Hanwha Solutions

Green Financing Framework

June 2023

1. Background of Hanwha Solutions

Hanwha Solutions (the "**Company**") is a newly formed corporation with the merger of Hanwha Chemical and Hanwha Q CELLS and Advanced Materials in January 2020, with the goal to create a global chemical, materials and energy company that leads the global eco-friendly energy market and high-value added materials industry. In particular, the Company's solar voltaic division, a part of its total energy solutions, makes up the largest segment of its operations. (Q CELLS made up 40.8% of the Company's revenue in FY2022). In addition, to expand the Company's renewable energy development portfolio including wind power generation, the Company acquired Q Energy France SAS, which had the name "RES France SAS" before the acquisition, one of the top 10 renewable energy development companies in France, in 2021.

The Company operates in four business areas: Q CELLS, Q ENERGY, Chemical and Insight. The Q CELLS Division provides smart solutions from Photovoltaic (PV) manufacturing, PV plants and systems, to electric power retail. The Q ENERGY Division including Q ENERGY France SAS and Q Energy Europe GmbH, has been a major player in the development, construction and operation of wind turbines and photovoltaic power plants in Europe. The Chemical Division produces Korea's first Polyvinyl Chloride (PVC) and petrochemical industry-based products, such as Polyolefin(PO), Toluene Diisocyanate(TDI), and Chlor-Alkali(CA). The Insight Division develops renewable energy, large-scale real estate, and premium housing as a comprehensive developer.

1.1 Hanwha Solutions' Q CELLS Division

Hanwha Solutions' Q CELLS Division (the "**Q CELLS Division**") is a complete energy solutions provider worldwide. The Q CELLS Division business scope ranges from the midstream of cells and modules to downstream solar solutions through ESS (Energy Storage System), power plants and energy retail, with manufacturing facilities in China, Malaysia, South Korea and the U.S.. Also, the Q CELLS Division has R&D centres across China, Malaysia, and South Korea with its headquarter located in Thalheim, Germany. The Q CELLS Division continuously receives the Hanwha Group's support and investments to develop solar technology, including Anti-LID, Anti-LeTID, Tra.Q, and mores.

Since entering the solar energy business in 2010, the Q CELLS Division has become the world's leading producer of solar cells and modules. Through continual investment in manufacturing capacity and R&D, the Q CELLS Division is expected to achieve an annual cell production capacity of 10.9 GW and module production capacity of 15.8 GW in 2023. In the U.S., the Q CELLS Division built a 1.7 GW module plant in 2019, followed by planned upcoming investments in a 3.4 GW module plant set for production in 2023. This will secure total module production capacity of 5.1 GW, the largest for a single operator in the U.S..

Besides production capacity, the Q CELLS Division's technology, brand and quality in solar cells and modules are well recognized around the world. In 2022, the Q CELLS Division demonstrated its industry-leading technological process by setting a new record for efficiency of next-generation tandem cells. The Q CELLS Division earned the Top Brand PV for brand recognition and customer satisfaction from EUPD Research and received its first Top Brand PV seal in the U.S., the 7th seal in Australia and a 9th consecutive seal in Europe. In addition, the Q CELLS Division was the first solar module manufacturer to pass the TÜV Rheinland's Quality Controlled PV in 2020. Such accomplishments propelled the Q CELLS Division to retain the No. 1 market share in the U.S. for four consecutive years in the residential and three consecutive years in the commercial markets.

The Q CELLS Division is strengthening competitiveness in solar modules and systems while actively promoting new businesses, such as green energy solutions and distributed energy solutions businesses. Recently, the Q CELLS Division announced that it will invest more than $2.5 billion to build a complete solar supply chain in the U.S.. The announcement marked the largest investment in the history of American solar and set it up as the only company in the U.S. to establish a fully integrated, silicon-based solar supply chain from raw material to finished panel.

1.2 Hanwha Solutions' Q ENERGY Division

Hanwha Solutions' Q Energy Division (the "**Q ENERGY Division**") is active in sustainable energy generation, and in selling clean electricity as an independent power producer, running subsidiaries that are located in Germany and France. With more than 20 years of experience, Q ENERGY Division operates an active development pipeline of 14 GW of green energy projects in France, Spain, Portugal, Germany, the Netherlands, Italy and the UK. Its portfolio spans from photovoltaics, to on- and offshore wind, and large-scale energy storage. The Q ENERGY Division operates along the entire value chain of energy projects – from greenfield development, to engineering, procurement and construction (EPC), to operations & maintenance (O&M), to creating value for green energy investors, all the way to acting as an independent power producer (IPP).

1.3 Hanwha Solutions' Chemical Division

Established in 1965, Hanwha Solution's Chemical Division (the "**Chemical Division**") is a market leader in South Korea's petrochemical industry and a global chemical company with high-value-added products, cost competitiveness, and strategic investments. It is a total solution chemical company with streamlined production systems for polyethylene (PE), polyvinyl chloride (PVC), and chlor-alkali (CA). The Chemical Division uses electrolysis to mass-produce green hydrogen, and securely store and transport the hydrogen in type-4 hydrogen tanks made of advanced plastic composites. In addition, the Chemical Division develops eco-friendly technologies and products, such as recycling waste plastics and biochemical.

Developing Green Hydrogen using Electrolyzer Technology

The Chemical Division is focused on developing commercial-hydrogen production via anion-exchange-membrane (AEM) electrolysis. This method has the advantages of using relatively affordable electrodes made of either nickel or cobalt as catalysts, which make the process economical to scale up to commercial-production levels. Through an intensive research into scaling up and refining AEM electrolysis, the Chemical Division seeks to set a new standard for green hydrogen production, by bringing down the amount of electricity needed to produce hydrogen. The goal is the development and application of power-to-gas (P2G) systems that link renewable power plants – such as solar farms and wind turbines – to electrolyzers, wherein surplus and off-peak electricity will help offset the power needed to produce green hydrogen through electricity. This green hydrogen technology will convert electricity produced by wind power into hydrogen, and involves establishing a water electrolysis facility and a hydrogen charging station capable of producing 290 tons of green hydrogen annually.

1.4 Hanwha Solutions' Insight Division

Hanwha Solutions' Insight Division (the "**Insight Division**") is a total development solution company that provides new business models to create new values through planning, developing, operating & maintaining and financing primarily in renewables and premium development businesses. In particular, with the nation's highest EPC (Engineering · Procurement · Construction) capabilities, the Insight Division presents an eco-friendly total energy solution that develops, invests in and constructs solar power while helping to achieve the goals of RE100.

1.5 Sustainability Commitment of Hanwha Solutions

Hanwha Solutions is committed to environmental sustainability, social sustainability and economic sustainability.

Sustainability Initiatives

Efficient resource management is at the top of the Company's agenda. In 2011, the Chemical Division joined the Carbon Disclosure Project (CDP) and became the first business in Korea to disclose its carbon management data to the public. In recognition of its efforts, the Chemical Division received the CDP's Carbon Management Special Award in 2014. Hanwha SolarOne (now Hanwha Q CELLS) was one of the first solar energy providers to receive ISO 14067 certification for quantifying and communicating the carbon footprint of its products. Meanwhile, Hanwha Advanced Materials received ISO 14001 certification for implementing an effective environmental management system[1].

The Company has also made energy efficiency improvements across its chemical refineries. Related projects include the overhaul of the Chemical Division plant in Yeosu, Korea in 2019, replacing older equipment with high-energy-efficiency models, and saving up to 30,000 tons of greenhouse gas emissions per year. Furthermore, the plant's toluene diisocyanate (TDI) unit recycles waste heat to generate electricity at an on-site power plant, cutting the plant's carbon emissions by a further 20,000 tons per year.

The Company has placed greater emphasis on solar energy as a low-carbon electricity source for its global operations, through installation of solar modules at its locations around the world. The Chemical Division is leading this transition by installing solar modules on idle sites at its plants, producing 1.8 MWh of energy per year and reducing carbon emissions by 1,000 tons annually.

The Company has also pursued eco-friendly plastics development. In 2017, the Chemical Division successfully commercialized ECO-DEHCH, an eco-friendly plasticizer, which received Korea's prestigious IR52 Jang Young-shil Award in 2018 in recognition of its safety and product qualities. Additionally, the Chemical Division is developing eco-friendly bioplastics, including biodegradable plastics made from plant-based starches.

The Chemical Division has also engaged in waste recycling. For example, the Chemical Division's manufacturing plant in Ningbo, China, accepts waste anhydrous hydrochloric acid from a neighbouring plant and recycles it to

[1] https://www.hanwha.com/en/sustainability/sustainable-operations.html

produce polyvinyl chloride (PVC). The Chemical Division is also the first in the world to develop recycling technology that turns waste materials from toluene diisocyanate (TDI) manufacturing back into raw materials that can be processed into adhesives, automotive materials, and other industrial goods.

Sustainable Supply Chain Management

Hanwha Solutions fosters a fair trading culture with its suppliers, pursues efficient communication and cooperative relationships, and maintains trusting relationships through mutual partnerships.

The Company strives to establish a sustainable cooperation system by identifying and eliminating supply chain risks in advance using the Guidelines for Suppliers Selection and Management. When registering a new supplier, the Company conducts a review in consideration of the Safety, Health & Environment (SHE), compliance and anti-corruption, and meeting the delivery date for the sustainability in terms of ESG. We also conduct a comprehensive evaluation using a checklist for each item by reflecting for example the credit risk ratings by external specialized agencies, financial information, and stability factors for business implementation.

In addition, the Company conducts regular sustainability evaluations of existing suppliers such as the status of regulatory measures and credit evaluation results and operates? an evaluation system for each order. Furthermore, the Company is strengthening ESG management capabilities by selecting excellent suppliers according to the evaluation results and reflecting the evaluation scores when selecting the next supplier.

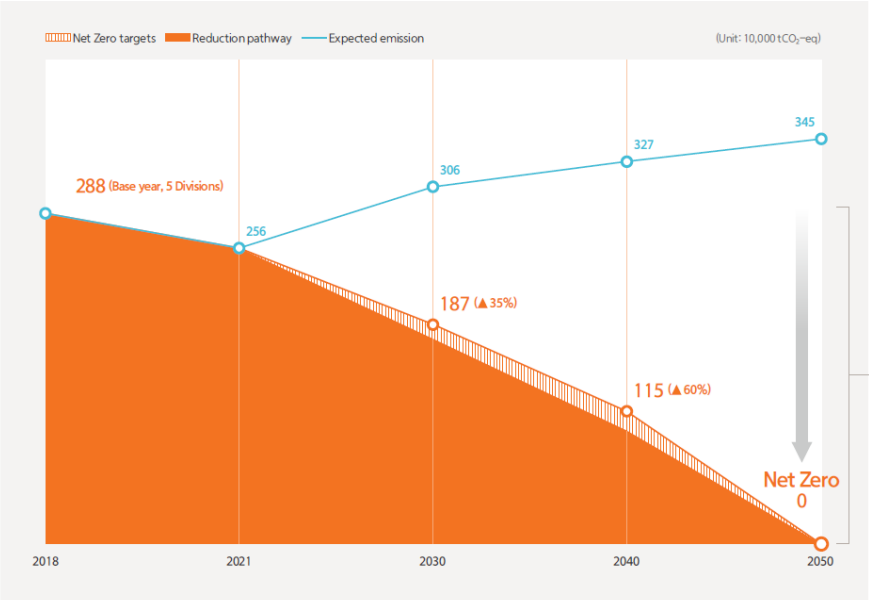
Investment in the Hydrogen Economy

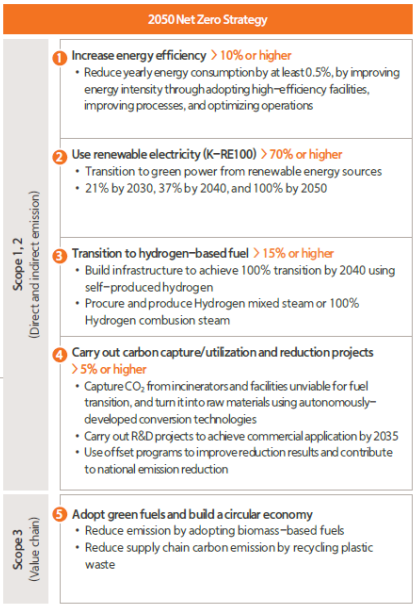
Besides investing in development of green hydrogen technologies under its Chemicals Division, the Company has also made a number of investments in hydrogen-related assets to further grow its clean energy business through to 2025, as it plans to establish an entire value chain across the hydrogen business from production to storage and distribution. In 2019, the Company acquired a local high-pressure tank facilities manufacturer, TK-FUJIKIN, to mass produce hydrogen fuel tanks and hydrogen tanks for trucks. In 2020, the Company signed a deal to acquire a US hydrogen tank maker, Cimarron Composites LLC[2]. The acquisition will help Hanwha Solutions secure advanced technologies required for hydrogen tanks for vehicles, trailers, high-pressure tanks for charging stations and others.

1.6 2050 Net Zero Roadmap

Climate change poses a challenge to all of us and demands enhanced corporate responsibility for environmental agendas. Hanwha Solutions will turn the crisis into a new business opportunity to provide meaningful and sustainable solutions.

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





[2] As hydrogen needs to be compressed at a high pressure to be used an energy source, making high-quality tanks essential for fuel development.

2. Hanwha Solutions Green Financing Framework

Hanwha Solutions and its subsidiaries (for renewable energy) intend to use this Framework as the basis to issue Green Bonds, Loans and other debt instruments ("Green Financing Instruments"). The Green Financing Instruments will fund Eligible Green Projects that conform to the green finance principles listed below:

- International Capital Market Association ("ICMA") Green Bond Principles ("GBP") 2021[3],
- ASEAN Green Bond Standards ("GBS"), issued by the ASEAN Capital Markets Forum (ACMF) in October 2018[4], and/or
- Loan Market Association ("LMA") Green Loan Principles ("GLP") 2023[5]

In aligning with the above principles and guidelines, the Company's Green Financing Framework is presented through the GBP/GBS/GLP's four core components as well as its recommendation for external review:

(a) Use of Proceeds
(b) Process for Project Evaluation and Selection
(c) Management of Proceeds
(d) Reporting

Bonds issued under this Framework may take the form of public transactions or private placements, in bearer or registered format, and may take the form of senior unsecured or subordinated issuances. Such Bonds and any loans entered into under this Framework will be standard recourse-to-the-issuer obligations and investors will not bear the credit risk of the underlying allocated eligible asset exposures.

2.1 Use of Proceeds

The Company and its subsidiaries (for renewable energy) will allocate an amount at least equivalent to the net proceeds of the Green Financing Instruments issued under this Framework to finance and/or re-finance, in whole or in part, green projects which meet the eligibility criteria of the following Eligible Green Project categories ("Eligible Green Projects"), as defined as below.

A maximum 3 years look-back period would apply for refinanced projects and we expect to be fully allocated within 1 year from the issuance of the Green Financing Instrument.

Eligible Green Project category	Eligibility Criteria	Eligible Projects	Relevant UN Sustainable Development Goals ("SDGs")[6]
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	• Investment in Q CELLS Division and its subsidiaries for the production and R&D of solar power components, energy retail businesses and the acquisition and/or construction and/or operation of solar power generation assets • Investment in Q ENERGY Division and its subsidiaries for the construction and/or operation of wind or solar power generation assets • Investment in BESS business for the construction and/or operation of BESS assets	

[3] In alignment with ICMA Green Bond Principles, June 2021, https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles_June-2022-280622.pdf
[4] In alignment with ACMF Green Bond Standards, October 2018, https://www.theacmf.org/initiatives/sustainable-finance/asean-green-bond-standards
[5] In alignment with LMA Green Loan Principles, February 2023, https://www.lsta.org/content/green-loan-principles/
[6] The mapping to SDGs is partially applied for demonstration only. For full mapping please refer to: https://www.icmagroup.org/green-social-and-sustainability-bonds/mapping-to-the-sustainable-development-goals/

2.2 Exclusionary Criteria

Proceeds will not knowingly be allocated to finance projects or activities that have been assessed by Hanwha Solutions as being any of the following:

- Weapons
- Alcohol
- Tobacco
- Fossil fuel
- Large-scale hydro power projects with a generating capacity of >25MW
- Biomass suitable for food production

2.3 Process for Evaluation and Selection of Projects

Hanwha Solutions and its subsidiaries (for renewable energy) have established the Green Financing Working Group ("GFWG") with responsibility for governing and implementing the initiatives set out in the Framework. The GFWG is composed of Accounting Team, Planning Team, Legal Team and Environment & Safety Team, while being coordinated by International Finance Team or Finance Team.

The GFWG will:

- Ratify eligible businesses and projects, which are initially proposed by constituent team members
- Identify and manage any potential and/or perceived social and/or environmental risks associated with the proposed eligible green projects
- Recognize mitigants to known material risks of negative social and/or environmental impacts from the selected eligible green projects
- Undertake regular monitoring of the asset pool to ensure the eligibility of businesses and projects, whilst replacing any ineligible businesses and projects with eligible new green assets
- Facilitate regular reporting on any Green issuance in alignment with our Reporting commitments
- Manage any future updates to this Framework
- Ensure that the approval of Eligible Green Projects will follow the Company's existing credit / loan / investment approval processes

2.4 Management of Proceeds

A dedicated ledger (the "Ledger") will be established to record the allocation of Proceeds. The GFWG will track the Proceeds via a formal internal process to ensure linkage to Eligible Green Projects, and periodically adjust the balance of the tracked net proceeds to match the allocations to Eligible Green Projects.

The Ledger will contain the following information:

I. Green Bond (or loan) details: pricing date, maturity date, principal amount of proceeds, coupon, ISIN number, etc.

II. Allocation of Proceeds:

   a. The Eligible Green Projects List, including for each Eligible Green Project, the Eligible Green Project category, project description, Company's ownership percentage, total project cost, amount allocated, settled currency, etc.

   b. Amount of unallocated Proceeds

Any proceeds temporarily unallocated will be placed in short-term liquid money instruments such as cash and market securities according to the Exclusionary Criteria and Company's investment guidelines until allocation to Eligible Green Projects.

In case of divestment, postponement or cancellation of an allocated project, or if an allocated project no longer meets the eligibility criteria, Hanwha Solutions and its subsidiaries (for renewable energy) shall reallocate the proceeds to other Eligible Green Projects on a timely basis.

2.5 Reporting

For Green Bonds, on an annual basis until full bond maturity or upon any material development of the Sustainability Financing Transactions, Hanwha Solutions and its subsidiaries (for renewable energy) will provide a dedicated green bond report with the following aspects:

I. Allocation Reporting

a. The amount of Proceeds allocated to each Eligible Green Project category

b. When possible, descriptions of the Eligible Green Projects financed, such as project locations, amount allocated, etc.

c. Share of financing vs refinancing

d. Selected examples of projects financed, if available

e. Amount of unallocated Proceeds

II. Impact Reporting

Hanwha Solutions and its subsidiaries (for renewable energy) will provide reporting on the environmental benefits of the Eligible Green Projects, in accordance with the Harmonized Framework for Impact Reporting issued by ICMA, potentially with the following impact indicators. In addition, calculation methodologies and key assumptions will be disclosed.

Eligible Green Project Categories	Eligible Projects	Impact Indicators
Renewable Energy	• Investment in Q CELLS Division and its subsidiaries for the production and R&D of solar components	• Number of solar components produced (number per year) • Annual renewable energy production (equivalent in GW) • Annual production capacity (in GW)
	• Investment in Q CELLS Division and its subsidiaries for the energy retail business	• Annual CO_2 emission reduced or avoided (tons/ year)
	• Investment in Q CELLS and Q ENERGY Division and their subsidiaries for the construction and/or operation of wind or solar power generation assets	• Installed capacity of renewable energy (MW) • Annual CO_2 emission reduced or avoided (tons/ year) • Annual renewable energy production (MWh)
	• Investment in BESS business for the construction and/or operation of BESS assets	• Installed capacity of battery energy storage system (MW) • Annual CO_2 emission reduced or avoided (tons/ year)

For Green Loans, the Company will provide green loan reporting mirroring the above components subject to the loan agreement and lenders' additional requirements.

3. External Review

I. Second Party Opinion

Hanwha Solutions and its subsidiaries (for renewable energy) have appointed Moody's Investors Service to assess this Green Financing Framework and its alignment with the GBP/GBS/GLP, and issue a Second Party Opinion accordingly. The Second Party Opinion will be made publicly available on the Company's official website.

II. Post-transaction External Verification

The Company will seek independent and external verification of its proceeds allocation and impact on an annual basis until full allocation or upon any material development of the Sustainability Financing Transaction(s). The verification will be performed by a qualified external reviewer with relevant expertise, such as an auditor or an environmental consultant.

Amendments to this Framework

The GFWG will review this Framework on a regular basis, including its alignment to updated versions of the Principles as and when they are released, with the aim of adhering to best practices in the market. Such review may result in this Framework being updated and amended. The updates, if not minor in nature, will be subject to the prior approval of the Company and subject to the updated review by an independent external reviewer. Any future updated version of this Framework that may exist will either keep or improve the current levels of transparency and reporting disclosures, including the corresponding review by an external reviewer. The updated Framework, if any, will be published on our website and will replace this Framework.