use of proceeds under its framework, and this reporting will be made publicly available on its website. Reporting will occur until bond maturity or upon any significant development of the sustainability financing transaction. The company has stated that reporting will cover descriptions of the eligible green projects, the amount of proceeds allocated at the project category level, the amount of unallocated proceeds and the likely sustainable benefits of the eligible projects. The company has communicated to us that reporting will also include significant developments, issues or controversies related to the projects, if any.

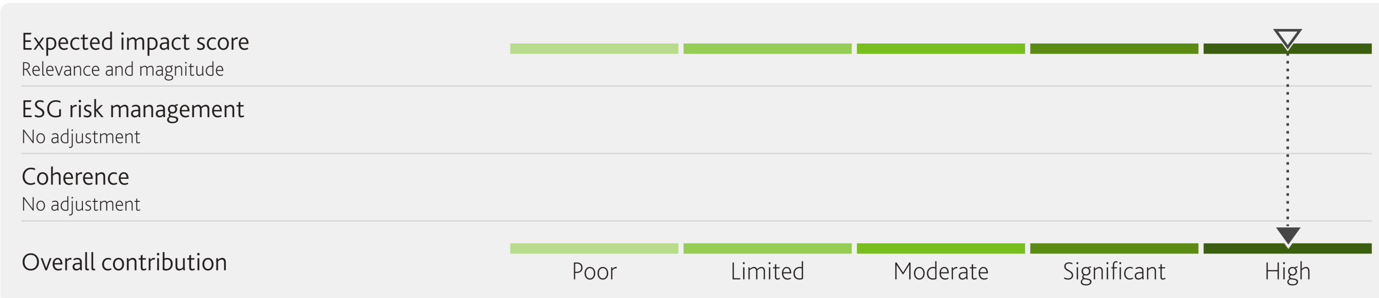
The company has identified relevant environmental reporting indicators for a single eligible category and has clearly disclosed these indicators in its framework. In addition, the company will seek independent and external verification of its proceeds allocation and impact on an annual basis until full allocation or upon any significant development of the sustainability financing transaction.

Best practices identified

- Reporting until full bond maturity or loan payback
- Reporting covers material developments and issues related to the projects or assets
- Reporting on allocation of proceeds and benefits done at least at eligible category level
- Exhaustive allocation reporting – balance or % of unallocated funds, types of temporary investments (e.g. cash or cash equivalent) and share of financing vs refinancing
- Clear and relevant indicators to report on the expected environmental/social impact of all the projects, where feasible, or eligible categories
- Disclosure of reporting methodology and calculation assumptions to bondholders or lenders at a minimum
- Independent audit of the tracking and allocation of funds at least until full allocation and in case of material changes
- Independent impact assessment on environmental benefits by a qualified third-party reviewer at least until full allocation and in case of material changes and/or case studies to report on the social impact/benefits

Contribution to sustainability

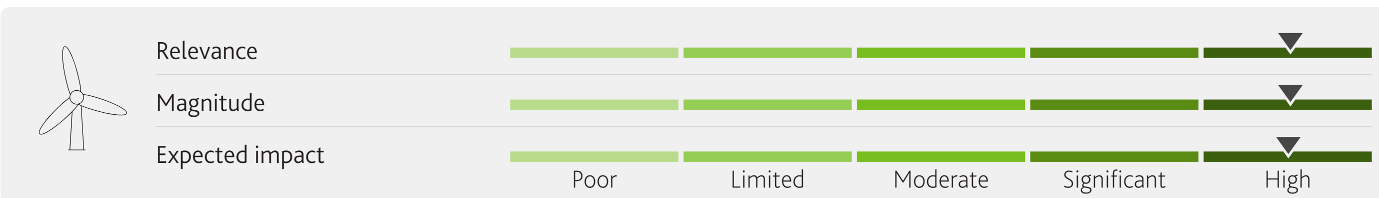
The framework demonstrates a high overall contribution to sustainability.



Expected impact

The expected impact of the eligible project on environmental objectives is considered high. A detailed assessment by eligible category is provided below.

Renewable energy



The company's eligible expenditures include those for the production of solar components, investment in downstream energy distribution including solar power generation, and investment in BESS businesses in various locations including Korea, Malaysia, China, United States, and Europe. Among these projects, most of the proceeds will be allocated to the company's core business, which is manufacturing of solar cells and modules.

The relevance of this category is high. The expansion of renewable energy capacity is essential and highly relevant at the global level to reduce GHG emissions stemming from a wide range of activities including electricity generation, buildings, and industrial and transportation activities. In addition, the renewable energy business segment now accounts for Hanwha Solutions' core business as total sales from the segment surpassed that of all other segments as of the fourth quarter 2022, and its renewable energy segment is expected to steadily expand amid strong demand for solar cells and modules.

The magnitude of this category is high because solar PVs constitute the use of best available technology with limited lock-in effects, and the company's solar cells and modules are essential enabling components of solar PV power generation. Meanwhile, the company is committed to following the technical screening criteria of the EU Climate Delegated Act for its eligible projects related to solar power generation and BESS businesses.

The company strives to minimize its GHG emissions during its production stage by acquiring internationally recognized certifications including the Carbon Footprint for Product (CFP) and the carbon certification program for solar modules granted by the Korean Ministry of Trade, Industry and Energy[1]. Although there could be some short-term negative impacts (for example, energy use during manufacturing, air pollution, e-waste and so forth) during the manufacturing and operational phases, these are mitigated through the company's environmental management system (ISO 14001) and internal waste management program based on the Extended Producer Responsibility (EPR) system, which takes into account recycling of PV wastes. In the long term, increasing the capacity of renewable energy installed is likely to entail a structurally positive and sustainable impact in terms of CO2 emissions avoidance and climate change mitigation.

ESG risk management

We have not applied a negative adjustment for ESG risk management to the expected impact score. Hanwha Solutions has a strong ESG risk management procedure in place to minimize the negative externalities from eligible projects. The company has established a

Safety, Health and Environment (SHE) governance system to actively monitor and minimize environmental and social risks, which is independently led by the CSO, and aims to promote compliance with the law and prevent accidents. Hanwha Solutions has achieved various ISO certifications including the occupational health and safety management system (ISO 45001), quality management system (ISO 9001), compliance management system (ISO 37301) and anti-bribery management system (ISO 37001) certifications across all its divisions. Meanwhile, the Q CELLS division received the environmental management system (ISO 14001) certification for two of its production plants in Korea, along with the TÜV Rheinland Quality Controlled PV certification for solar module quality control.

Coherence

We have not applied a negative adjustment for coherence to the expected impact score. The projects to be financed under the framework align with the sustainability priorities of Hanwha Solutions — to deliver sustainable solutions through technology-based solutions in energy and materials. The Q CELLS division now accounts for the largest share of revenue and this portion will continue to expand as demand for renewable energy rises. While the company operates its chemical division in which the production process is inherently highly energy-intensive, the company is focused on developing a green hydrogen value chain to support the low-carbon transition of the company's own business as well as the broader economy.

To achieve net zero by 2050, Hanwha Solutions plans to reduce GHG emissions to 35% below the 2018 emissions by 2030, and by 100% by 2050. The company is engaged in firm-wide efforts to achieve the targets, including joining RE100 for renewable energy transition, replacing fossil fuels with hydrogen-based fuels and actively developing CCUS technologies.

Appendix 1 - Mapping eligible category to the United Nations' Sustainable Development Goals

The eligible category included in Hanwha Solutions' framework is likely to contribute to one of the UN's SDGs, namely:

UN SDG 17 Goals	Eligible Category	SDG Targets
GOAL 7: Affordable and Clean Energy	Renewable Energy	7.2: Increase substantially the share of renewable energy in the global energy mix

The UN's SDGs mapped in this SPO take into consideration the eligible project categories and associated sustainability objectives/ benefits documented in the company's financing framework, as well as resources and guidelines from public institutions, such as the ICMA SDG Mapping Guidance, and the UN SDG targets and indicators.

Appendix 2 - Summary of the eligible category in Hanwha Solutions' framework

Eligible Categories	Description	Sustainability Objectives	Impact Reporting Metrics
Renewable Energy	Expenditures for, and refinancing of, the company's renewable energy/clean energy business, including: - Solar components under its Q CELLS Division and its subsidiaries and R&D in solar components production - Solar and/or wind power generation assets (including construction and operation) and downstream distribution of energy based on solar and/or wind power generation - BESS(Battery Energy Solution System) projects dedicated to the solar and/or wind power generation assets	Climate Change Mitigation	- Number of solar components produced (number per year) - Annual renewable energy production (equivalent in GW) - Annual production capacity (in GW) - Annual CO2 emission reduced or avoided (tons/ year) - Installed capacity of renewable energy (MW) - Annual CO2 emission reduced or avoided (tons/ year) - Annual renewable energy production (MWh) - Installed capacity of battery energy storage system (MW) - Annual CO2 emission reduced or avoided (tons/ year)

Moody's related publications

Second Party Opinion analytical framework:

» Framework to Provide Second Party Opinions on Sustainable Debt, October 2022

Topic page:

» ESG Credit and Sustainable Finance

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

Endnotes

1 **Hanwha Solutions Sustainability Report 2022**.

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