



WHEN TRUST MATTERS



# SK HYNIX GREEN BOND IMPACT REPORT PERIODIC REVIEW



**Document title:** Periodic Review on 2024 SK hynix Green Bond Impact Report

**Prepared by:** DNV Business Assurance Korea Ltd.

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This statement is valid until the Green Bond Impact Report provided on January 2024 remains unchanged.

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### Disclaimer

Our assessment relies on the premise that the data and information provided by the client to us as part of our review procedures have been provided in good faith. Because of the selected nature (sampling) and other inherent limitation of both procedures and systems of internal control, there remains the unavoidable risk that errors or irregularities, possibly significant, may not have been detected. Limited depth of evidence gathering including inquiry and analytical procedures and limited sampling at lower levels in the organization were applied as per scope of work. DNV expressly disclaims any liability or co-responsibility for any decision a person or an entity may make based on this Statement.

### Statement of Competence and Independence

DNV applies its own management standards and compliance policies for quality control, in accordance with ISO/IEC 17021:2015 - Conformity Assessment Requirements for bodies providing audit and certification of management systems, and accordingly maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. We have complied with the DNV Code of Conduct<sup>1</sup> during the assessment and maintain independence where required by relevant ethical requirements. This engagement work was carried out by an independent team of sustainability assurance professionals. DNV was not involved in the preparation of statements or data included in the Framework except for this Statement. DNV maintains complete impartiality toward stakeholders interviewed during the assessment process.

<sup>1</sup> DNV Code of Conduct is available from DNV website ([www.dnv.com](http://www.dnv.com))

## DNV'S INDEPENDENT ASSESSMENT

### Scope and Objectives

On 17 January 2023, SK hynix (hereafter, "SK hynix" or the "Company") issued a triple tranche Senior Unsecured Bond with the total amount of USD 2.5 bn - consisting of a USD 750 mn 3 year tranche, a USD 1 bn 5 year SLB (Sustainability Linked Bond) tranche, and a USD 750 mn 10 year Green tranche (hereafter, "BOND"). The BOND was issued on the basis of SK hynix's Green Financing Framework (hereafter, the "Framework") which was published in January 2021 and verified by Vigeo Eiris with its Second Party Opinion (SPO).

DNV has been commissioned by SK hynix to provide the review of 2024 SK hynix Green Bond Impact Report. Our criteria and information covered to serve the purpose are described under 'Work Undertaken' shown below. The periodic review was made based on the information and documents provided by SK hynix as well as the interview conducted with them and correspondence exchanges. We do not provide any independent assurance or other type of audit activities.

In this report, no assurance is provided regarding the financial performance of the Issuer, the value of any investments in the BOND, or the long-term environmental benefits arising from the nominated projects. Our main objective of these reviews has been to provide an assessment that the BOND has met the criteria established on the basis set out below.

### Responsibilities of the Management of SK hynix and DNV

The management of SK hynix has provided the information and data used by DNV during the delivery of this review. Our statement represents an independent opinion and is intended to inform SK hynix 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 SK hynix. DNV 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 shall not be held liable if any of the information or data provided by SK hynix used as a basis for this assessment were not correct or complete.

### Basis of DNV's opinion

- **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. The eligible activities should produce clear environmental benefits.
- **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 and that a declaration of how unallocated funds will be handled should be made.
- **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.

## 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 SK hynix 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 Protocol, adapted to the purpose of the annual and impact report, as described above and in Schedule 3 to this Assessment;
- Assessment of documentary evidence provided by SK hynix on the annual report and supplemented by a high-level desktop research. These checks refer to current assessment best practices and standards methodology;
- Review of published materials by SK hynix and SK hynix's website;
- Discussions with SK hynix's responsible people, and review of relevant documentation and evidence related to the criteria of the Protocol; and
- Documentation of findings against each element of the criteria. Our opinion as detailed below is a summary of these findings.

## Findings and DNV's Opinion

DNV's findings are listed below:

**1. Principle One: Use of Proceeds.** SK hynix has reported use of the proceeds of the BOND to finance and refinance projects and assets including:

- Sustainable Water and Wastewater Management
- Energy Efficiency
- Terrestrial and Aquatic Biodiversity Conservation
- Pollution Prevention and Control

DNV reviewed the criteria for the project categories above to determine the eligibility of the nominated projects (including the newly added DDR 5) and assets. DNV can confirm that proceeds were used for eligible green projects mentioned in the Framework.

**2. Principle Two: Process for Project Evaluation and Selection.** The BOND's proceeds have been allocated to finance and refinance the assets as defined in Schedule 1. DNV has reviewed evidence that demonstrates that SK hynix regularly assesses opportunities for improvement and devises action plans and initiatives to mitigate negative environmental impact from its operations.

**3. Principle Three: Management of Proceeds** DNV has reviewed evidence showing how SK hynix traced the proceeds from the Bond, from the time of issuance to the time of disbursement. The full amount of the proceeds will be managed within its existing accounting system, and thereafter disbursed in accordance with its financing schedule. The details of the disbursement and the outstanding value will be tracked using SK hynix's internal financial reporting system. At the end of each financial period, SK hynix reviews the outstanding balance of the BOND. As stated above, DNV 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.** SK hynix has confirmed that it will include and maintain a dedicated section on the Green Bond in its website. This includes a description of the project and value of the proceeds invested, as well as the associated qualitative and quantitative environmental impacts.

On the basis of the information provided by SK hynix and the work undertaken, it is DNV's opinion that the BOND meets the criteria established in the Protocol and that it is aligned with the Green Bond Principles 2021, which is to "enable capital-raising and investment for new and existing projects with environmental benefits".



**for DNV Business Assurance Korea Ltd.**  
Seoul, Republic of Korea / 2 January 2024

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**Chang Rok Yun**  
Senior Auditor

**Project Team**  
DNV Business Assurance Korea

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**Sang Rye Chang**  
Senior Auditor

**Technical Reviewer**  
DNV Business Assurance Korea

## Schedule 1: NOMINATED ASSETS FINANCED (OR REFINANCED) THROUGH GREEN BOND

Total allocation: KRW 935,675.11mn (USD 696 mn)<sup>2</sup>

Refinancing ratio: 43.5%<sup>3</sup>

Project Description	Amount Allocated (KRW million)				
	City <sup>4</sup>	2020	2021	2022 <sup>5</sup>	2023 (1Q-3Q)
<b>Sustainable Water and Wastewater Management</b>					
Regional municipal water project 2nd phase	IC	-	-	5,373	-
Facility investment to reduce water usage and wastewater	IC, CJ	-	-	-	259
Construction of cooling tower drainage reuse system	IC	-	-	485	34
Improvement of water pollutant treatment	CJ	-	-	3,129	-
<b>Energy Efficiency</b>					
Development of DDR5	CJ	52,410	111,235	224,966	299,142
Development of SSD	IC, CJ, BD	-	-	-	228,271
<b>Terrestrial and Aquatic Biodiversity Conservation</b>					
Icheon Eco Park Construction	IC	-	-	1,015	-
<b>Pollution Prevention and Control</b>					
Installment of measuring equipment (TMS) for atmospheric management	IC, CJ	-	-	6,055	123
Establishment of nitrogen oxide (NOx) reduction infrastructure	IC, CJ	-	-	832	409
Improvement of waste heat recovery and temperature reduction system	IC, CJ	-	-	544	-
Investment in pollutant analysis equipment	IC	-	-	407	-
Investment in water quality analysis equipment	CJ	-	-	984	-
<b>Allocation</b>		<b>52,410</b>	<b>111,235</b>	<b>243,791</b>	<b>528,238</b>

<sup>2</sup> KRW/ USD = 1344.8 (as of end Sep 30, 2023)

<sup>3</sup> Refinancing Ratio = Allocation from 2020-2022 / Allocation from 2020-2023.1-3Q

<sup>4</sup> IC = Icheon; CJ = Cheongju; BD = Bundang

<sup>5</sup> Allocation to "Development of DDR5" project pertains to the entire year of 2022, while the rest only covers 2022.4Q

## Schedule 2: IMPACT REPORTING (GREEN CATEGORY)<sup>678</sup>

### Sustainable Water and Wastewater Management

Indicator	2020	2021	2022	2023 (1Q-3Q) <sup>9</sup>
Water Reuse (1,000m <sup>3</sup> )	26,932	34,464	36,075	35,175
Water Reuse Rate (%)	32	37	37	44
Water Consumption per Revenue* (m <sup>3</sup> / 10 billion won)	3,267	3,189	3,883	6,037
Water Withdrawals per Revenue(m <sup>3</sup> / 10 billion won)	21,041	16,675	17,522	26,501
Wastewater Discharge (1,000m <sup>3</sup> )	56,700	57,984	60,858	43,917

\* Values of the impact indicator increases due to decrease in revenue

### Energy Efficiency

#### (1) Improvement in Energy Efficiency vs DDR4

Type of DRAM	2018
DDR5 Server DRAM	14.4%

#### (2-1) SSD Energy Efficiency Development\*

Generation**	Active Read/ WritePower	Seq.Read	Performance per Watt((MB/s)/W)	Performance Improvement***
PE8110 E1.S	20W	6,400MB/s	320	100.0%
PE9010 E1.S	20W	6,600MB/s	330	103.1%
PS1010 E3.S****	25W	14,800MB/s	592	185.0%

\*@8TB, Max Power

\*\* PE8110 (Previous Generation)/ PE9110 (Current Generation)/ PS1010 (Released in 2023)

<sup>6</sup> SK hynix decided not to disclose the impact by each of the allocated projects due to confidentiality

<sup>7</sup> The indicators were made at the company level

<sup>8</sup> Given the allocations were mostly for domestic projects, the impact indicators were limited to domestic figures

<sup>9</sup> 2023.1-3Q data are interim figures and may slightly change in the future

\*\*\* Baseline PE8110 E1.S

\*\*\*\* To see more details of PS1010 E3.S, visit <https://news.skhynix.co.kr/presscenter/ces-2023-preview>

### (2-2) SSD vs HDD Performance Per Watt\*

Type (Model Code)	Power	Read (or Write)	Performance per Watt((MB/s)/W)	HDD vs SSD**
HDD Model (A)***	5.3W	190MB/s	35.8	11.2%
HDD Model (B)***	6.2W	185MB/s	29.8	9.3%

\* @8TB, Max Power

\*\* HDD Performance per Watt vs SSD (PE8110 E1.S) Performance per Watt

\*\*\* Release Year: HDD Model (A) in 2017/ HDD Model (B) in 2021

### Terrestrial and Aquatic Biodiversity Conservation

Location	Area <sup>3</sup> (m <sup>2</sup> )	Impact
Icheon, Korea	20,334	Construction of ecological park to improve environment and secure biodiversity

### Pollution Prevention and Control

Indicator	2022 (1Q-3Q)	2022 (4Q)	2023 (1Q-3Q)
Installation of Environment Analysis System (unit)	-	4	-
Installation of Water Quality Measurement system (unit)	1	6	-

NOx Emission Trend	2020	2021	2022	2023 (1Q-3Q) <sup>10</sup>
<b>Domestic (ton)</b>	<b>705</b>	<b>490</b>	<b>315</b>	<b>176</b>
Incheon (ton)	364	241	195	90
Cheongju (ton)	342	249	121	86

<sup>10</sup> 2023.1-3Q data are interim figures and may slightly change in the future.

### Schedule 3. The SK hynix-specific Eligibility Assessment Protocol

#### 1. Use of Proceeds

Ref.	Criteria	Requirements	Works Undertaken	DNV Findings
1a	Type of bond / loan	<p>The Bond and Loan must fall in one of the following categories, as defined by the Green/Social Bond Principles:</p> <ul style="list-style-type: none"> <li>Green/Social Use of Proceeds Bond</li> <li>Green/Social Use of Proceeds Revenue Bond</li> <li>Green/Social Project Bond</li> <li>Green/Social Securitized Bond</li> <li>Loan instrument made available for Green and Social project (Green and Social use of loan proceeds)</li> </ul>	<p>Review of:</p> <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussion with SK hynix management or a delegated entity</p>	<p>The Bond falls into green bond whose issue date is 17 January 2023 with the amount of USD 750 million with the ten year tenor.</p>
1b	Sustainable Project Categories	<p>The cornerstones of Sustainability Bond and Loan are the utilization of the proceeds of the bond and the loan which should be appropriately described in the legal documentation for the security.</p>	<p>Review of:</p> <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>Sub Project Performance and Financial Documentation</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussion with SK hynix management or a delegated entity</p>	<p>The proceeds of the Bond were used for sustainable water and wastewater management, energy efficiency, terrestrial and aquatic biodiversity conservation, and pollution prevention and control.</p>
1c	Environmental benefits	<p>All designated Green Project categories should provide clear environmentally sustainable benefits, which, where feasible, will be quantified or assessed by the Issuer.</p>	<p>Review of:</p> <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>Environmental impact verification related documents</li> </ul>	<p>DNV reviewed raw data provided by SK hynix to verify environmental impact of the invested projects and its accuracy of calculation.</p> <ul style="list-style-type: none"> <li>According to the Company's ESG strategy framework - PRISM<sup>11</sup>, the Company set the goal of achieving 600</li> </ul>

<sup>11</sup> <https://news.skhynix.com/sk-hynix-prism-framework/>

Ref.	Criteria	Requirements	Works Undertaken	DNV Findings
			<ul style="list-style-type: none"> <li>SK hynix-Intel co-published performance verification white paper on DDR5's application to Intel CPUs (14 September 2023)</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussions with SK hynix management or a delegated entity</p>	<p>million tons of accumulated water resource conservation, which will lead to increase of water reuse. In line with this DNV found that rate of water reuse has increased steadily up to 2023 (1Q-3Q). Though water consumption and withdrawal per revenue (m<sup>3</sup>/KRW 10 bn) has increased, SK hynix has communicated to DNV that this is a temporary situation resulting from the cyclical downturn of the semiconductor industry.</p> <ul style="list-style-type: none"> <li>In terms of energy efficiency, SK hynix newly added DDR5 and DNV reviewed SK hynix-Intel co-published performance verification of DDR5 to verify 14.4% energy efficiency increase against DDR4.</li> <li>With regard to Pollution Prevention and Control, DNV checked the number of installed air pollutant analysis system and water quality measurement system. DNV also confirms that the level of NOx has steadily decreased due to its effort for pollution prevention.</li> </ul>
1d	Refinancing Share	In the event that a proportion of the proceeds may be used for refinancing, it is recommended that issuers provide an estimate of the share of financing vs. re-financing, and where appropriate, also clarify which investments or project portfolios may be refinanced.	<p>Review of:</p> <ul style="list-style-type: none"> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussions with SK hynix management or a delegated entity</p>	KRW 935,675 million (USD 696 million) was allocated out of total USD 750 million. Allocated rate is 92.8% and the refinancing ratio is 43.5% whose period covers from 17 January 2020 to 16 January 2023.

## 2. Process for Project Selection and Evaluation

Ref.	Criteria	Requirements	Works Undertaken	DNV Findings
2a	Investment-decision process	<p>The Issuer of a Sustainability Bond and Loan should outline the decision-making process it follows to determine the eligibility of projects using Sustainability Bond and Loan proceeds. This includes, without limitation:</p> <ul style="list-style-type: none"> <li>A process to determine how the projects fit within the eligible Green and Social Projects categories identified in the Green/Social Bond Principles and Green/Social Loan Principles;</li> <li>The criteria making the projects eligible for using the Sustainability Bond proceeds; and</li> <li>The environmental sustainability objectives, and the social objectives</li> </ul>	<p>Review of:</p> <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>Excerpt of the ESG Management Committee meeting minute to decide eligible projects</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussions with SK hynix management or a delegated entity</p>	<p>DNV’s assessment concluded that the Company has taken appropriate measures for the proceeds to be allocated to the eligible green projects by ensuring that the existing ESG Management Committee, which includes the CEO, review the preliminarily selected potential Eligible Projects for final approval.</p>
2b	Issuer/borrower’s environmental and social and governance framework	<p>In addition to information disclosed by an issuer on its Sustainability Bond process, criteria and assurances, Sustainability Bond and Loan investors may also take into consideration the quality of the issuer’s overall framework and performance regarding environmental sustainability.</p>	<p>Review of:</p> <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>SK hynix Sustainability and CSR Policy and Governance Framework</li> <li>2023 SK hynix Sustainability Report</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussions with SK hynix management or a delegated entity</p>	<p>The Company’s ESG strategy framework - PRISM presents five focus pillars which will contribute to its achievement of Net Zero by 2050. In particular, through ‘Restore’ among PRISM’s five pillars, the Company tries to maintain Scope 1 and 2 greenhouse gas emission at 2020 levels and achieve a renewable energy use rate of 33% by 2030. It also intends to reduce GHG emission intensity by 57% by 2026 compared to 2020. With regard to water use, it tries to conserve 600 million tons of water by 2030, starting from 2020. It also tries to reduce water withdrawal intensity by 35% (by 2026).</p> <p>Its annual Sustainability Report is also published in accordance with environmental reporting guidelines of the GRI reporting, TCFD, and SASB and has shown various environmental performance data in a quantitative manner.</p> <p><a href="https://sustainability.skhynix.com/datacenter?section=sustainReport">https://sustainability.skhynix.com/datacenter?section=sustainReport</a></p>

### 3. Bond Characteristics

Ref.	Criteria	Requirements	Works Undertaken	DNV Findings
3a	Tracking procedure	The net proceeds of Sustainability Bonds should be credited to a sub-account, moved to a sub-portfolio or otherwise tracked by the Issuer in an appropriate manner and attested to by a formal internal process that will be linked to the Issuer's lending and investment operations for Green/Social Projects.	Review of: <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>Sub Project Performance and Financial Documentation</li> <li>ERP snapshot</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> Discussions with SK hynix management or a delegated entity	The evidence reviewed shows how SK hynix has tracked the BOND's proceeds appropriately, from the time of issuance to the time of disbursement. The full amount of the proceeds has reported to have been managed by SK hynix's financial department with existing accounting system. The details of the disbursement and the outstanding value have been tracked in SK hynix's internal financial system.  DNV can confirm that SK hynix's internal process can manage and track the outstanding balance of the green bond proceeds.
3b	Tracking procedure	So long as the Sustainability Bonds and Loans are outstanding, the balance of the tracked proceeds should be periodically reduced by amounts matching eligible green investments or loan disbursements made during that period.	Review of: <ul style="list-style-type: none"> <li>2021 SK hynix Green Financing Framework</li> <li>Sub Project Performance and Financial Documentation</li> <li>ERP snapshot</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> Discussions with SK hynix management or a delegated entity	The evidence reviewed shows that SK hynix has traced the proceeds from the BOND, from the time of issuance to the time of disbursement, and reduced the net balance of proceeds by amounts in line with its financing schedule. Furthermore, At the end of each financial period (on a monthly basis), the outstanding balance of the Bond was reviewed.
3c	Temporary holdings	Pending such investments or disbursements to eligible Green and Social Projects, the Issuer should make known to investors the intended types of temporary investment instruments for the balance of unallocated proceeds.	Review of: <ul style="list-style-type: none"> <li>Sub Project Performance and Financial Documentation</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> Discussions with SK hynix management or a delegated entity	The evidence reviewed shows that unused proceeds are invested in financial products (such as Money Market Deposit Accounts-MMDA or regular deposit accounts) in accordance with the Framework and the Company's internal policy.

#### 4. Reporting

Ref.	Criteria	Requirements	Works Undertaken	DNV Findings
4a	Periodical reporting	<p>In addition to reporting on the use of proceeds and the temporary investment of unallocated proceeds, Issuers should provide at least annually a list of projects to which Sustainability Bond proceeds have been allocated including</p> <ul style="list-style-type: none"> <li>when possible with regards to confidentiality and/or competitive considerations</li> <li>a brief description of the projects and the amounts disbursed, as well as the expected environmentally sustainable impact.</li> </ul>	<p>Review of:</p> <ul style="list-style-type: none"> <li>SK hynix website</li> <li>2024 SK hynix Green Bond Impact Report</li> </ul> <p>Discussion with SK hynix (or a delegated entity)</p>	<p>The report will be uploaded on <a href="https://www.skhynix.com/ir/UI-FR-IR13/">https://www.skhynix.com/ir/UI-FR-IR13/</a>. The Company intends to publish the Impact Report until the net proceeds are fully allocated and upload it on the website. In addition, the relevant information can be also found in its annual sustainability report.</p>



### **About DNV**

Driven by our purpose of safeguarding life, property and the environment, DNV 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.

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