



Green Bond Impact Reporting 2024

January 2024



Double Bottom Line (DBL) Management Philosophy

SK hynix embraces Double Bottom Line (DBL) management as our core philosophy in pursuit of co-prosperity with society through the creation of Economic Value (EV) and the enhancement of Social Value (SV) in all business activities.

SK hynix has classified social value as (1) indirect contribution to economy, (2) environmental performance, (3) social performance, and (4) governance, and disclosed the result transparently. In 2022, SK hynix began measuring the social value generated by its key suppliers, aiming to promote DBL management philosophy across the semiconductor ecosystem.



2022-2023 at a Glance – Global Top-Tier Technology Leader

SK hynix continued to demonstrate its technological competitiveness, releasing groundbreaking products, including HBM3, the highest-performing DRAM available, and the world's highest-density 238-layer 4D NAND. Also, SK hynix is undertaking various activities to achieve its medium to long-term goals based on PRISM.

Securing the Foundation for Future Growth

- Initiated the construction of the new semiconductor production facility, **Cheongju M15X (eXtension)**
- The **Yongin Cluster** project, which includes the construction of four fabs, is on progress, and the construction of the first fab will be completed by 2027

Continued Pursuit of ESG Management

- Increased the company's overall utilization of renewable electricity to **29.6%** and conserved **49.4mn** tons of water resources
- Set the intermediate target of maintaining **absolute GHG emissions (Scope 1 & 2) at the 2020 level** by 2030
- Became a founding member of the **Semiconductor Climate Consortium**, established by Semi-conductor Equipment and Materials International
- Participated in industry-wide collaboration to achieve **net-zero emissions by 2050**
- In January 2023, SK hynix became the first global memory semiconductor company to issue a **Sustainability-Linked Bond (SLB)** which was selected as **the Best Sustainable Finance Deal** by FinanceAsia.

- Format: SLB
- Size: USD1bn
- Coupon: 6.375%
- Tenor: 5-year

Enhancing Technological Competitiveness

- Achieved mass production of **HBM3, the highest-specification DRAM** in the market
- Made progress in high-speed DRAM products such as **DDR5 MCR DIMM¹ and LPDDR5T** (in Jan 2023)
- Developed **238-layer 4D NAND**, and started mass production in May 2023

Note: 1) MCR DIMM(Multiplexer Combined Ranks Dual In-line Memory Module): A module product with multiple DRAM chips attached to the board and improved speed as a result of two ranks operating simultaneously

Achievements and Targets of PRISM

The analysis of SK hynix's sustainability endeavors in 2022 revealed that we successfully achieved our targets for 19 out of the total 25 goals (excluding biennially managed goals).

In March 2023, the ESG Management Committee, along with key executives and the CEO, deliberated on these results and established new targets for 2023. SK hynix's commitment to 2030 PRISM goals will persist in 2023.



Pursue

Category	2030 Goals (Base year: 2020)	2023 Targets	2022 Achievements
Our Value to Society	• Generate value created from SV social contribution activities of KRW 1 trillion (cumulative)	KRW 289.1bn	KRW 250.6bn
	• Create 1,000 jobs for people with disabilities or low-income households*	1,000 jobs	1,052 jobs
	• Promote the participation of 100,000 people in the global ICT talent fostering program (cumulative)*	27,467 persons	17,767 persons
	• Help 100,000 people from underserved communities by conducting social contribution activities with cutting-edge technology (cumulative)*	28,015 persons	23,728 persons
	• Serve 12,000 people through our meal sharing program (cumulative)*	4,280 persons	3,480 persons
Robust Governance	• Increase gender/nationality diversity of the Board to 30%	20%	11%
Safety & Health at Work	• Reduce the integrated incidents rate by 10%* (Base year: 2021)	2.2% decrease	1.8% decrease
	• Reduce the rate of metabolic syndrome by 10%* (Base year: 2021)	2.2% decrease	9.0% increase

Restore

Category	2030 Goals (Base year: 2020)	2023 Targets	2022 Achievements
Climate Action	• Maintain scope 1 and 2 GHG emissions at 2020 levels	6.19mn tCO ₂ eq	7.17mn tCO ₂ eq
	• Reduce GHG emissions intensity by 57% (by 2026)	37% decrease	30% decrease
	• Create energy saving of 3,000 GWh (cumulative)	678GWh	393GWh
	• Achieve 33% renewable electricity use	30%	Overseas 100% Overall 29.6%
Water Stewardship	• Conserve 600 million tons of water (cumulative)	140mn tons	99.23mn tons
	• Reduce water intensity by 35% (by 2026)	5% decrease	14% decrease
Circular Economy	• Receive ZWTL Gold (99%) certification	99% in Wuxi 95% in Chongqing	100% in Korea

Note: * Figures from domestic sites

※ Emissions targets are based on market-based method. GHG emissions from the Dalian fabrication plant (acquired from Intel), and Key Foundry are not reflected. All intensities are measured by a unit of production (Gigabit equivalent)

Achievements and Targets of PRISM

Innovate

Category	2030 Goals (Base year: 2020)	2023 Targets	2022 Achievements
Sustainable Manufacturing	• Reduce GHG emissions from process gases by 40%	26% decrease	5.2% increase
	• Improve the destruction and removal efficiency of abatement systems to 95%	90% (overall)	94% (domestic)
Green Technology	• Double HBM energy efficiency	1.38 times(2024)	1.28 times
	• Increase eSSD energy efficiency by 1.8 times	1.26 times	1.2 times (2021)

Synchronize

Category	2030 Goals (Base year: 2020)	2023 Targets	2022 Achievements
Responsible Engagement	• Ensure 100% of new suppliers sign the SK hynix Supplier Code of Conduct	100%*	100%*
	• Ensure 100% of tier 1 suppliers complete online ESG self-assessment (every two years)	100%*	89% (2021)*
	• Ensure 100% of high-risk/critical suppliers receive on-site ESG assessment (every two years)	100%	53%
	• Triple the number of responsibly sourced minerals (from 3TG minerals to 12 minerals)	5 minerals (3TG+cobalt)	4 minerals (3TG)
Shared Growth	• Invest KRW 3 trillion in technological cooperation to promote shared growth (cumulative)	KRW 782.3bn	KRW 698.6bn

Motivate

Category	2030 Goals (Base year: 2020)	2023 Targets	2022 Achievements
Inclusive Workplace	• Triple the ratio of women in executive positions (Base year: 2021)	2.4%	2.1%
	• Ensure 10% representation of women in team leader positions**	5.1%	4.2%
Empowering People	• Achieve 200 hours of annual self-development education per employee**	128 hours per employee	112 hours per employee

Note: * Figures from domestic sites

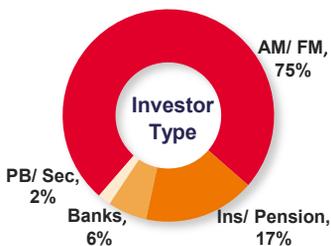
** Figures based on domestic engineering and office staff

Green Bond Key Figures

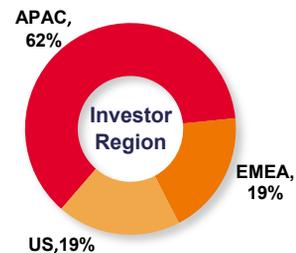
On 10 January 2023, SK hynix priced a USD 2.5bn triple-tranche Senior Unsecured Bond, consisting of a USD 750mn 3-year tranche, a USD 1bn 5-year SLB (Sustainability-Linked Bond) tranche, and a **USD 750mn 10-year Green tranche**. The net proceeds from the Green bond has been allocated toward the financing or refinancing, in whole or in part, of Eligible Projects in accordance with the Green Financing Framework.

Issuer	SK hynix Inc. ("SK hynix")
Issue type	Senior Unsecured, 144A / RegS, Green Bond
Issue Rating	Baa2 / BBB- (Moody's / S&P)
Issue Date	17 January 2023
Amount Issued	USD 750 million
Tenor	10-year
Coupon	6.500%
ISIN	144A: US78392BAF40 & RegS: USY8085FBL32

Green Bond Allocation Distribution by Investor Type



Green Bond Allocation Distribution by Geography



Allocation Highlights

Total Allocation Achieved: 92.8% of the total proceeds

Sustainable Water & Wastewater Management \$ 6.90mn	Energy Efficiency \$ 681.16mn	Terrestrial & Aquatic Biodiversity Conservation \$ 0.75mn	Pollution Prevention & Control \$ 6.96mn
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Allocation Reporting

Total Allocation¹ : KRW 935,675.11mn (Equiv. USD 696mn)

Refinancing Ratio² : 43.5%

Project Description	City ³	Amount Allocated (KRW million)			
		2020	2021	2022 ⁴	2023 (1Q-3Q)
Sustainable Water and Wastewater Management					
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	-
Energy Efficiency					
Development of DDR5	IC	52,410	111,235	224,966	299,142
Development of SSD	IC, CJ, BD	-	-	-	228,271
Terrestrial and Aquatic Biodiversity Conservation					
Icheon Eco Park Construction	IC	-	-	1,015	-
Pollution Prevention and Control					
Installment of monitoring system (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 air pollutant analysis equipment	IC	-	-	407	-
Investment in water quality analysis equipment	CJ	-	-	984	-
Total		52,410	111,235	243,791	528,238

Note: ¹⁾ KRW/ USD = 1344.8 (as of end Sep 30, 2023)

²⁾ Refinancing Ratio = Allocation from 2020-2022 / Allocation from 2020-2023.1-3Q

³⁾ IC = Icheon; CJ = Cheongju; BD = Bundang

⁴⁾ Allocation to "Development of DDR5" project pertains to the entire year of 2022, while the rest only covers 2022.4Q

Impact Reporting^{1, 2, 3}



Sustainable Water and Wastewater Management

Indicator	2020	2021	2022	2023 ⁴ (1Q-3Q)
Water Reuse and Reuse Rate				
Water Reuse (1,000m ³)	26,932	34,464	36,075	35,175
Water Reuse Rate (%)	32	37	37	44
Water Management				
Water Consumption per Revenue* (m ³ / KRW 10bn)	3,267	3,189	3,883	6,037
Water Withdrawals per Revenue* (m ³ / KRW 10bn)	21,041	16,675	17,522	26,501
Wastewater Discharge (1,000m ³)	56,700	57,984	60,858	43,917

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



Energy Efficiency

Type of DRAM	Improvement in Energy Efficiency
Improvement in Energy Efficiency vs DDR4	
DDR5 server DRAM	14.4%

Generation**	Active Read/ Write Power	Seq. Read	Performance per Watt ((MB/s)/W)	Performance Improvement***
SSD Energy Efficiency Development[†]				
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)/ PE9010 (Current Generation)/ PS1010 (Released in 2023)

*** Baseline PE8110 E1.S

**** To see more details of PS1010 E3.S, [click here](#)

Type (Model Code)	Power	Read (or Write)	Performance per Watt ((MB/s)/W)	HDD vs SSD**
SSD vs HDD Performance Per Watt				
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

Note: ¹⁾ SK hynix decided not to disclose the impact by each of the allocated projects due to confidentiality

²⁾ The indicators were made at the company level

³⁾ Given the allocations were mostly for domestic projects, limited the impact indicators to domestic figures

⁴⁾ 2023. 1Q-3Q data are interim figures and may slightly change in the future

Impact Reporting^{1, 2}

Terrestrial and Aquatic Biodiversity Conservation

Location	Area ³ (m ²)	Impact
Icheon, Korea	20,334	The ecological park near the SK hynix Icheon Campus is now open to the public. The water in the park, notable for its crystal-clear quality, originates from the wastewater treatment plant at the Icheon Campus and flows into the Jukdang Stream in Icheon.



Icheon Ecological Park

Pollution Prevention and Control

Indicators	2022 (1Q-3Q)	2022 (4Q)	2023 (1Q-3Q)
Installation of Air Pollutant Analysis System (unit)	-	4	-
Installation of Water Quality Measurement System (unit)	1	6	-

NOx Emission Trend	2020	2021	2022	2023 (1Q-3Q) ³
Domestic (ton)	705	490	315	176
Ichoen (ton)	364	241	195	90
Cheongju (ton)	342	249	121	86

Continuous monitoring through a biomonitoring system

- ✓ SK hynix continuously monitors the surrounding environment to minimize any negative impact we may have on the ecosystem around our plants, and make restoration efforts if any damage is incurred.
- ✓ To this end, we have installed and operated a biomonitoring system as well as a telemonitoring system (TMS) that measures the physicochemical properties of effluent in the automatic water quality monitoring system.



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²) The indicators were made at the company level

³) 2023. 1-3Q data are interim figures and may slightly change in the future

Case Study: DDR5 and its Application

- SK hynix – Intel co-published **performance verification white paper on DDR5's application to Intel CPUs** for use in servers (14 September 2023)
- SK hynix's **DDR5 boosts server bandwidth by 70% while lowering power consumption by 14.4%** compared to the product's previous generation

SK hynix – Intel White Paper on DDR5's application to Intel CPUs

On 14 September 2023, SK hynix announced that it has co-published a white paper with Intel which reveals that its **DDR5 server DRAM applied to Intel's CPUs demonstrated industry-leading performance levels.**

The recent server industry has called for low-power, high-performance semiconductors. The white paper highlighted that SK hynix and Intel will usher in an era of more advanced data centers through memory and CPUs that deliver industry-leading performance and energy efficiency.

The white paper reveals that **SK hynix's DDR5 uses 14.4% less power than DDR4**, while the 4th Gen Intel® Xeon® Scalable processors offer performance efficiency that is 2.9 times greater than the previous generation. In servers with Xeon, DDR5 achieved an improved performance per watt that was **1.22 times higher for**

integer computations and 1.11 times higher for floating point computations compared to DDR4. Accordingly, the energy efficiency provided by DDR5 and Xeon to allow server chip customers to **build more sustainable data centers.**

(Source: Intel White Paper [[Click here to read the full white paper](#)])



Outstanding Performance of SK hynix DDR5

DDR5's power consumption was 14.4% less than DDR4 due in large part to new technologies such as High-K Metal Gate (HKMG). HKMG is a next-generation process that uses a High-K insulating film inside a DRAM transistor to prevent leakage current and improve its capacitance—the ability to store charge. Semiconductor memory products with HKMG therefore have a higher power efficiency.

