

# ENVIRONMENT

- 7. GREEN POLICY
- 8. ECO-PRODUCTS
- 9. EHS MANAGEMENT



Samsung is committed to providing eco-friendly products and services based on a green management ideology to contribute to lives of humanity and the preservation of the world's environment through business activities that respect people and nature. At all worksites, we minimize all environmental impacts, from the purchase of raw materials, development, production, and distribution to use and disposal stages of products. We also apply stricter standards to the management of hazardous materials used for the manufacturing process, implementing EHS management for employees and local communities. —

## ENVIRONMENT

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# ENVIRONMENT GREEN POLICY

**Material issues**

1. GHG Reduction at Worksites
2. Environmentally-friendly products and service

## OUR VISION

Eco-friendly management is part of the Five Samsung Business Principles; demonstrating that the company will do its utmost to conduct business activities that respect and improve the lives of people and conserve the planet's resources. Our Green Management vision is "Providing a Green Experience, Creating a Sustainable Future" and is symbolized under our trademark slogan "PlanetFirst".

## OUR COMMITMENT

Samsung is committed to conducting and communicating activities at both strategic and operational levels of the company; to preserve the environment. These activities span across our facilities, at the workplaces of our suppliers, and local communities worldwide. We also strictly adhere to our Environmental Health & Safety (EHS) policies regarding environmental issues related to our facilities and employees.

## IN THIS REPORT

Through the work of United Nations Framework Convention on Climate Change (UNFCCC), Paris COP21 in December 2015 and the World Economic Forum in Davos in January 2016 the global economy is unanimously recognizing that climate change is a significant threat to the global economy. Governments have committed to accelerate the shift to a low-carbon economy model. In this chapter, we will introduce what Samsung is doing to respond to climate change through EM2020 (Eco-Management 2020) and our mid-term roadmap for green management. This roadmap includes operation systems, communication activities, and highlights major awards we have received from external organizations.

## TRENDS & CHALLENGES

**Increased risk from climate change** According to the IPCC (Intergovernmental Panel on Climate Change), if GHG emissions continue as they are now, global temperatures are expected to rise an average of 1.8°C by 2050.

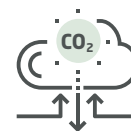
For climate change mitigation and adaptation to it, countries worldwide are forecasted to make annual investments of 1 percent of their GDP, or USD 70 billion to 100 billion, by 2050 (Stern Review). Responding to climate change is an urgent task for humanity and a new driving force for industries. Through reduced GHG emissions and clean technology, companies are being asked to contribute to the protection of the global environment, while also creating business opportunities and increasing corporate value.

## WHAT WE ARE DOING



### Declaration of Green Management and Green Management System

Sharing eco-friendly ideas and our vision through the Green Management Declaration, mid-term roadmap, and Environmental Declaration. Operating various green management councils and an established global green management system to supervise our company wide environmental efforts



### EM2020

Through EM2020, second phase of mid-term roadmap, managing GHG emission reduction at the product use stage and the annual reduction rate of GHG emission intensity at worksites, as performance indicators



### Response to Climate Change

Analyzing climate change risks, and reflecting the results when deciding upon corporate policies according to their importance. We also conduct research projects with external institutions for adaptation to climate change



### Green Communication

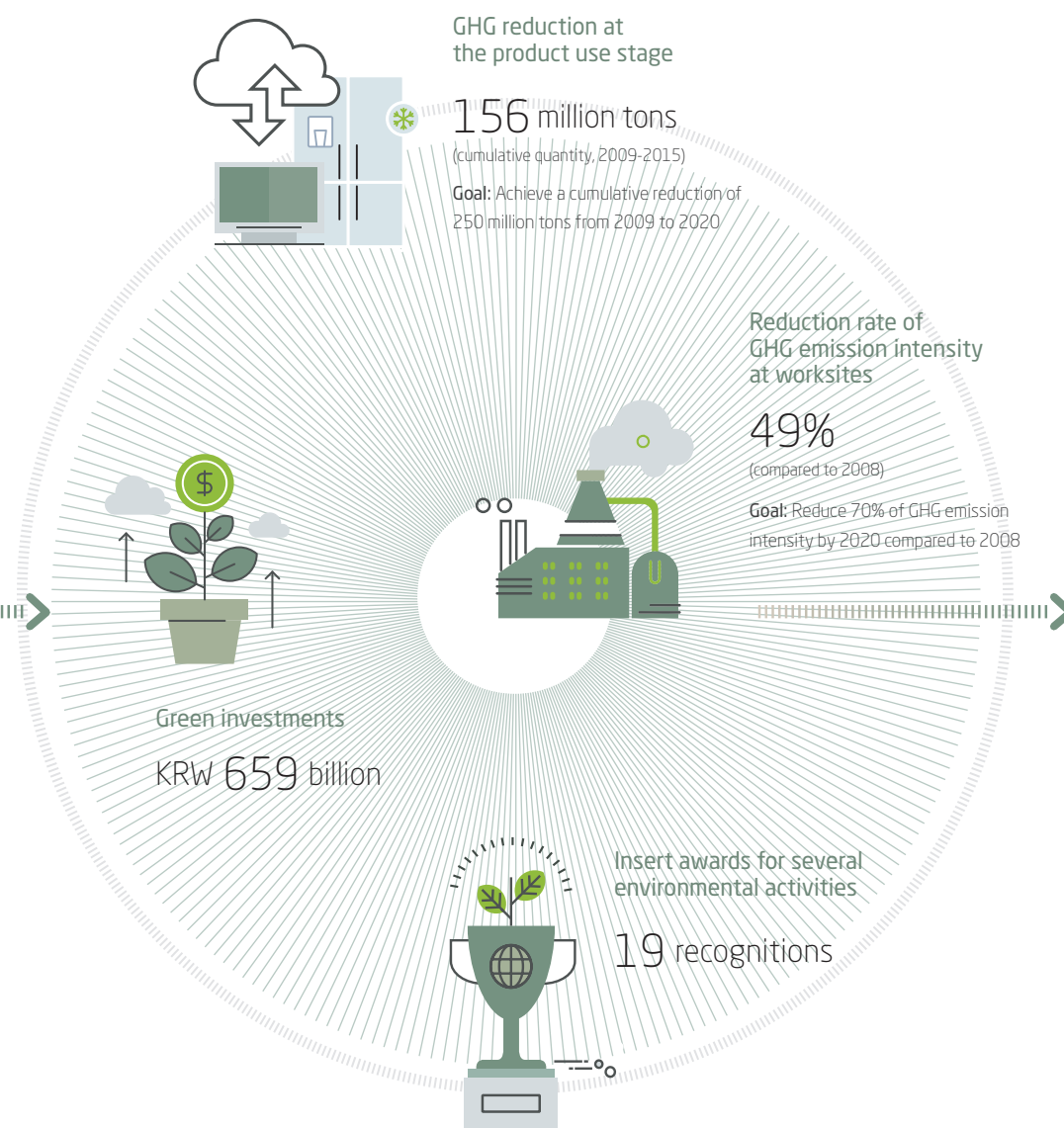
Communicating with relevant stakeholders on green activities through established channels and external agencies; e.g. the Carbon Disclosure Project and Water Disclosure Project

Link to SDGs



[Goal 7] Ensure access to affordable, reliable, sustainable and modern energy for all  
**7.a** By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fue technology, and promote investment in energy infrastructure and clean energy technology

[Goal 13] Take urgent action to combat climate change and its impacts  
**13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries



## FUTURE PLANS

1

### Green Management Activities

Pursue continuous and progressive green management activities such as green management councils, responses to external evaluations, and joint research with academia




## Green Management

Since its foundation, Samsung has worked tirelessly to fulfill its environmental responsibility. This is demonstrated by the fact that eco-friendly management principles are core values of our business.

We committed to a high degree of environmental protection through the Environmental Declaration of 1992 and reinforced this commitment through the Green Management Declaration in 1996. In 2009, we announced Eco-Management 2013 (EM2013), a mid-term roadmap for green management, and established the slogan PlanetFirst to symbolize a new value system of green management.

### Value System of Green Management

<p><b>Basic Philosophy</b></p> <p>Contribute to the prosperity of human life and the conservation of the environment by conducting business activities that respect humanity and nature.</p>
<p><b>Vision</b></p> <p>Providing a Green Experience, Creating a Sustainable Future</p> <p>Provide customers with a new green experience and lead a sustainable future in a global society through innovative green products and technologies.</p>
<p><b>Slogan</b></p> <p>The slogan PlanetFirst captures Samsung Electronics' determination to pursue corporate social responsibility and sustainable management through business activities that put top priority on the Earth.</p> 

### GHG Reductions at the Product Use Stage

(million tons of CO<sub>2</sub>)

■ Cumulative reduction of GHG at the product use stage  
■ Annual reduction



\* See Chapter 8 for detailed information on GHG emissions of products

## Mid-term Roadmap: Eco-Management 2020

Samsung established its mid-term roadmap of Eco-Management 2020 (EM2020) in 2014. The company now manages GHG reduction at the product use stage and during the manufacturing process as key performance indicators (KPIs). We will continue to work hard to provide new value for customers, the environment, and society through eco-friendly innovation activities.

### GHG Reduction at the Product Use Stage: Cumulative Reduction of 250 Million Tons from 2009 to 2015

In order to reduce GHG emissions at the product use stage, we continuously improve the energy efficiency of products, with the aim of achieving a cumulative reduction of 250 million tons of GHG emissions at the product use stage from 2009 to 2020. In addition, we reduced approximately 33 million tons of GHG emissions in 2015.

### Reduction of GHG Emission Intensity at Worksites: Reduce 70% of Intensity by 2020 Compared to 2008

To reduce GHG emissions at manufacturing sites, Samsung operates facilities with high energy efficiency and treats gases generated during the production process such as F-Gas. By doing this, we aim to reduce 70 percent of 2008 GHG emission intensity levels by 2020. GHG emissions intensity has increased due to the expansion of our global manufacturing sites and production facilities, but we will work hard to reduce absolute emissions by continuously improving energy efficiency at each worksite.

## Green Management System

### Operation Units

At Samsung, the Global CS (Customer Service) Center and the Environment & Safety Center, under the direct control of the CEO, are in charge of general issues regarding products and environment health and safety, respectively. The Global CS Center handles product environment aspects, such as the establishment of global green management strategies, operation of eco-design processes to develop eco-products, management of hazardous substances in products, responses to product-based energy regulations, and recycling of waste electronic goods worldwide. For its part, the Environment & Safety Center handles overall areas of the environment and safety of global manufacturing sites, including GHG, water resources, and safety & health management.

### Reduction of GHG Emissions Intensity

(tons of CO<sub>2</sub> / KRW 100 million in sales)



\* For more detailed information on GHG emissions, see Chapter 9.

In addition, we regularly operate green management meetings that are joined by related divisions to foster company-wide cooperation and to reinforce green management in all areas of the business. These meetings help the company to monitor stakeholder requirements, and global trends, to consider new business strategies focused with environmental relevance and to promote cooperation of all involved departments in charge of developing eco-products.

## Global Green Management System: G-EHS, e-CIMS

### Company-wide Meetings for Green Management

	Description	Organizer	No. of Meetings
Environment and Safety Committee	Deliberate on green management strategies and consult on key issues at worksites	CFO	3/year
Eco Council	Establish eco-product development goals and implementation strategies	Head of Global CS Center	2/year
IM/CE Division Synergy Committee	Consult on EHS issues, best practices, and healthcare at worksites	Head of Environment and Safety Center	3/year
DS Division EHS Committee	Consult on key EHS issues	CEO	6/year
Company-wide EHS Manager Council	Consult on the establishment of safety culture, compliance with laws and regulations, and management of chemical substances	Head of Environment and Safety Center	6/year
Company-wide GHG Council	Establish and execute action plans in response to climate change	Head of Environment and Safety Center	4/year

Samsung has developed a Global Environment, Health & Safety System (G-EHS) for the integrated management of EHS areas. Through G-EHS, we have also established a system to share overall information on green management, such as GHG reduction, responses to product environment regulations, prevention of environment and safety accidents, and performance management. In this way, we have maximized the efficiency of internal green management communications. Moreover, we operate an Environmental Chemicals Integrated Management System (e-CIMS) for our suppliers to prevent the inclusion of hazardous substances in our products by examining documental evidence of material testing and conducting on site audits. Furthermore we encourage our suppliers to establish an environmental management system, as of 2015, 2,018 of Samsung's suppliers had ISO 14001 certification to promote environmental management activities.

### Green Investment

Samsung regularly evaluates green investments by considering both economic profitability and the environmental gains obtained through green management. This information is utilized to make reasonable green management decisions.

### Green Communication

Samsung annually discloses green management strategies and goals. It also reports to its stakeholders on the company's activities in each area of green management, including GHG emissions, eco-products, eco-friendly social contribution activities, and stakeholder communication programs.

In particular, the company is involved with the Carbon Disclosure Project and the Water Disclosure Project, led by the CDP, to disclose its performance and information on climate change and water management.

### Green Communication

Consumers	<ul style="list-style-type: none"> <li>· Korea) Green Shop · Korea) PlanetFirst school education program · USA) Recycling Direct</li> <li>· Germany) IFA trade fair environmental promotion · Global) Samsung Newsroom articles on environmental topics</li> </ul>
Suppliers	<ul style="list-style-type: none"> <li>· Korea) Support for establishing GHG inventory</li> <li>· Korea) Green procurement guide</li> </ul>
Local Communities	<ul style="list-style-type: none"> <li>· Korea) Semiconductor Plant Communication Council</li> <li>· Germany) No Waste Day · UK) E-recycling Lessons in Digital Classrooms</li> </ul>
Employees	<ul style="list-style-type: none"> <li>· Korea) Campaigns to collect e-waste</li> <li>· Global) Green Sales Guides for flagship product</li> </ul>

### Green Investment

(KRW 100 million)

#### Facility investments

3,267

Investments in facilities to prevent air/water/waste pollution at worksites

#### Operating cost

3,323

Cost of operating facilities to prevent environmental pollution and other expenses



6,590

Total



1 Upcycling of electronics in Sweden  
2 No Waste Day in Germany

### Eco-friendly Social Contribution Activities

In order to fulfill its corporate social responsibility, Samsung conducts a variety of eco-friendly social contribution activities. This includes using products with high energy efficiency with employees and local communities, a campaign to recycle cellphone waste, and volunteering for marine conservation. In fact, in some countries like Korea, Sweden and UK our employees take part in educational programs as lecturers to teach students under the college level about the importance of the environment and to improve their daily habits when it comes to environmental protection by saving/recycling energy and resources.

## Response to Climate Change

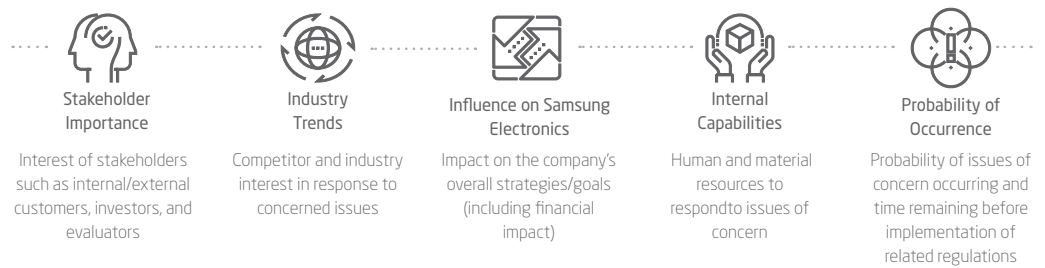
### Analysis of Risks and Opportunities

Samsung analyzes risks and opportunities related to climate change and then prioritises selected issues based on their materiality and influence so that they can be reflected in the company's policies.

#### Process of Responding to Climate Change

- 1 Issue Identification
- 2 Risk and Opportunity Assessment
- 3 Strategy Development
- 4 Implementation
- 5 Result Analysis
- 6 Goal Re-establishment

#### Criteria for Analysis of Risks and Opportunities



#### Risk Management and Utilization of Opportunities

Risk Management			Opportunity	
Response Activity	Classification		Classification	Creation Activity
Developing refrigerants with low global warming potential	Carbon tax	Regulatory	International Agreements	Promoting CDM projects at worksites, securing emissions credits
Establishing a system to reduce carbon emissions and to respond to carbon trading	GHG emissions trading scheme		Regulations and standards on product labeling	Expanding acquisition of eco-labels and energy labels; and proactively working with standardisation bodies
Developing products with high energy efficiency and acquiring related certification	Regulations on product energy efficiency			
Expanding investments in facilities to prevent and recover from natural disasters	Typhoon and flood damage	Physical	Rise of average temperatures	Reinforcing the energy solutions business for air conditioners and buildings
Preparing scenarios on disaster prevention and recovery and investing in heating/ air conditioning facilities	Yellow dust		Increased air pollution such as yellow dust and fine dust	Expanding the launch of air purifiers and sterilization washing machines
Strengthening internal green activities and external communication	Corporate reputation	Other	Company evaluations	Identify areas for improvement
Researching consumer insight and expanding development of eco-products	Consumer behavior changes		Customer (B2C and B2B) requests	Preemptive response to customer demand for eco-products



## Establishment and Implementation of Strategies

In order to better respond to climate change, Samsung established policies to tackle scope 1, 2 and 3 emissions. This was approached by choosing to reduce GHG emission intensity at worksites and to reduce GHG emissions at the product use stage as key goals and then develop implementation strategies under EM2020, its mid-term roadmap for green management. Additionally, the company continues to explore ways to reduce emissions by monitoring indirect GHG emissions from such factors as employee business trips, logistics, and suppliers.

### Climate Change Response Strategies

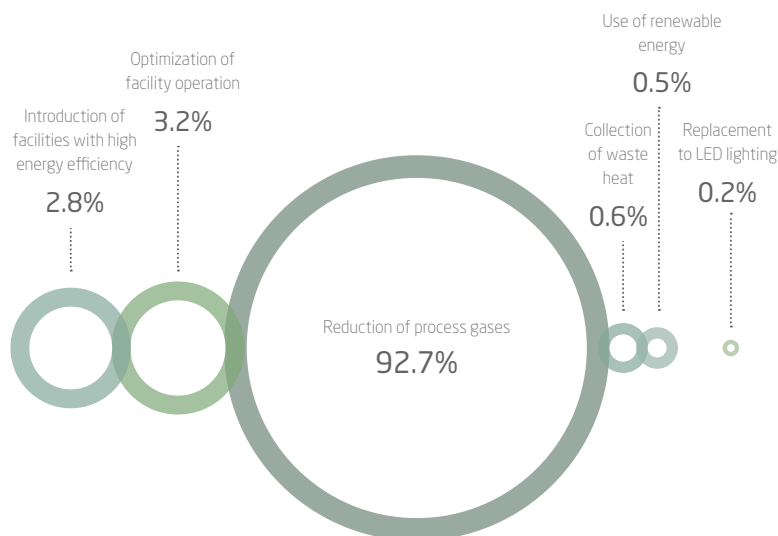
Major Areas	Strategies
Reducing GHG emissions at production sites	- Operating facilities to reduce F-Gas emissions in the semiconductor manufacturing process - Managing energy reduction projects and efficient energy consumption
Expanding energy management at worksites	- Establishing an energy management system at all worksites and maintaining certifications (since 2013) - Managing energy costs and indicators for each worksite
Reducing GHG emissions from product usage	- Developing/releasing products with high energy efficiency
Managing Scope 3 GHG emissions	- Managing GHG emissions from logistics and employee business trips (since 2009)
Supporting suppliers	- Monitoring suppliers' GHG emissions (since 2012)

## GHG Reduction Goals and Reduction Plans

Samsung has set, and closely monitors reduction goals for direct GHG emissions at manufacturing sites and GHG emissions at the product use stage after sales. With electronic products, indirect GHG emissions due to power consumption during the use process are higher than GHG emissions generated during the manufacturing and disposal stages. Therefore we established the goal of reducing GHG emissions at the product use stage through improving the energy efficiency of products. Absolute emissions increase with the expansion of manufacturing sites and the introduction of new facilities associated with the growth of our business therefore we calculate GHG emissions to sales (GHG emission intensity) in order to help us better understand our progress and how to further reduce emissions.

Since 2009, we have operated our own eco-rating system to manage energy efficiency of products systematically, with the aim of achieving a cumulative reduction of 250 million tons of GHG emissions at the product use stage from 2009 to 2020. To achieve our GHG reduction goal in 2016, Samsung operates an F-Gas treatment facility and plans to introduce additional facilities for emission reduction. In addition, we will continue to optimize facility operations through the introduction of facilities with high energy efficiency and high-efficiency lighting equipment, such as LED lighting.

### GHG Reduction Plan by Category in 2016 (Korea)



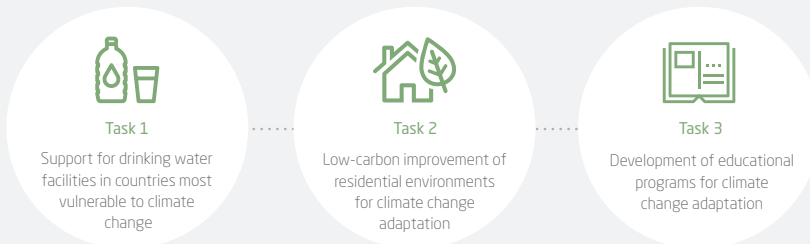
## Research in the Field of Climate Change Adaptation

Samsung makes substantial efforts to mitigate climate change through reduction of GHG emissions however we also understand many of the impacts of climate change are already occurring around the world. We therefore pay close attention to the field of climate change adaptation; a strategy to minimize risks due to climate change including changes in ecosystems, industrial changes, and occurrence of disasters, while also maximizing opportunities for sustainable development.

### Study on Climate Change Adaptation in Association with SNU

Samsung conducted a joint study on "Corporate Social Responsibility Activities for Climate Change Adaptation" with the Graduate School of Environmental Studies, Seoul National University in 2015. This study analyzed how climate change risks affect socially disadvantaged groups of people and the role of companies in climate change adaptation. It then ultimately chose three tasks to pursue after considering the utility of the tasks and the possibility of adequate implementation. Moving forward, we will actively carry out selected tasks through in-house preparation.

#### CSR Activities for Climate Change Adaptation



#### INTERVIEW



Graduate School of Environmental Studies, SNU  
Prof. Yun Sun-jin

#### What do you think about Samsung and other companies' climate change response activities?

Recently, climate change is rapidly becoming a more serious concern and I think companies that use a lot of energy are responsible for the climate change we see today. Companies will often only look at costs when it comes to the use of energy and not think about the results of this very seriously. However, I believe they should recognize that we obtain energy from nature and therefore take the issue more seriously. I hope Samsung, as a global company, will play a leading role in responding to climate change and also pay more attention to the issue in the future through industry-university research opportunities.

#### What was your impression while conducting industry-university research on CSR activities for climate change with Samsung Electronics?

While jointly working on this research, Samsung always showed sincerity and a real sense of purpose. They also seemed determined to put our research results into practice by reporting them to the CEO when the project was completed. Samsung could set an example to other companies by acting on climate change.

#### The industry-university research was done in the field of climate change adaptation. How is that different from the existing climate change response?

The GHG already emitted has accumulated in the atmosphere and continues to cause climate change. Thus, even if we reduce emissions by half, we cannot prevent climate change itself. As a result, we must look closely at how to adapt to the climate change we are facing today. For their own part, companies need to focus on CSR initiatives required for, among things, disadvantaged groups of people and the specific regions hit hardest by climate change. Although many companies today are dedicated to mitigating climate change, they have relatively less interest in climate change adaptation, so I hope Samsung Electronics will take the initiative in addressing the issue.

## External Evaluations & Awards

Samsung has been selected as a top company in global eco-friendly evaluations and sustainability rankings due to our continuous GHG reduction initiatives, green worksite management, and the release of eco-products. At the same time, it has received numerous awards worldwide due to its performance in eco-friendly activities.

### External Rating of Eco-friendliness

Since joining the Dow Jones Sustainability Index (DJSI) WORLD in 2009, Samsung has been selected as a “Best Company” in its field for seven consecutive years. We have also been included in the Carbon Disclosure Project’s CDLI (Carbon Disclosure Leadership Index) as one of the top 50 companies for seven consecutive years. This is clear proof that we are highly rated in various external environmental evaluations.

#### Result of External Evaluation

Title	Announcement	Description
Dow Jones Sustainability Index (DJSI)	Sept. 2015	Named one of the top companies in the environment sector for the technology & hardware group out of 3,000 companies assessed by the DJSI
Carbon Disclosure Project (CDP)	Sept. 2015	First Korean company to join the Carbon Disclosure Leadership Index (CDLI) for 7 consecutive years
Environmental, Social and Governance (ESG) evaluation	Oct. 2015	Grade A+ in the environment category among all publicly traded companies in Korea

### Environmental Awards

Governments and organizations in different countries operate eco-friendly award programs in various forms to promote excellent eco-friendliness of products and encourage green management activities among companies. Below is the list of awards which Samsung has received for the company’s eco-products and green management activities such as voluntary collection & recycling of waste products and eco-friendly education programs carried out in numerous countries.

#### Major Environmental Awards

Recipient	Country	Title	Organizer	Time	Description
Company	Korea	Eco-label Award	Ministry of Environment	Nov. 2015	<ul style="list-style-type: none"> <li>• Grand Prize in the office equipment category</li> <li>• Excellent utilization of Eco-label</li> </ul>
	U.S.	ENERGY STAR Partner of the year Award	U.S. Environmental Protection Agency (EPA)	Apr. 2015	<ul style="list-style-type: none"> <li>• Top award for sustained excellence for three consecutive years</li> <li>• Top award for climate communications for two consecutive years</li> <li>• PR activities at Times Square, NY</li> </ul>
		SMM Electronics Challenge Tier Award	U.S. Environmental Protection Agency (EPA)	Feb. 2016	<ul style="list-style-type: none"> <li>• Electronics recycling leadership</li> <li>• Collected and responsibly recycled more than any other manufacturer</li> </ul>
		Green Power Partnership	U.S. Environmental Protection Agency (EPA)	Feb. 2016	<ul style="list-style-type: none"> <li>• 3rd consecutive year ranked in top 100</li> </ul>
Products	Korea	Government Prize for New Future Packaging Technology	Ministry of Trade, Industry & Energy	May 2015	<ul style="list-style-type: none"> <li>• For smartphone &amp; tablet products</li> <li>• Efficient packaging boxes and 100% recycled paper used for packaging</li> </ul>
		Energy Winner Award	Consumers Korea	July 2015	<ul style="list-style-type: none"> <li>• For 9 products including Ceiling Air Conditioner</li> </ul>
		Green Product of the Year Award	Green Purchasing Network	Sept. 2015	<ul style="list-style-type: none"> <li>• For TVs and washing machines</li> <li>• As voted on directly by consumers</li> </ul>
	U.K.	Best in Carbon	Carbon Trust	Aug. 2015	<ul style="list-style-type: none"> <li>• Industry’s first low-carbon certification for a smartphone</li> </ul>
	U.S.	CES 2016 Innovation Awards	The Consumer Technology Association (CTA)	Jan. 2016	<ul style="list-style-type: none"> <li>• Eco-Design category</li> <li>• 1st Curved FHD TV made with polyketones</li> </ul>
		SMM Electronics Challenge Champion Award	U.S. Environmental Protection Agency (EPA)	Feb. 2016	<ul style="list-style-type: none"> <li>• Galaxy S6, winner in the product category</li> <li>• 99.9% recyclable</li> <li>• 100% recycled paper packaging box</li> </ul>

Best Company in the DJSI  
WORLD for 7 consecutive years



Dow Jones  
Sustainability Indexes



# ENVIRONMENT ECO-PRODUCTS

### Material issues

- Environmentally-friendly products and services
- Energy efficiency
- E-waste tack-back & recycling

## OUR VISION

Starting with the product planning and development stages, our vision is to fully uphold our responsibility for the whole product life cycle principle; by minimizing all our product's environmental impacts and improving resource efficiency at all stages of the product life.

## OUR COMMITMENT

To analyze our environmental impact contained at each stage of the product life cycle; from design and manufacturing; to purchase and usage; to end-of life processing and disposal. Samsung is committed to constantly improving energy efficiency and recyclability, and reducing hazardous substances in products through an Eco-design Process and Eco-rating System which evaluate the eco-friendliness of all products throughout their life cycle. We fulfill all related global environmental regulations for products and strive towards higher standards through voluntary agreements and labels; to provide our customers with an increasing number and quality of eco-products.

## IN THIS REPORT

Customers are increasingly searching for reasons to trust the organization behind the products they choose to purchase. It is important that our sustainability activities meet the high expectations of Samsung's employees, customers and external stakeholders to give the reasons to be confident that they are choosing environmentally responsible products. In this chapter, we introduce our efforts to meet the needs of our customers and stakeholders through reducing our environmental impact at each stage of the product life cycle and highlighting the characteristics of our eco-products.

## TRENDS & CHALLENGES

**Shifting to a Circular Resource Paradigm** The traditional linear model—where resources begin at the acquisition of raw materials and end at the final disposal of products—is increasingly outdated. Manufacturing industries are gradually shifting to a circular resource paradigm. This has been driven by global resource depletion, raw material price volatility and further environmental concerns. Such a shift is being made possible through a close collaboration between companies, industries, and various stakeholders. To accelerate such a positive change, the electronics industry also needs to continue to create added value in products and services by reducing resource consumption and reinforcing the use of recycled resources.

## WHAT WE ARE DOING



### Monitoring our Goals

Managing eco-product development rate and recycled amount of waste electronic products as our performance indicators. Meeting EM2020 goals for GHG emissions reduction at the product usage stage.



### Resource Circulation Management

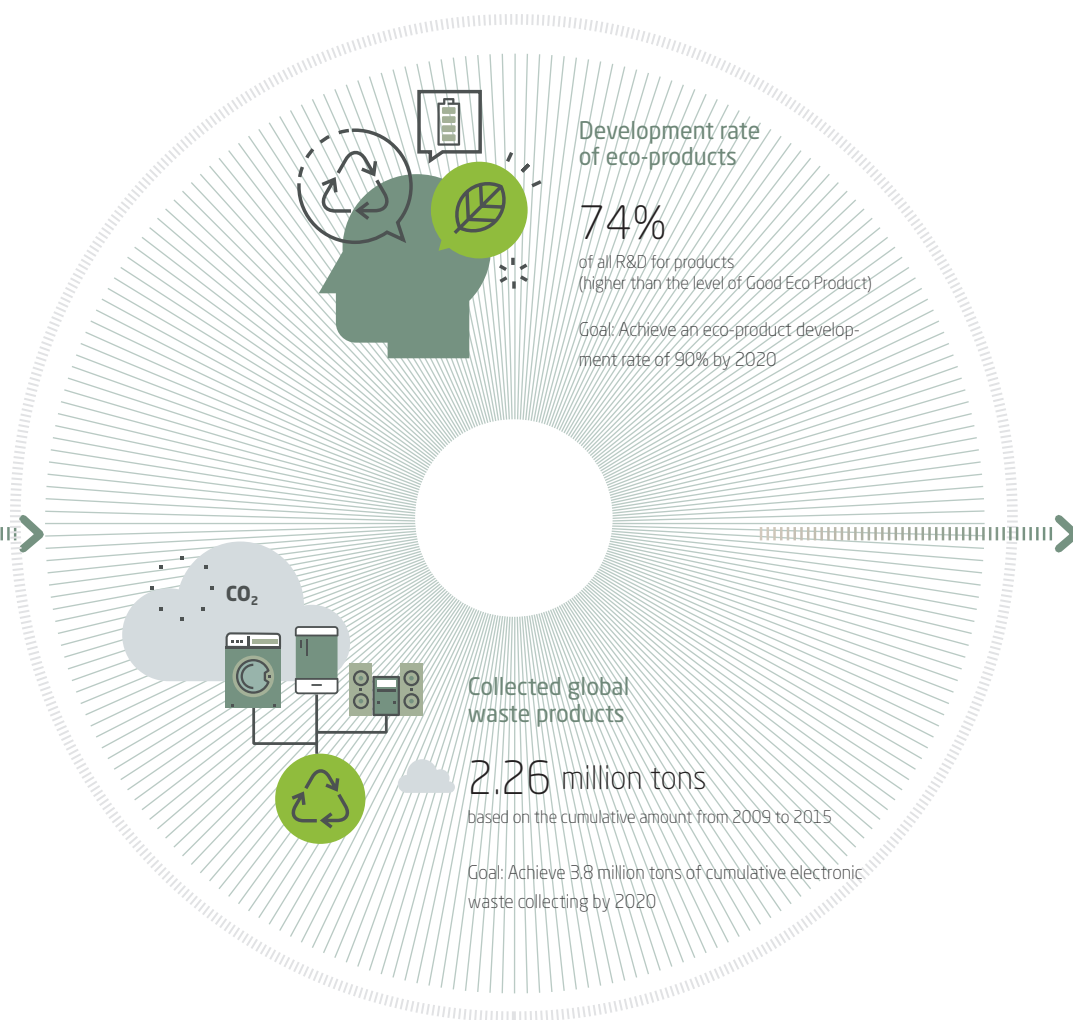
In order to minimize our environmental impact throughout the entire life cycle, and increase resource efficiency at each stage; we will establish and operate a resource circulation management system.

Link to SDGs



[Goal 7] Ensure access to affordable, reliable, sustainable and modern energy for all  
**7.3** By 2030, double the global rate of improvement in energy efficiency

[Goal 12] Ensure sustainable consumption and production patterns  
**12.4** By 2020, achieve environmentally sound management of chemicals and all wastes throughout their life cycle in accordance with agreed-upon international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impact on human health and the environment  
**12.5** By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse



FUTURE PLANS

1

Eco-product Development Rate

90% by 2020

2

Collected Amount of Waste Electronic Products

a cumulative total of 3.8 million tons by 2020 (2009 baseline)



## Key Green Products in 2015

Samsung develops products that reduce the use of energy, hazardous substances, and resources using a variety of green technologies. The key eco-products launched by the company in 2015 are as follows.

<div data-bbox="515 740 664 893" data-label="Image"> </div> <div data-bbox="531 919 664 949" data-label="Text"> <p>(UE60J6150)</p> </div> <div data-bbox="469 957 716 1129" data-label="List-Group"> <ul style="list-style-type: none"> <li>• EU Energy Label A++</li> <li>• Light intensity sensor</li> <li>• Energy-saving mode</li> <li>• Auto power down function</li> <li>• Reduction of product weight by 27% (Compared to UE58H5270AS)</li> </ul> </div>	<div data-bbox="1098 580 1260 1117" data-label="Image"> </div>	<div data-bbox="1400 580 1503 1095" data-label="Image"> </div>
<div data-bbox="457 1206 723 1378" data-label="Image"> </div>	<div data-bbox="1098 1144 1260 1298" data-label="Image"> </div> <div data-bbox="1123 1323 1283 1355" data-label="Text"> <p>(RB41J7359SR)</p> </div> <div data-bbox="1087 1366 1303 1602" data-label="List-Group"> <ul style="list-style-type: none"> <li>• EU Energy Label A+++</li> <li>• Twin cooling technology</li> <li>• Fresh storage function (Fixed temperature maintenance)</li> <li>• Metal cooling system (High efficient cooling)</li> <li>• environmentally-friendly refrigerant (R600a)</li> </ul> </div>	<div data-bbox="1371 1081 1528 1234" data-label="Image"> </div> <div data-bbox="1357 1257 1552 1289" data-label="Text"> <p>(AF18J9975WwK)</p> </div> <div data-bbox="1341 1298 1576 1440" data-label="List-Group"> <ul style="list-style-type: none"> <li>• Ultra-power saving inverter, 75% less energy consumption (Compared to previous inverter)</li> <li>• PM2.5 filter system (Removal of fine dust)</li> </ul> </div>
<div data-bbox="774 1325 1015 1489" data-label="Image"> </div> <div data-bbox="817 1500 974 1638" data-label="Image"> </div> <div data-bbox="834 1659 981 1689" data-label="Text"> <p>(LS27E65UDS)</p> </div> <div data-bbox="764 1698 1045 1893" data-label="List-Group"> <ul style="list-style-type: none"> <li>• Annual power consumption reduced by 36% (Compared to LS27C65UDS)</li> <li>• Eco-saving function</li> <li>• Recycled plastic used (30%)</li> <li>• Sugar cane used for accessory bag (20%)</li> <li>• Intertek Greenleaf certification</li> </ul> </div>		



(WD9500J)

- Eco-bubble technology
- Inverter Motor
- AddWash (No need to drain → Reduction of water use)
- Power saving mode

Washing Machine



Printer

(SL-C2680FX)

- Annual power consumption reduced by 15% (Compared to SL-C2670FW)
- Number of parts decreased by 25% (321 → 242)
- Achieving Germany Blue Angel



Laptop

(NT110S1J)

- Mercury-free LED backlight
- Power consumption reduced by 57% (compared to NT900X3C)
- High-efficiency battery (maximum use of 8 hours)
- Recycled plastic used (20%)



Tablet

(Galaxy Tab S)

- High-efficiency charger (charging efficiency 75%)
- Recycled plastic used for the charger (20%)
- 100% recycled paper packaging
- Soy ink printing for packaging



Smartphone

(Galaxy S6 edge)

- High-efficiency charger (charging efficiency 82%) (standby power of 0.02W)
- Ultra-power saving mode
- Recycled plastic used for the charger (20%)
- 100% recycled paper packaging



SSD

(V-NAND, 2.5" Type)

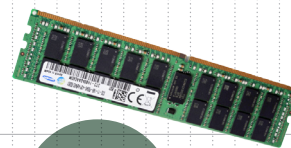
- Reduction of energy consumption by 30% (Enterprise Storage System) (Compared to the same level HDD)
- No use of halogenated compounds (PVCs, BFRs, CFRs)
- No noise, no vibration, no heat



Memory

(20nm 8Gb DDR4)

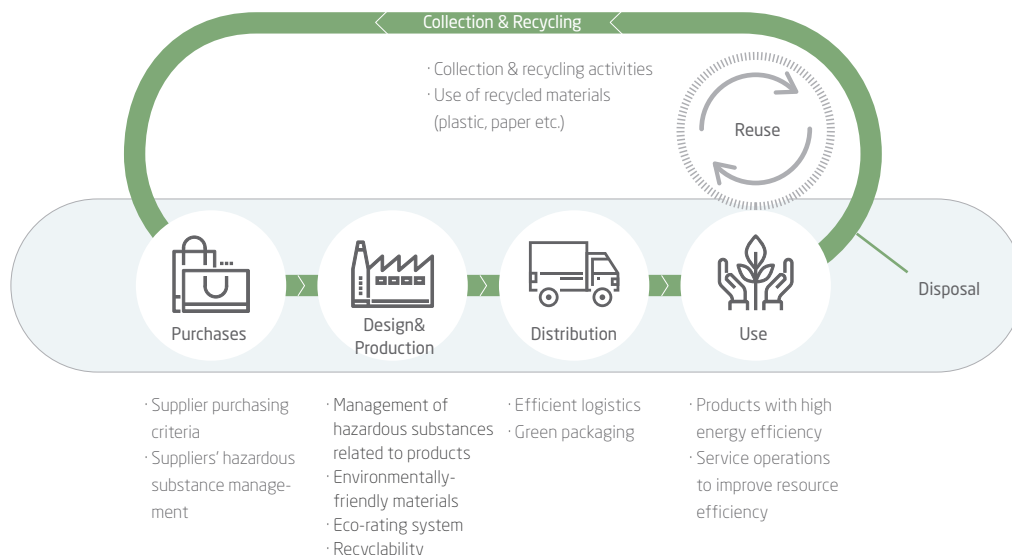
- Reduction of energy consumption by 50% (Compared to 64GB DDR4 LRDIMM)
- Doubling server efficiency (Reduction of server operation by half)
- No use of halogenated compounds (PVC, BFRs, CFRs)



## Circular Resource Management System

Samsung takes circular economy into consideration when assessing environmental aspects in product design. In order to minimize the environmental impact of our products we release eco-products that consider resource efficiency through the reuse of parts, use of recycled packaging and plastics, and increased recyclability of product parts.

### Resource Circulation System and Environmental Objectives at Each Stage



## Purchase

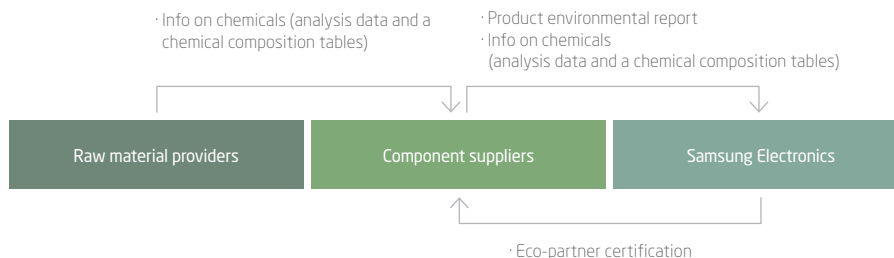
### Green Purchasing

Recognizing the importance of being environmentally conscious, in 2007 Samsung established guidelines on the need to purchase eco-products throughout its operations. We have encouraged the purchase of environmentally-friendly office supplies and consumables used in manufacturing processes that puts top priority on purchasing eco-products first.

### Eco-partner Certification

Samsung has established a hazardous substance management system regarding raw materials and parts for the company's products, while also operating an Eco-Partner certification system to assess the environmental impact of product components, raw materials, and production processes at our suppliers. We trade only with suppliers that have acquired all necessary eco-related certification. In addition, for the efficient management of our Eco-Partner certification system, we have developed e-CIMS (Environmental-Chemicals Integrated Management System) to monitor hazardous substances used by our suppliers.

### Eco-partner Certification Process



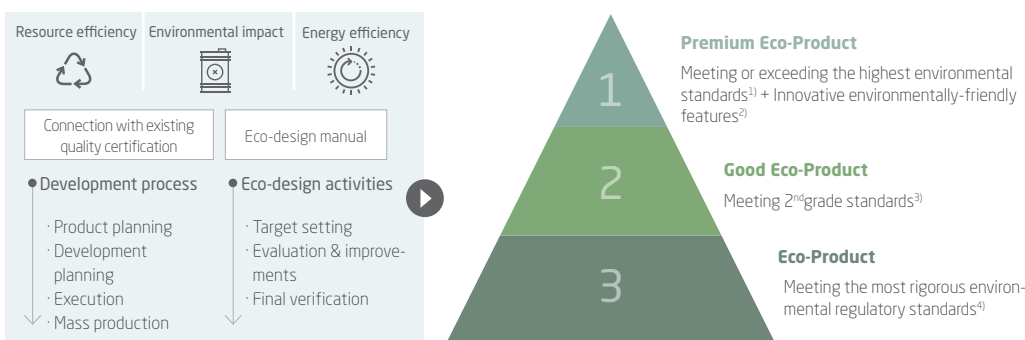


## Design & Production

### Eco-design and Eco-rating

From 2005, Samsung has established in-house eco-design process to secure the eco-friendliness of its products from their development stage. Since 2014, we have operated our own eco-rating system which consists of three ratings (Premium Eco-Product, Good Eco-Product, and Eco-Product) that are given to every product development project, while also taking into consideration each country's eco-label standards. Products are assessed from many different perspectives based on elements ranging from basic regulations on energy efficiency, resource efficiency, and environmental impact to newer, more distinguished environmental features such as fulfilling the requirements of voluntary eco-labels. Through continuous revision and evaluation of standards, we reflect new eco features and the latest environmental innovation in our products. Samsung manages the rate of Good Eco-Product level or higher among all product development projects, and we are striving to have 90 percent of new development projects receive the Good Eco-Product stamp of approval or higher by 2020.

#### Eco-design Process and Eco-rating System



1) Compliance with EPEAT Gold and UL Platinum standards

2) Received one of the following certifications: Korea (Energy consumption efficiency 1st grade); EU (Energy label A+++); US (EPA Energy Star Most Efficient); Green Technology certification (granted by the Korea Institute for the Advancement of Technology)

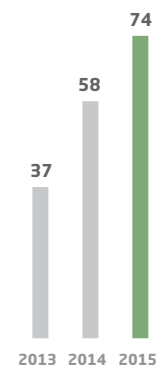
3) Compliance with 85-90% of EPEAT Silver and UL Platinum standards

4) Compliance with EU RoHS, packaging, and WEEE regulations (our global products comply with the most strict environmental legislation from around the world; placing many products above the minimum legal requirements in their local countries)

#### Current Status of Eco-product Development

(%)

Rate of Good Eco-Product level or higher among all product development projects



### Management of Hazardous Substances in Products

Samsung strictly controls the use of chemicals in our products. With the expansion of worldwide RoHS and REACH like regulations in several jurisdictions, Samsung increasingly conducts rigorous inspections and management for raw materials and parts it uses to ensure it provides safe, environmentally-friendly products for customers. Through such efforts, we control the management process so that restricted substances are not unintentionally present in our products.

### Controlled Substance Rating

Samsung has its own standard (Regulations on Managing Controlled Substances in Product Environment) in order to manage the use of chemical substances in our products. We review and enforce its provisions on a regular basis across the company in order to ensure the highest level of compliance is being adhered to.

#### Controlled Substance Rating

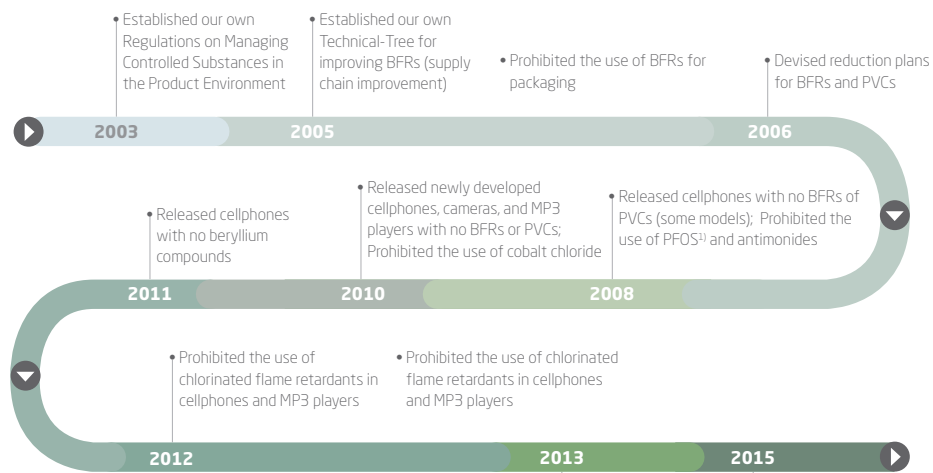
Class I (prohibited substances)	Substances regulated by EU RoHS
Class II (prohibited substances)	Substances managed by all other national laws or international agreements. (e.g. substances causing ozone depletion or global warming)
Class III (substances with a reduction plan)	Substances with our own reduction plan after considering their impact on the environment and on humans (e.g. BFRs, phthalates)
Others (observed substances)	Substances that are expected to be regulated in the future (e.g. candidate substances for EU REACH's SVHC*)

\* SVHC: Substances of Very High Concern

### History of Hazardous Substance Management

Since 2005, Samsung has maintained an Environmental Analysis Lab for analyzing hazardous substances and volatile organic compounds. It has also acquired KOLAS(Korea Laboratory Accreditation Scheme) certification and the official testing lab license of Germany's BAM Institute(The Federal Institute for Materials Research and Testing). All of these achievements have improved the reliability of chemical analysis and firmly established an in-house monitoring process on restricted substances. Furthermore, we have made voluntary plans to stop using potentially hazardous chemicals like PVCs, BFRs, and phthalates to continuously reduce the use of hazardous substances in our products.

#### History of Hazardous Substance Management



1) PFOS: Perfluorooctanesulfonate  
2) HBCDs: Hexabromocyclododecanes

#### Cases of Hazardous Substance Reduction in Major Products

More information on the management of chemicals in products is available on the website below.

[https:// www.samsung.com/uk](https://www.samsung.com/uk) >  
About us > Environment >  
Chemical Management



##### TV

- 2008.1~ **TBBP-A free** All parts
- 2012.1~ **PVC free** Internal wires
- 2013.1~ **Phthalate free** Internal wires
- 2013.1~ **Antimony free** Internal wires
- 2015.1~ **Cadmium free** LED panel \*(some models only)



##### Smartphone

- 2008.1~ **TBBP-A free** All parts
- 2010.1~ **BFRs free** All parts
- 2010.4~ **PVC free** All parts
- 2011.1~ **Phthalate free** All parts
- 2011.1~ **Beryllium free** All parts
- 2012.1~ **Chlorinated Flame Retardants free** All parts
- 2013.1~ **Antimony free** All parts

## Expanded Development of Environmentally-friendly Materials

Samsung develops environmentally-friendly materials through collaborative projects between various departments including R&D and quality management. A bio-material using industrial corn was used for the covers of smartphones released in 2015, including the Galaxy J2, Galaxy Z3, Banyan (SM-B350E), and Galaxy O5, while a new material called polyketone that is composed of carbon monoxide generated during the oil refining process was used in TVs for the first time in Samsung.

## Easily Recyclable Products

To increase the recycling efficiency of the product, Samsung is designing products to be easy to disassemble and marks a type of material in every plastic parts of the product. In our TVs, the use of screws is being reduced in favor of snap connections which allow a faster and easier disassembly of our devices. In addition, display sets are being marked with a mercury free symbol in order to indicate that they can be recycled mechanically. We are expecting all of these efforts make easy to distinguish materials at the disposal stage and the recycling of plastic parts will be increased.

### Case: Environmentally-friendly Materials & Easily Disassemble

1



#### FHD TVs Made with Polyketone

Samsung applied polyketone to its FHD Curved TVs(UN55K6200);the first time this has been accomplished in Samsung. Polyketone is a substance made using carbon monoxide which decreases resource consumption and environmental pollution compared to existing plastic. This material has been 10% used for TV(UN55K6200) speakers, but we are planning to gradually expand its application.

2



#### Galaxy S6 with 100% Recyclable Aluminum

Samsung applied 100 percent recyclable aluminum to its smartphones starting with the company's leading smartphone in 2015; the Galaxy S6. Unlike plastic, which is recycled by classifying materials during the disposal process, the single material of aluminum (known as a permanent material) can be recycled without any separate treatment; retaining value and material properties. The same material is now used for the Galaxy S7, which was released in 2016

3



#### Easily Disassembled Laptops

Samsung laptop launched in 2015 (XE500C13 22 other models) which applied connector combination type in components. It is easy to disassemble or replace components.

In addition, more than 25g of plastic applied to a product has been designed to enable anyone to easily disassemble using normal hand tools such as a screwdriver.

1. FHD Curved TV
2. Galaxy S6
3. Laptop

## Distribution

### Efficient Logistics

By making the company's products smaller and lighter, Samsung tries to minimize resource consumption during the production process and to reduce fuel consumption and GHG emissions, which also allows us to transport more products with each journey.

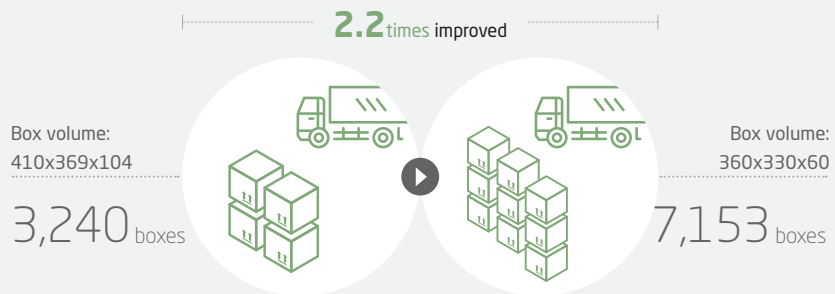
### Environmentally-friendly Packaging

Samsung contributes to reducing the environmental impact of its product packaging by developing environmentally-friendly packaging materials. The cases of environmentally-friendly packaging include shrink-wrap packaging for washing machines, recyclable packaging for refrigerators, 100 percent recycled packaging boxes for the Galaxy series smartphones, and Bio-vinyl packaging for TV accessories. Moving forward, we will continue to expand the application of environmentally-friendly packaging materials.

#### Case: Efficient Logistics & Environmentally-friendly Packaging

##### Improved Transportation Efficiency of Laptops

For the 2015 NT110S1J laptop, we greatly improved logistics efficiency by making the product and packaging lighter. The volume of the packaging box was reduced by roughly 54 percent, increasing transportation efficiency by 2.2 times compared to the previous model. As a result, GHG emissions generated during the transportation process decreased by 50 percent and the generation of packaging waste was reduced by 35 percent.



\* Standard model: NT110S1J (compared to NT900X18)  
\* Based on a 40ft. container



1. Packaging boxes for the Galaxy series
2. Environmentally-friendly ink mark
3. FSC Certification

##### Galaxy Series with Environmentally-friendly Packaging Materials

Made with 100 percent recycled paper which earned Forest Stewardship Council (FSC) certification, Samsung developed SERP (Samsung Eco-Recycled Paper) to use for the Galaxy series smartphones. The paper reduced the weight of packaging and lowered GHG emissions by 14,398 tons. This led to a decrease of KRW 43.7 billion in logistics expenses and had an equivalent effect of planting 5.18 million trees. Additionally, solvent-free soy ink was used for printing packaging and manuals.



## Use & Reuse

### Improvement of Product Energy Efficiency

Samsung continuously develops highly energy efficient products that meet higher standards than global energy regulations. Through the company's own eco-rating system we work hard to reduce power consumption and GHG emissions generated during the product use stage.

### Saving Power Consumption of Products

Samsung shares information on trends in environmental regulations and technology development among all employees working in the environment field through its company-wide Eco Council twice a year. We also develop products with high energy efficiency through R&D in energy saving technology. Consequently, annual average power consumption reduced by 47 percent compared to 2008 levels. (Based on eight major products released in 2015)





### Reduction of GHG Emissions at Product Use Stage

We define indirect GHG emissions as power consumption generated when consumers use our products as "GHG emissions at the product use stage." We convert annual improvement in the energy efficiency of each product into GHG emissions to manage the results. Based on eight major products released in 2015, annual average GHG emissions reduced by 57 percent compared to 2008 levels.

### Major Energy Saving Technologies in 2015

In 2015, Samsung developed various energy-saving technologies, including low-power System-on-Chip design for LED TVs, software for the power saving mode on PCs using a chip set motion mode control, and saving of power consumption for the sleep mode on printers and multifunction printers. In fact, we had our leading energy-saving technologies officially recognized when we acquired Green Technology certification in Korea for products with energy saving technology.

#### Major Energy Reduction Technologies in 2015

TV	PRINTER	PC	WAP (NETWORK)
			
Low-power System-on-Chip design	Power consumption saving for sleep mode	Software for PC power saving mode using a chip set motion mode control	Power saving automation technology for user and schedule-based wireless RAN

#### Power Consumption Saving Rate of Products




\* Saving of annual average energy consumption of 8 major products (cellphones, laptops, TVs, monitors, refrigerators, washing machines, air conditioners, and printers) compared to 2008 levels.

#### GHG Emissions at Product Use Stage

(1,000 tons of CO<sub>2</sub>)



\* Calculation scope: 8 major products (cellphones, laptops, TVs, monitors, refrigerators, washing machines, air conditioners, and printers)




High Efficiency heat pump


### Energy Saving Technology

**Heat Pump: High Efficiency Heat Exchangers**

Samsung improved the performance of heat exchangers of air conditioners by between 20 and 30 percent after the company began applying a high efficient micro-channel structure to indoor and outdoor air conditioner units. As a result, our excellent technology in improving energy efficiency was recognized when we received Korean Green Technology certification.



Performance improvement of heat exchangers  
**20~30%**



Recognition for excellent technology  
**Green Technology certification**

**Services to Improve Resource Efficiency**

To improve resource efficiency, Samsung works hard to extend the periods of product use by offering services such as repairing products, upgrading firmware for performance improvement, and extending warranty coverage periods. Furthermore, we will continue to explore ways to reuse various waste products.

**Sales of Refurbished Phones**

Samsung changes parts, reinstalls software, or changes labels for returned products and sells them as refurbished phones for reduced prices. This service is provided in the U.S. and U.K., and contributes to improving resource efficiency by facilitating the reuse of goods which would otherwise just be disposed.

**Provision of Firmware Upgrading Software**

Samsung provided firmware upgrades via a wireless network and its website for the company's smartphones, TVs, monitors, printers, and PCs to enhance the functions and performance of those products so that consumers can use them for longer periods.

Sales of Refurbished Phones

<https://www.samsung-outlet.com/uk-outlet/home/>



### Resource Efficiency Improvement Service

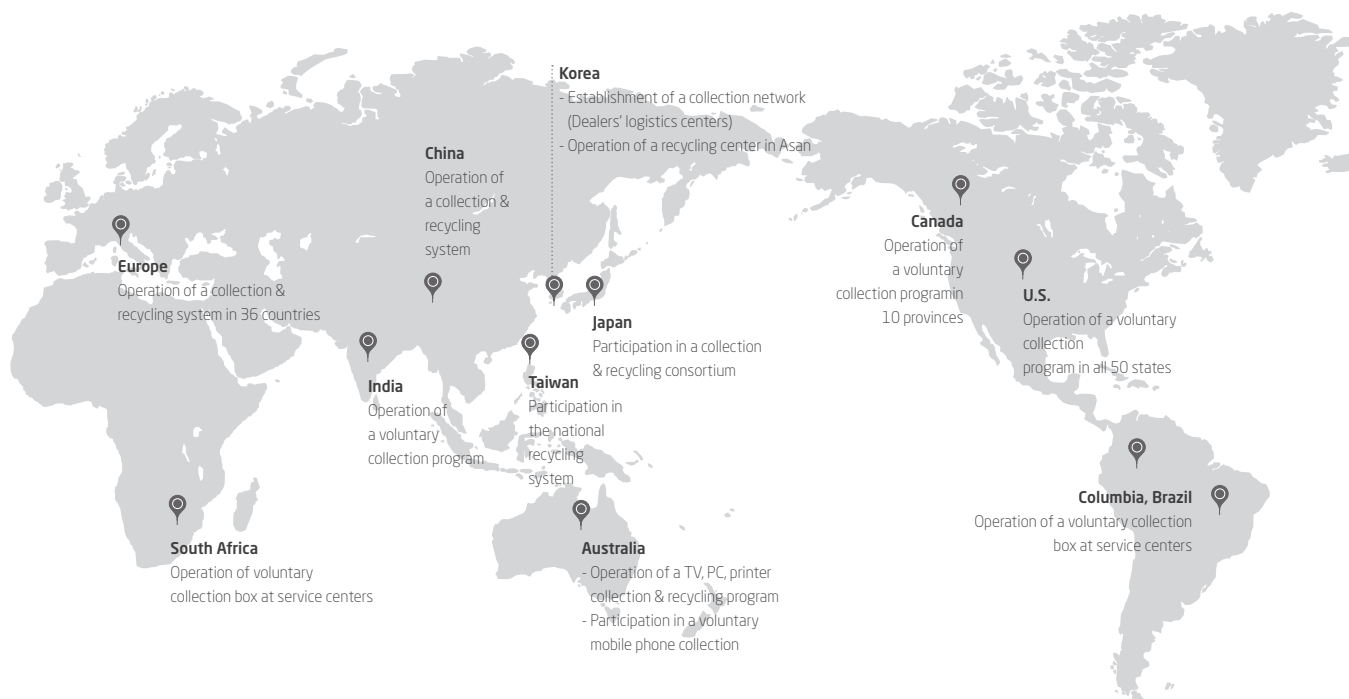
**Firmware Upgrade**

For smartphones released in 2015, we improved performance such as speed and buffering through firmware, thereby allowing consumers to use their smartphones in an optimized way without purchasing new products.

## Collection & Recycling

In addition to designing products which are easy to disassemble, Samsung is making multiple efforts to reuse resources by conducting activities such as the establishment of waste product collection systems, active recycling, and expanded use of recycled materials – specifically plastics.

### Global Take-back & Recycling Program



Collection of Waste Products: Global (tons)

	2013	2014	2015
Asia/Oceania	58,447	59,890	86,102
Europe	213,638	259,906	215,227
America	51,936	52,135	54,354
Total	324,021	371,931	355,683

\* The figures for the 2014 was corrected

Recycling Product & Packaging: Korea (tons)



	2013	2014	2015
Product	58,447	59,044	79,950
Packaging	4,984	6,549	7,040

Recycling Status by Product: Korea (tons)

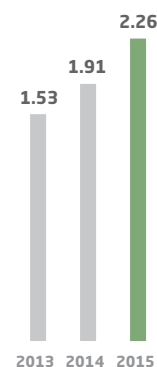
Classification	Refrigerators	Washing Machines	Displays	Other
Recycling Quantity	37,689	13,016	4,672	24,573
				<b>Total 79,950</b>

Recycling Status of Resource Reutilization: Korea (tons)

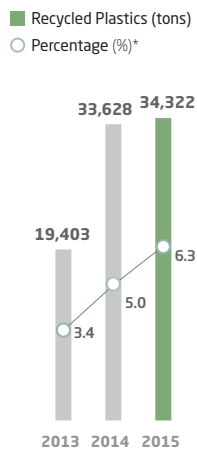
Classification	Scrap Metal	Nonferrous Metal	Synthetic Resin	Glass	Other
Quantity of Resource Reutilization	32,414	12,017	19,572	1,430	3,577
					<b>Total 69,010</b>

Cumulative Collecting Quantity: Global

(since 2009, million tons)



**Cumulative Quantity of Recycled Plastics Used**



\*Percentage (%) Use of recycled plastics to total use of plastics

**Collection & Recycling Activities**

Samsung established waste product collection systems in each region and works tirelessly to enhance the collection & recycling of waste products.

Since 2009, we have been running the Samsung Requirements for WEEE Management for suppliers in order to maximize the recycling of waste products and to minimize their environmental impact, while also addressing workers' EHS issues during the collection and treatment process. The requirements include recycling companies' obligation to observe EHS regulations, to manage subcontractors, to prohibit child labor, forced labor and illegal exportation of waste.

We are expanding the closed loop recycling system that uses plastic collected from electronic goods for new products in order to promote recycling.

**Collection & Recycling Performance**

Samsung collected a total of 2.26 million tons of waste products from 2009 to 2015, and aims to collect 3.8 million tons (cumulative) of waste products by 2020.

**Use of Recycled Plastics**

In an effort to reduce the environmental impact generated from the production process of petroleum-based plastics and to establish a resource circulation society, Samsung uses recycled plastics for some products after classifying, cleaning, and shaping plastics from collected waste products in collaboration with recycling companies. We work hard to expand the application of recycled plastics for Samsung products as we increase our purchase of them, develop new standards for quality of recycled plastics and share new technology with recycled resin suppliers.

In 2015, we applied a total of 34,322 tons of recycled plastics (6.3 percent of total plastic use) to monitors, printers, washing machines, refrigerators, vacuum cleaners, and earphone cases.

**Global Eco-label Certification**

**Global Eco-labels**

Samsung has proudly received eco-label certifications whereby the environmentally-friendly characteristics of its products are certified by third parties. Samsung is obtaining eco-labels from the governments of 11 countries, including Korea, the U.S. and several European countries, as well as environmental certifications from standard institutions such as Underwriters Laboratories (UL) in the U.S. and the CSA in Canada. By the end of 2015, a cumulative total of 2,218 models had acquired eco-label certification.

**Status of Global Eco-labels**

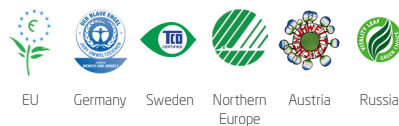
Asia

846



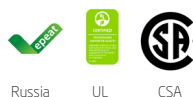
Europe

826



North America

537



Latin America

9





## Global Carbon Labelling

In 2015, Samsung calculated carbon emissions from various product groups such as cellphones, TVs, washing machines, and vacuum cleaners. Our results were certified by third parties in Korea, the U.K., and Japan. In doing so, we gathered a clearer understanding of the carbon emissions at each life cycle stage of our products and have used the learnings to improve their environmental impact.

### Korea: Carbon Emission Label

(certification of low carbon emissions + low carbon products + carbon neutral products)



UK:  
Carbon Trust



Japan:  
Carbon  
Footprint

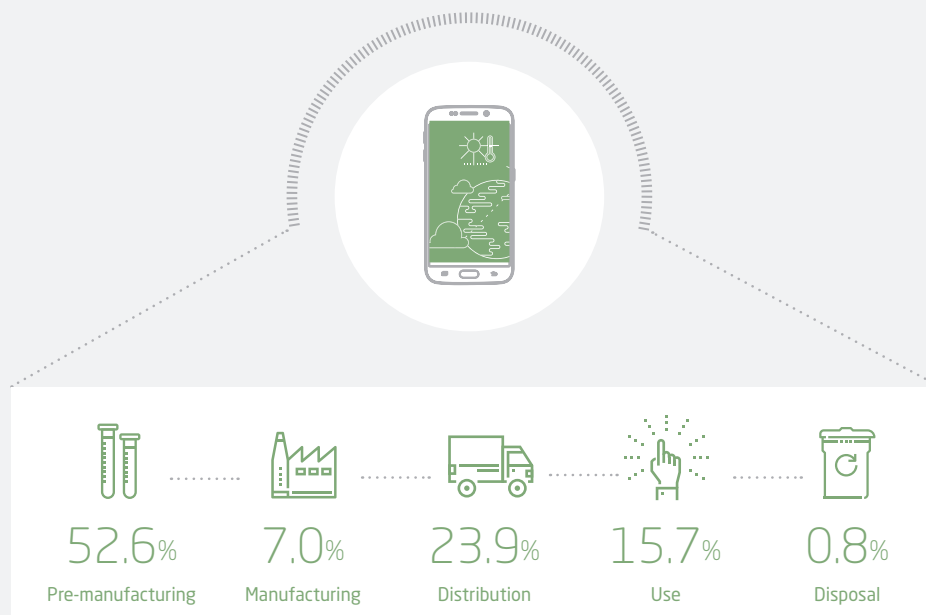


## Case of LCA for Smartphones

To acquire Sustainable Product Certification (SPC) from UL, Samsung conducted a life cycle assessment (LCA) for its leading smartphones (Galaxy S6 and Galaxy Note 5) based on a total of 12 environmental impact categories, including global warming and ozone layer depletion. The two models showed their largest environmental impact in the areas of pre-manufacturing and distribution. Based on LCA results, we strive to reduce the environmental impact of our products, for example, by improving energy efficiency and reducing supply chain emissions.

\*12 categories: global warming, acidification, eutrophication, ozone layer depletion, formation of photochemical oxidants, human toxicity, freshwater toxicity, seawater toxicity, soil toxicity, primary energy consumption, water use, and waste generation

### Results of the Global Warming Impact of the Galaxy S6



# 9 / ENVIRONMENT EHS MANAGEMENT

**Material issues**

1. GHG Reduction at Worksites
2. Energy Efficiency
3. Water Risk Management
4. Waste Management
5. Hazardous Substance Management

## OUR VISION

Samsung Electronics' manufacturing sites conduct green management activities by minimizing negative environmental impacts from their production facilities at each stage—from the procurement of raw materials and production to the distribution, use, reuse and disposal phases.

## OUR COMMITMENT

According to our main business principle, which emphasizes environment, safety, and health (EHS), Samsung contributes to improving the lives of people everywhere and protecting the environment, thereby leading the way to creating a sustainable society. We develop and manufacture all of our products and services with a priority on our employees and customers safety and environmental protection.

## IN THIS REPORT

Resource depletion issues occur in many ways around the globe. According to the United Nations, the world will need 45 percent more energy and 30 percent more water by 2030. In the midst of increasing water scarcity, worsening resource depletion, reduction of biodiversity, and climate change that accelerates all of these issues, Samsung does its best to assure a sustainable future. The starting point for this is the green management across our facilities. In this chapter, we deal with the four key goals of our EHS management as well as eco-friendly efforts in different fields such as GHG emissions, water resources, safety, and waste.

## TRENDS & CHALLENGES

**Increased Demand for Energy** Global demand for energy expected to continuously increase due to growing global population, urban concentration, and improved quality of life.  
 · Expansion of global initiatives against the use of fossil fuels.  
 · Companies need to maximize energy efficiency and adopt renewable energy for their worksites.

**Water Scarcity** In 2030, the gap between global water demand and water supply is forecasted to be 40 percent. As water is essential for most human activities, from homes to farming, energy and industry, water scarcity will have an enormous influence on humanity's health, environment, and economic development. Due to their significant use of water resources, industries should take the initiative in the efficient management and recycling of water resources.

## WHAT WE ARE DOING



**EHS Management**

Manage the established four key mid- and long term goals for EHS management of our worksites and manage our performance



**GHG and Energy**

Scope 1, 2, and 3 (part) management of global worksites



**Water Resource Management**

Examining water resource risks, efforts for reduction of water use, and look at water resources around our worksites and their influence on nearby ecosystems



**Chemicals**

Responding to regulations such as the Act on Registration and Evaluation of Chemical Substances (ARECs) and the Toxic Chemicals Control Act (which goes into effect in 2015); establish a chemical management system

**Waste Management**

Operating ways of waste reduction management and recycling

**Pollutant Management**

Managing air and water pollution caused by the expansion of production lines

**Conservation of Biodiversity**

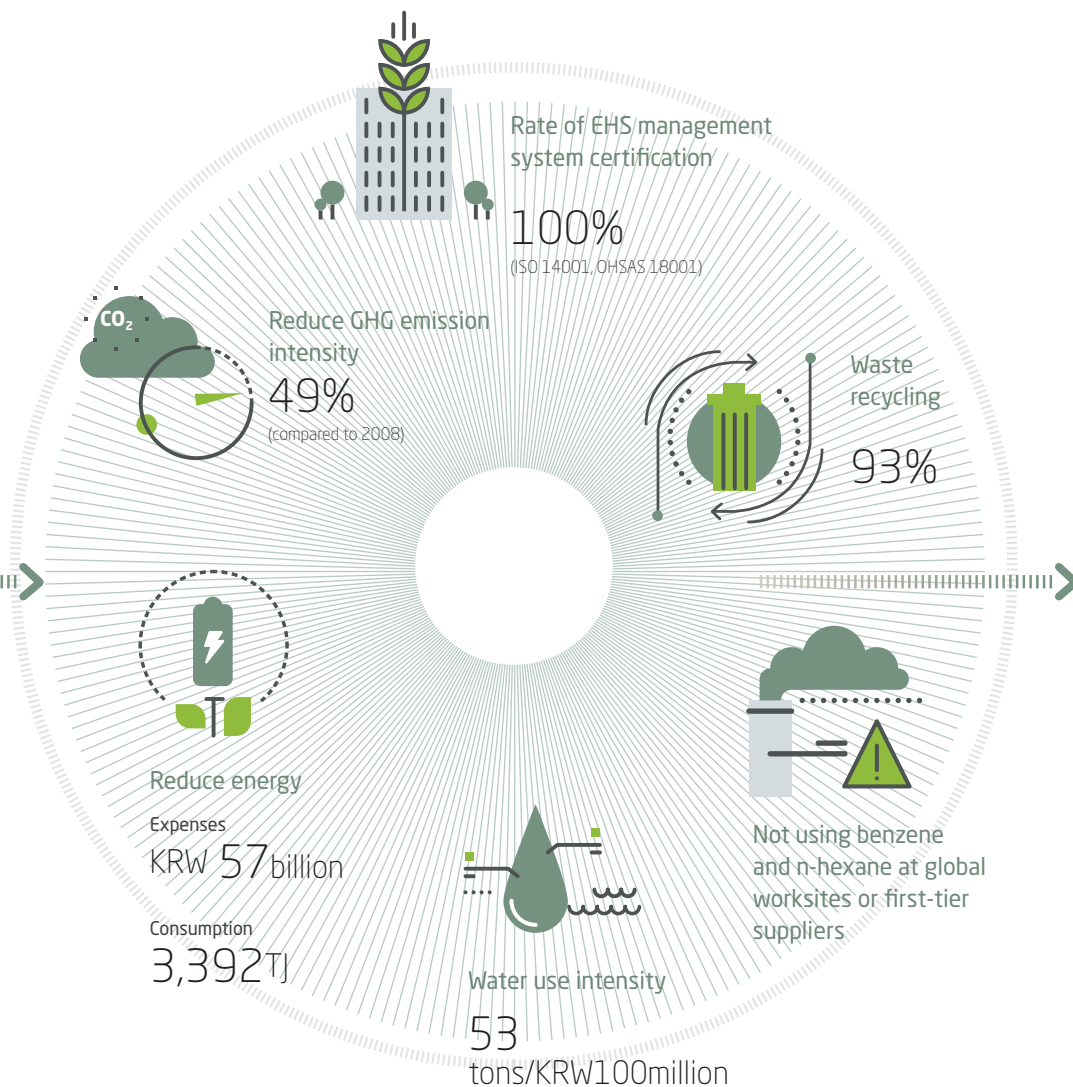
Promoting the importance of conservation of biodiversity with employees and reflecting this in business plans

Link to SDGs



- [Goal 3] **Ensure healthy lives and promote well-being for all at all ages**  
**3.9** By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- [Goal 6] **Ensure availability and sustainable management of water and sanitation for all**  
**6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally
- [Goal 7] **Ensure access to affordable, reliable, sustainable and modern energy for all**  
**7.3** By 2030, double the global rate of improvement in energy efficiency

- [Goal 12] **Ensure sustainable consumption and production patterns**  
**12.4** By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment
- [Goal 15] **Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss**  
**15.a** Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems



FUTURE PLANS

- 1 Maintain the rate of EHS management system certification at 100%
- 2 Reduce 70% of GHG emission intensity by 2020 (compared to 2008)
- 3 Achieve water use intensity by 50 tons/KRW 100 million by 2020
- 4 Achieve a waste recycling rate of 95% by 2020

# 9

## Major EHS Areas

Samsung set four key mid- and long-term goals for EHS management at its facilities and concentrates on managing the results of related efforts.

### Major EHS Areas

Major Policies	KPI	2020 Goal	Result in 2015	Description
EHS Management System	Rate of EHS management system ISO14001 certification*	100%	100%	This indicates whether the establishment of detailed EHS goals, activities, and review processes are managed across all Samsung facilities. Our goal is to gain or maintain certifications for all of our manufacturing sites.
	0HSAS18001	100%	100%	
GHG Emissions Reduction	KRW-based GHG emissions	1.55 tons of CO <sub>2</sub> /KRW100 million (Reducing by 70% compared to 2008)	2.64 tons of CO <sub>2</sub> /KRW100 million (49% decrease compared to 2008)	This indicator is to manage GHG emissions (Scopes 1-2) in order to respond to global climate change. Samsung aims to reduce GHG emissions that occur in all ranges of our business.
Water Use Reduction	KRW-based water use	50 tons/ KRW100 million**	53 tons/ KRW100 million**	This demonstrates water resource management and reduction of water use at our worksites. Samsung aims to expand water recycling by securing stable water resources.
Expansion of Waste Recycling	Rate of waste recycling	95%	93%	This indicator shows efficiency of recycling resources. Our ultimate goal is to recycle all the waste from our facilities.

\* Global 37 manufacturing sites

### GHG Emissions Intensity

(Tons of CO<sub>2</sub>/KRW 100 million in sales)

#### Korea\*



#### Global\*\*



\* KRW-based emissions calculation formula in Korea: Total CO<sub>2</sub> emissions ÷ (HQ based sales / price index(1))

\*\* Global KRW-based emissions formula: sions ÷ (global consolidated sales (2)/price index (1))

(1) Bank of Korea's PPI for the year (2005 PPI = 1)

(2) Sales from the display business are excluded

## GHG & Energy Management at Worksites

Samsung manages GHG emissions from its facilities based on international agreements and domestic standards. The company manages the direct emissions of GHG from workplaces (Scope 1) and indirect emissions of GHG from the consumption of electricity and steam at workplaces (Scope 2). In addition, we manage other indirect emissions of GHG from product use, distribution, and business trips (Scope 3).

### GHG Management (Scope 1, 2)

We monitor GHG emissions at all our facilities and manage emission goals and results on a monthly basis through our on-line green management system, G-EHS. The amount of GHG emissions is calculated by using the methods provided in the GHG management guideline of each country. For standards not stipulated in the guidelines, we comply with international standards such as the Intergovernmental Panel on Climate Change (IPCC) Guideline and ISO 14064. Over the past few years, Samsung has completed large-scale manufacturing sites in Vietnam and China, constantly increasing the source of GHG emissions. There was also a drop in sales, but GHG emissions intensity slightly dropped over the previous year as the company continued to adopt highly efficient facilities and reduce gas use in the production process.

#### GHG Emissions (1,000 tons of CO<sub>2</sub>)

Region	Classification	2013	2014	2015
Korea	Scope 1	2,031	2,275	1,821
	Scope 2	4,272	4,500	4,908
	Total	6,303	6,775	6,729
Global	Scope 1	2,221	2,620	2,445
	Scope 2	5,797	6,670	7,747
	Total	8,018	9,290	10,192

#### GHG Emissions by Gas Type (1,000 tons of CO<sub>2</sub>)

Classification	2013	2014	2015
CO <sub>2</sub>	6,394	7,366	8,524
CH <sub>4</sub>	2	2	2
N <sub>2</sub> O	254	290	305
HFCs	149	207	218
PFCs	1,079	1,271	1,018
SF <sub>6</sub>	139	153	124
Total	8,018	9,290	10,192

### Third-Party Assurance of GHG Emissions

To raise the credibility of our GHG emissions data, we annually conduct 3rd-party audits. In 2015, our GHG emissions data was verified and assured by the Korean Foundation for Quality through documents and on-site inspections.

### Management of GHG Emissions from Other Sources (Scope 3)

In order to recognize our potential impact on climate change, manage related risks, and explore new opportunities as we conduct our business, Scope 3 covers GHG emissions from our suppliers, distribution of components and products, business trips of employees, and product use by customers.

#### Suppliers

Samsung has been monitoring GHG emissions at its suppliers' facilities since 2009. In 2015, we expanded this coverage to include all of our suppliers.

#### Logistics

Despite the expansion of global manufacturing sites, production, and product sales according to the expansion of our global business, we are minimizing the increase of our GHG emissions from logistics for products, materials, and parts through efficient transportation.

#### GHG Emissions from Logistics by Transportation Mode

(1,000 tons of CO<sub>2</sub>)

Classification	2013	2014	2015
Rail/Road	98 (1%)	92 (1%)	43 (0.4%)
Airline	2,652 (26%)	4,739 (45%)	4,457 (42.5%)
Shipping	7,455 (73%)	5,777 (54%)	5,978 (57.1%)



#### Total



### Employee Business Trips

In order to minimize GHG emissions due to business trips, Samsung remote meeting alternatives to reduce overseas business trips. For this, we support video conferences and the use of public transportation at all global facilities. As a result, the amount of GHG emissions from employee business trips has continuously declined.

#### GHG Emissions from Employee Business Trips by Transportation Mode (Korea) (Tons of CO<sub>2</sub>)

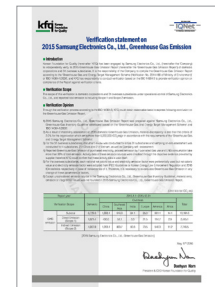
Classification	2013	2014	2015
Airplane	123,137	115,592	104,050
Car	6,268	4,529	3,091
Taxi	530	415	344
Train	456	376	347
Bus	278	230	185



#### Total (Korea)



### Third-Party Assurance of GHG Emissions



#### Suppliers' Emissions

(1,000 tons of CO<sub>2</sub>)

12,741  
in 2014

\* Coverage changed to all suppliers in 2015

\*\* Calculated based on each supplier's size of transactions with Samsung

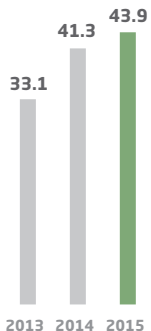
### Energy Intensity

(GJ/KRW 100 million sales)

Korea\*



Global\*\*



\* Korea KRW-based energy conversion formula: Energy consumption ÷ (HQ based sales / price index (1))

\*\* Global KRW-based energy conversion formula: total global energy consumption ÷ (global consolidated sales (2) / price index (1))

(1) The Bank of Korea's PPI for the year (2005 PPI = 1)

(2) Sales from Display Business excluded

### Worksite Energy Management

With the introduction of new manufacturing facilities and an increase of annual production each year, the amount of energy consumed at facilities has been continuously on the rise. Accordingly, each facilities continuously selects energy reduction activities and tasks, establishes annual plans, and manages energy use through quarterly management.

#### Electricity and LNG Consumption

		(TJ)		
Classification	Region	2013	2014	2015
Electricity	Korea	87,826	92,471	100,873
	Global	113,452	127,821	147,530
LNG	Korea	8,111	8,500	9,885
	Global	10,369	11,411	13,096

### Activities to Reduce GHG & Energy Consumption

#### Reduction Activities at Facilities

For the systematic energy consumption management at facilities, Samsung established an energy management system to analyze its energy consumption on a regular basis and carry out targeted energy reduction programs.

In 2015, Samsung conducted 1,710 energy reduction activities at facilities in Korea and reduced 1.23million tons of GHG emissions and 3,392TJ of energy, saving a total of KRW 57billion. F-Gas processing accounted for 87% of the total GHG reduction, and we are continuously carrying out reduction activities through the introduction of photovoltaic facilities and high-efficiency facilities as well as reuse and recycling of waste heat and operational improvements with facilities using energy.

#### Expansion of Renewable Energy

Samsung has expanded the introduction of renewable energy for its facilities and new buildings. In 2015, the amount of consumed electricity that was replaced by renewable energy reached 92.06GWh, and we will continue to increase the amount along with direct electricity production and green electricity purchases, while also acquiring renewable energy certifications.

#### GHG & Energy Reduction Activities

##### GHG Reduction through F-Gas decomposition equipment

Samsung reduced GHG emissions by adopting catalytic oxidative decomposition equipment to handle F-Gas from the semiconductor etching process. The purpose of the semiconductor etching process is to rid unnecessary parts of thin film from the wafer, for which F-Gas has been used and emitted as a process substance. F-Gas treatment equipment decomposes F-Gas at a certain temperature through catalytic response, and Samsung came to decompose about 90 percent or more of CF4 substance. By doing this, Samsung reduced a total of 1,012,000 tons of GHG emissions in 2015.



##### EPA Green Power Partnership

Samsung Electronics America signed an agreement on renewable energy with the EPA in 2010 and has continuously increased the use of renewable energy since then. As a result, it was named one of the Top 10 Companies in 2015 (by the amount of renewable energy use) in the Tech and Telecom category out of over 1,400 participating companies.

## Water Resources

Water resource scarcity is emerging as a serious global issue. Based on its responsibility as a leading company in the global IT industry, Samsung has set water resource management policies, reduction goals, and response strategies to execute. Through this, the company participates in solving problems associated with water resource depletion and minimizes critical risks in business management.

### Dealing with Water Resources



#### Our Belief

"Samsung recognizes water resources as an important asset for a sustainable society and business management, and fulfills its corporate responsibility as a global company by striving to protect them."

#### Action Plans

1

##### We work hard to minimize water resource risk in business management.

We evaluate the impact of our business activities including production on water resources to minimize risks and to continuously pursue the introduction of new technology.

2

##### We recognize the importance of water resources as part of our corporate culture.

We establish the preservation and sustainability of water resources as our corporate culture to make our employees recognize their responsibility for water resource management and consider the company's impact on local communities and the environment with the highest priority.

3

##### We actively cooperate with external water resource policies.

Based on domestic and overseas guidelines on water resources, we actively cooperate with local governments and central governments of the region where we operate as well as international organizations in establishing and executing policies on water resources.

4

##### We disclose our water resource policies and activities.

We transparently disclose corporate policies and activities regarding the use of water resources to stakeholders, including local communities.

## Water Resource Risk Management

Samsung analyzes risks at each worksite regarding water resource depletion, which is emerging as a global environmental issue, to secure stable water resource supply as well as to analyze how the company's business operation influences water resources and the ecosystem around its facilities. In order to examine water resource risks, we apply to our global manufacturing plants the water resource management methods distributed by the Food and Agriculture Organization (FAO) and the World Business Council for Sustainable Development (WBCSD). We analyze water risks at our operation sites located in water-stressed countries, and have developed response strategies guided by the Carbon Disclosure Project's (CDP) Water Disclosure recommendations.

### Regional Water Balance Quantity

Region	Operation Site (Sites)	Withdrawal (1,000 tons)	Discharge (1,000 tons)	Water-stressed Countries <sup>1)</sup> (No. of operation sites)
Asia	27	84,816	67,147	Korea (7), India (2)
Latin America	5	7,162	5,215	
Europe/Africa	6	436	221	Poland (1), Egypt (1), Republic of South Africa <sup>2)</sup> (1)

1) Reference to water resource management from the Food and Agriculture Organization (FAO)

2) South Africa facility operated from 2015 is included

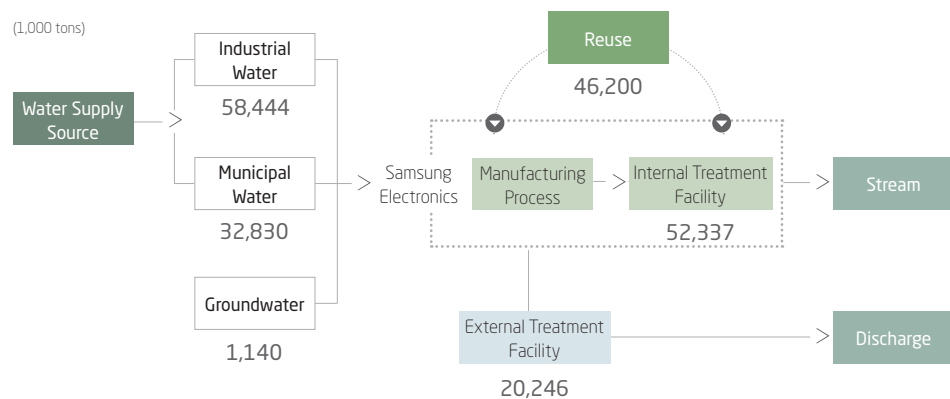
**Risk Response Strategies**

		<b>Risk Response Strategies</b>
Physical Risks	Worsening water quality	· Securing water quality through a pre-withdrawal treatment process
	Floods	· Forming wetlands and building embankments to prevent flooding of rivers around facilities
	Water cutoff	· Building dual water supply lines and water storage facilities to prevent delayed production
Regulatory Risks	Changes in regulations regarding water use and discharge	· Abiding by stricter in-house standards than each country's legal discharge regulations · Reducing discharge by increasing water recycling
	Efficiency-based legislation	· Examining water efficiency for building new facilities and investment in improving water efficiency of existing facilities
	Uncertainties in new regulations	· Continuous monitoring of global environmental laws and regulations
Reputational Risks	Lawsuits due to wastewater	· Continuous monitoring of effluent · Early establishment of an environmental management system for new manufacturing facilities
	Tarnished image due to wastewater leakage and other factors	· Operating an emergency response system against accidents · Reinforcing internal/external communication regarding water resources

**Current Situation in Water Resources**

Samsung minimizes water resource risks by building dual main water supply lines and sufficient water storage facilities. On the other hand, waste water released from our operation sites is safely treated through internal and external treatment facilities. When waste water is released through internal treatment facilities, we apply stricter internal standards than legal requirements. With the increase of production at facilities and the establishment of new manufacturing facilities abroad, the amount of water used at facilities has been continuously on the rise. However, Samsung constantly works hard to decrease water use and increase water recycling by carrying out a 3R (reduce, reuse, recycle) campaign. We have reduced water use through various activities. For example, we optimized the amount of water used for producing ultra-pure water, and installed a wastewater treatment system to reuse treated water. As the semiconductor production process becomes more refined, the recovery rate of ultra-pure water is decreasing, but we have increased the reuse of other types of wastewater and the water reuse, which has increased by 22.9 percent over the previous year. Samsung will continue to pursue activities to reduce water resource consumption in order to achieve a consumption intensity of 50 tons/KRW million.

**Flow of Water Resources**





### Water Usage




Classification		Water Usage by Withdrawal Sources (1,000 tons)			Consumption Intensity	
		Industrial Water	Municipal Water (Service Water)	Groundwater	Total	(tons/KRW 100 M*)
Korea	2013	47,765	6,080	232	54,077	34
	2014	49,806	7,202	247	57,255	42
	2015	58,444	6,271	203	64,918	48
Global	2013	47,765	19,847	1,069	68,681	35
	2014	49,806	23,659	1,219	74,684	41
	2015	58,444	32,830	1,140	92,414	53

\* KOREA: HQ-based sales, Global: Globally-consolidated sales (excluding sales from the display business)

### Water Resource Saving Activities

Samsung's water resource saving activities include minimizing water use by improving the manufacturing process and maximizing water efficiency by reusing wastewater after purification treatment. As a result, we reused 46,200 thousand tons of wastewater in 2015.

#### Major Saving Activities

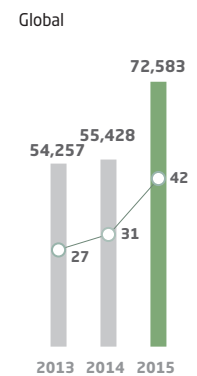
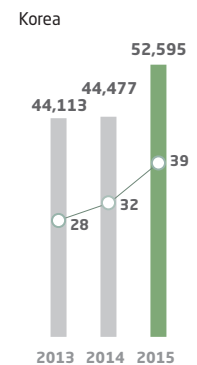
Optimization of water management inside the utility system and semiconductor manufacturing processes	Reusing water from the wastewater reprocessing system	Reusing water used during the manufacturing process as secondary water
 <ul style="list-style-type: none"> <li>Optimizing the water used for the production of ultra-pure water and for wet scrubbers, cooling towers, and wastewater treatment facilities</li> </ul>	 <ul style="list-style-type: none"> <li>Reprocessing acid/alkaline wastewater and organic wastewater to be used for the ultra-pure water production system</li> <li>Using reprocessed wastewater for fire-fighting and landscaping</li> </ul>	 <ul style="list-style-type: none"> <li>Using used ultra-pure water for another process</li> <li>Reusing condensate water from outdoor air handling units and concentrated water from cooling towers for wet scrubbers</li> </ul>

### Water Reuse

Classification		Water Reuse		Ultra-Pure Water Recycling		
		Reused Quantity	Reuse Rate	Supply Quantity	Recovery Quantity	Recovery Rate
		(1,000 tons)	(%)	(1,000 tons)	(1,000 tons)	(%)
Korea	2013	34,571	63.9	27,357	12,525	45.8
	2014	32,295	56.4	25,490	11,273	44.2
	2015	37,014	57.0	26,757	11,516	43.0
Global	2013	45,262	65.9	41,143	20,932	50.9
	2014	37,594	50.3	31,782	14,067	44.3
	2015	46,200	50.0	34,397	14,632	42.5

### Waste Water Discharge

■ Generation (1,000 tons)  
○ Wastewater Intensity (tons/KRW100M)



\* Korea: head office sales, Global: global consolidated sales (except displays)

**Suppliers' Water Usage**

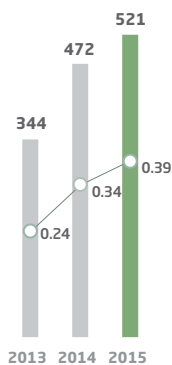
(1,000 tons)

327,638  
2014

\* Calculated based on each supplier's transaction size with Samsung

**Use of Hazardous Materials\* (Korea)**

■ Use (1,000 tons)  
○ Intensity (tons/KRW1.00 million\*)



\* HQ-based sales

**Management of Suppliers' Water Resources**

Since 2014, Samsung has managed suppliers' water resource use and operation of wastewater treatment facilities. Going forward, we will continue to reinforce a comprehensive water resource management system inside our supply chain.

**Chemical Substance Management**

**Chemical Substance Management Policy**

In order to manage chemical substances, Samsung's related units; its manufacturing, R&D, and purchasing units, are efficiently collaborating with one another. When newly purchasing chemicals, Samsung manages them through the chemical substance management system under a G-EHS system based on the material safety data sheet (MSDS), chemical warranty letters, and letters of confirmation (LOC). Also, we examine the usability of each chemical substance before purchasing it based on the company's own Regulated Substance Management Rules. For allowed chemical substances, we continuously reinforce prevention against potential accidents, such as ensuring there are improved protective equipment boxes and preventive drug boxes for storage and handling facilities. In addition, for the management of the supply chain, we check tier 1 suppliers' restriction of hazardous chemicals (including benzene and n-hexane) through chemical warranty letters every year, and prohibit hazardous chemicals from coming into our worksites. We conduct regular training for employees handling hazardous chemicals at each worksite for the purpose of using chemicals, ways to use them, and countermeasures to possible accidents, while also inspecting storage and handling facilities on an ongoing basis.

**Reinforced Responses to Chemical Substance Regulations**

In 2015, the Act on Registration and Evaluation of Chemical Substances (ARECs) and the Toxic Chemicals Control Act became effective in Korea. Accordingly, Samsung changed its chemical substance management system, which before then had separately handled chemicals for each product in an integrated management system.

**Use of Chemical Substances and Reduction Efforts**

With the increasing production of semiconductors, the quantity of chemical substances used at Samsung Electronics is gradually increasing, but the company is constantly reducing the use of chemicals by applying continuous electro-deionization (CEDI) devices to some hazardous chemical substances. Also, we carry out process improvement in order to decrease chemicals used for cleaning parts and pipes during production processes.



**Chemical Substance Management at Samsung Materials Research Complex**

With increasing responsibility for chemical substance management regarding the leakage of hazardous substances, Samsung ensured safety as the company established an exclusive storage facility of chemical substances inside the Samsung Materials Research Complex to separately store dangerous chemicals according to their properties under the Safety Control of Dangerous Substances Act. Besides the chemical substance management system, we established a separate reagent management system to thoroughly manage the quantities of chemical substances used and stored.

- 1 Separate storage and management of each chemical substance
- 2 Exclusive storage facility of chemical substances

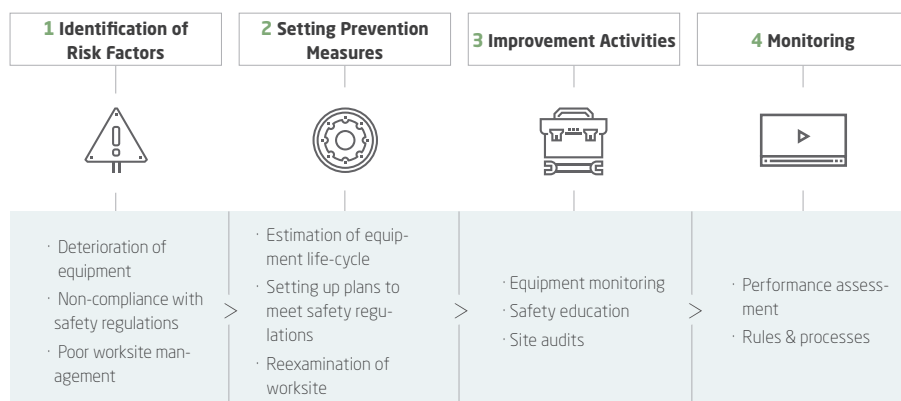
## Worksite Safety

In order to provide a safe, pleasant work environment for all employees, Samsung established an accident management process to reinforce employee safety management while promoting a safety management culture through continuous EHS education.

### Accident Management System

Samsung conducts regular safety training programs to identify problems caused by the deterioration of equipment in advance and to remove risk factors due to non-compliance with safety regulations. We continuously check potential risk factors to set improvement measures and remove EHS risks in advance through regular monitoring.

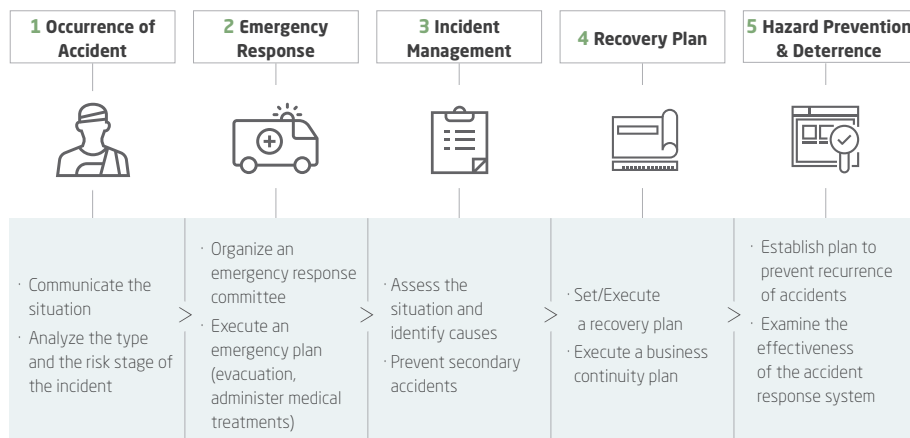
#### Accident Prevention Process



### Accident Response Procedures

In order to prepare for emergency situations, Samsung identified emergency scenarios for different types of accidents. We verify the effectiveness of our response system through regular drills. Furthermore, we carry out emergency evacuation drills and first aid training on a regular basis so that our employees can be evacuated fast and safely.

#### Accident Response Procedure



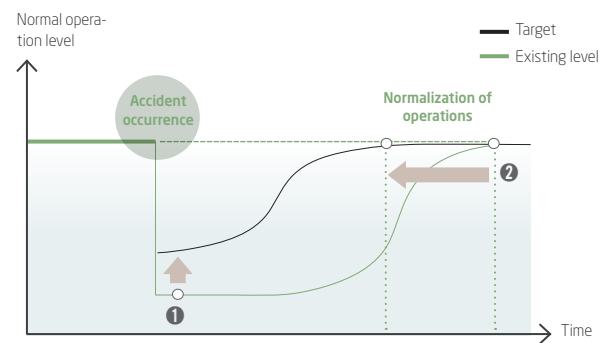
### Business Continuity Plan

Extreme weather conditions, such as floods, droughts, heat waves, and severe typhoons are occurring due to changes in the climate worldwide. Also, social stability is worsening as seen in conflicts between countries and regional terrorism, while new types of infectious diseases, including Ebola, Middle East respiratory syndrome, and Zika virus, are affecting populations around the world every year. Samsung conducts various activities in order to prevent environmental, social, and facility-related risks in advance. We have established a business continuity system for each worksite so that we can supply products and services for our customers as scheduled even if there are inevitable accidents.



### Business Continuity Activity Plan

- 1 Minimizing halts in production & reducing damages
- 2 Minimizing production delays through the business continuity plan



### Certification Received for Business Continuity Management

Samsung Electronics' Gumi site acquired the ISO 22301 certificate for its business continuity management system, giving it official recognition as a worksite that can provide a stable supply of products for customers. We are examining the effectiveness of our business continuity management system to reinforce it so that we can minimize damages when unexpected accidents occur shorten the time between the occurrence of an accident and the normalization of business operations.

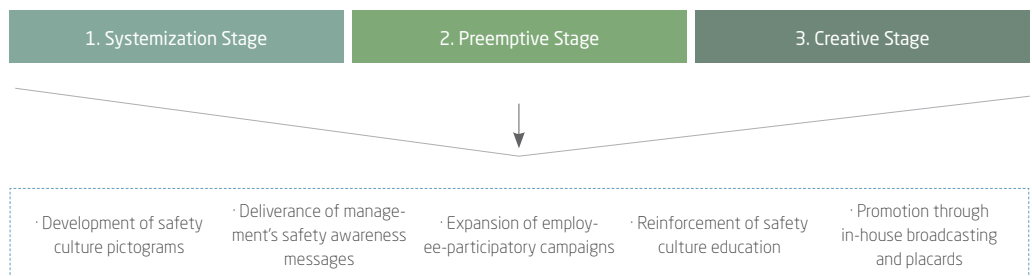
### Reinforcement of EHS Capabilities

Samsung recently launched a Safety Culture Office in order to improve employees' EHS awareness and has conducted a variety of related activities, while also holding an annual Environment & Safety Innovation Day for sharing/discussing advanced best practices of EHS innovation. In addition, we provide EHS education for all employees expand the offer of specialized EHS training

### Launch of Safety Culture Secretariat

With the aim of establishing the world's highest level of safety culture by 2018, Samsung has established a Safety Culture Secretariat in Jan. 2016 that helps to promote responsible safety behavior. Recently, we conducted an extensive "WALK SMART" campaign via in-house broadcasting and promotional materials for people to control their use of smart-phones while walking. Also, we developed a questionnaire to evaluate the level of safety culture and started to use it for regular evaluation of global facilities in 2015. We analyzed insufficient aspects of safety culture to establish mid- and long-term strategies, while reinforcing related training and promotion toward employees. Besides such efforts, we adopted an institutional strategy to reflect our level of safety management in all of the performance goals of management. Our employees will work hard to improve the level of safety culture through active participation in safety management activities.

#### Mid- and Long-term Goals for Safety Culture



1,2 WALK SMART Campaign

### Environment & Safety Innovation Day

Samsung holds an Environment & Safety Innovation Day every year in order to gather EHS capabilities and upgrade its overall worksite management level, using it as an opportunity to share best practices of EHS activities. The Environment & Safety Innovation Day contributes to all executives and employees in sharing the importance of safety and to establishing EHS culture through our innovation practice exhibition—preventing EHS accidents at global facilities—and benchmarking of improved facilities and presentation of best practices. The 2015 Environment & Safety Innovation Day invited heads of 157 suppliers and related people for a "Suppliers' Day" where they shared the results of the Best EHS Partners program conducted during the past year to learn from best partners as benchmarks. Samsung will continue to expand the Environment & Safety Innovation Day as an opportunity for employees and suppliers to experience the needs for change and innovation in safety, and to firmly establish safety culture throughout the company.

#### WALK SMART Campaign Pictograms



**Environment & Safety Innovation Day Programs**

Classification	Key Features
Innovation Practice Exhibition	Exhibiting best practices selected from on-site improvement activities conducted at Samsung's global manufacturing sites and at suppliers over the past year
Excellent Worksite Benchmarking	Providing various safety experience sites where attendees at the event can find benchmarks and apply best practices to their facilities
Special Lectures on Safety Culture	Inviting lecturers from companies with advanced EHS management to introduce risk practices to overcome risks and share the importance of safety culture
Presentation of Best Practices	Having a best worksite practice contest to provide a learning opportunity for employees through the presentation of final selected practices



1 Exhibition of best practices in EHS  
2 A special lecture on safety culture

**EHS Education**

**Employee EHS Training**

Samsung provides all employees with basic training as required by regulation and also gives hands-on training programs for better education. Samsung's EHS simulation lab educates employees on CPR and response protocol for different emergency situations, while also working hard to prevent accidents and raise safety awareness among employees through regular fire drills and safety culture campaigns.

**Specialized EHS Training**

In order to improve EHS staff's job skills, Samsung operates specialized programs for different EHS areas. We provide training on regulations in various fields for compliance with EHS regulations. We have also fostered in-house inspectors in ISO14001/OHSAS18001/ ISO50001 certification for the smooth operation of management systems in environment, safety, health, and energy. In addition, we opened licensing courses for professional engineers, master craftsman, and industrial engineers, producing many EHS experts.

**2015 EHS Education**

General Training (all employees)	Specialized Training (EHS staff)
<p><b>Required by Regulations</b> New hire orientation, regular training, supervisor training, legally appointed manager training</p> <hr/> <p><b>Hands-on Training</b> CPR training, fire drills</p>	<p><b>Training on Regulations</b> Basic regulations (Occupational Safety &amp; Health Act, Toxic Chemicals Control Act, Framework Act on Fire Services), new &amp; revised regulations</p> <hr/> <p><b>Fostering in-house inspectors (persons)</b> ISO 14001 (14), OHSAS 18001 (14), ISO 50001 (36)</p> <hr/> <p><b>Response to stakeholders</b> EICC response expert course, working-level course for GHG emission trading scheme</p> <hr/> <p><b>Licensing courses</b> Courses to foster professional engineers, master craftsman, industrial engineers, and fire safety managers</p>



### Case: EHS Capability Building

#### Global EHS Conference

To enhance the level of EHS management at overseas manufacturing sites, Samsung holds a Global EHS Conference every year. In 2015, 39 managers (10 from Samsung Display) in charge of EHS and utility shared cases of EHS accidents and prevention measures as well as best practices as benchmarks. Samsung does its best to create a safe and pleasant work environment at overseas operation sites. It does this by spreading EHS policies and advanced EHS management methods.

- 1 Fire protection training
- 2 Suwon worksite's best practice for benchmarking



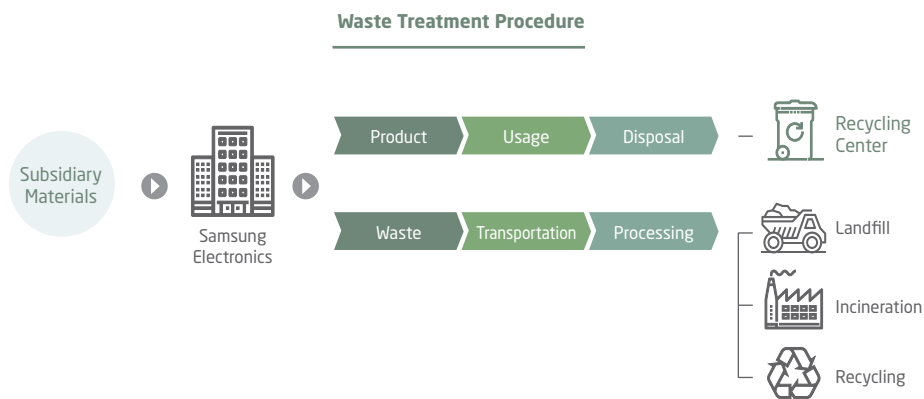
#### EHS Golden Bell

Samsung held the 2nd EHS Golden Bell event in 2015. Over 500 employees in Korea joined the quiz competition on in-house rules and related regulations to share basic EHS knowledge and recognize its importance. Samsung tries to establish a corporate culture that values EHS and to create facilities without accidents through events where employees voluntarily participate in.

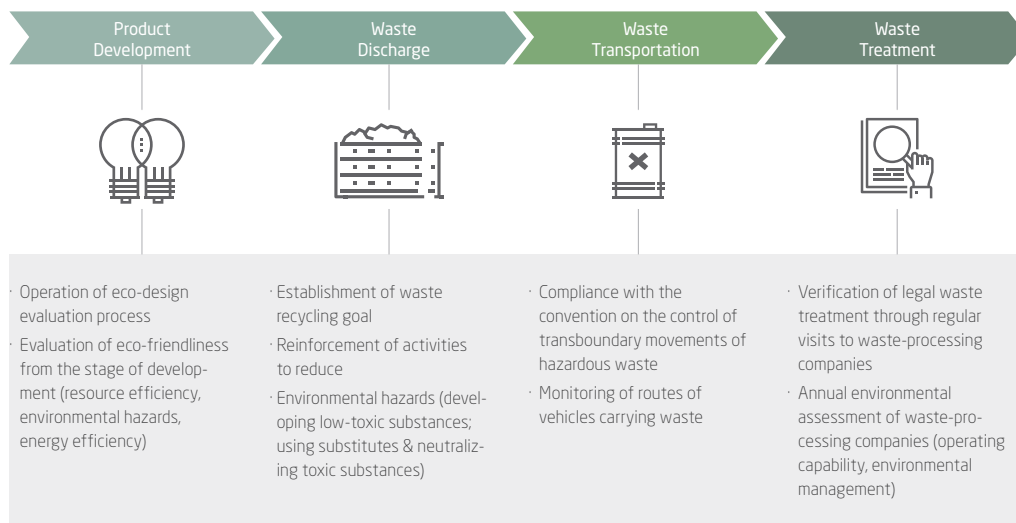
- 1 An event with employees' participation
- 2 EHS Golden Bell at Hwaseong (Korea)

## Waste Management

In order to minimize waste generated during the production process, Samsung establishes product design and manufacturing processes that consider resource efficiency. We have also established management plans for each process for lawful treatment and reduction of waste.



Waste Management Plans



Waste Discharge and Recycling

Although the amount of waste increased due to newly established overseas manufacturing sites, we are working hard to minimize air pollution caused by incineration and soil pollution caused by landfills, while also expanding the list of waste items to be recycled.

Waste Generation

Classification	Waste Generation (tons)			Waste Intensity (tons/KRW 100 million)	
	General Waste	Hazardous Waste*	Total		
Korea	2013	318,104	75,938	394,042	0.25
	2014	369,257	104,643	473,900	0.34
	2015	334,897	133,976	468,873	0.35
Global	2013	544,472	108,853	653,325	0.33
	2014	606,495	171,935	778,430	0.43
	2015	680,614	256,727	937,341	0.54

\* Figures were calculated based on different calculation standards by country where operation sites are located.

Waste Processing and Recycling

Classification	Waste Processing (tons)				Recycling Rate (%)	
	Recycling	Incineration	Landfill	Total		
Korea	2013	374,694	15,626	3,722	394,042	95
	2014	455,437	12,609	5,854	473,900	96
	2015	449,954	13,623	5,296	468,873	96
Global	2013	601,827	32,340	19,158	653,325	92
	2014	718,251	32,089	28,090	778,430	92
	2015	875,828	31,123	30,390	937,341	93



## Pollutant Management

### Management of Air Pollutants

Although air pollutant generation increases due to expanded production lines and production volume, Samsung strives to reduce the quantity of pollutant discharge by replacing its boilers with low NOx burner boilers, installing optimal prevention facilities for new and expanded production lines, and continuously performing efficiency enhancement activities at its prevention facilities.

**Quantity of Air Pollutant Discharge**

(tons)

Classification		NO <sub>x</sub>	SO <sub>x</sub>	Dust	NH <sub>3</sub>	HF
Korea	2013	342	Minimum Amount	21	2	5
	2014	338	0.1	22	3	5
	2015	372	0.01	16	3	3
Global	2013	585	76	84	N/A	N/A
	2014*	612	164	225	N/A	N/A
	2015	642	117	438	N/A	N/A

\* The figures for the 2014 have been corrected due to errors.

### Water Pollutants

In response to the increased quantity of released wastewater and water pollutants due to expanded production lines at overseas operation sites, Samsung continuously conducts research to operate pollutant treatment facilities at optimal conditions.

**Quantity of Water Pollutant Discharge**

(tons)

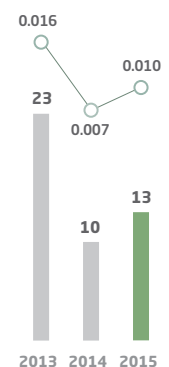
Classification		COD	BOD	SS	F	Heavy metals
Korea	2013	149	55	61	142	9.7
	2014	143	42	35	163	7.0
	2015	165	47	18	166	8.3
Global	2013	376	61	110	188	10.1
	2014	540	128	200	211	7.2
	2015	970	277	436	240	12.7

### Management of Ozone-Depleting Substances

Among the ozone-depleting substances defined by the Montreal Protocol, Samsung's domestic operation sites do not use chlorofluorocarbons (CFCs) that have high ozone depletion potential (ODP). Instead, we use hydrochlorofluorocarbons (HCFCs) with relatively low ODP in refrigerators, cooling equipment refrigerants, and cleaners at our operation sites. Furthermore, we plan to reduce the use of HCFCs by introducing new technologies, while cutting back the use of substances with ODP by replacing them with HFCs that do not harm the ozone layer.

**Use of Ozone-Depleting Substances (Korea)**

■ CFC-eq (ton)  
 ○ Intensity (kg/KRW 100 million)



**Soil Pollutants**

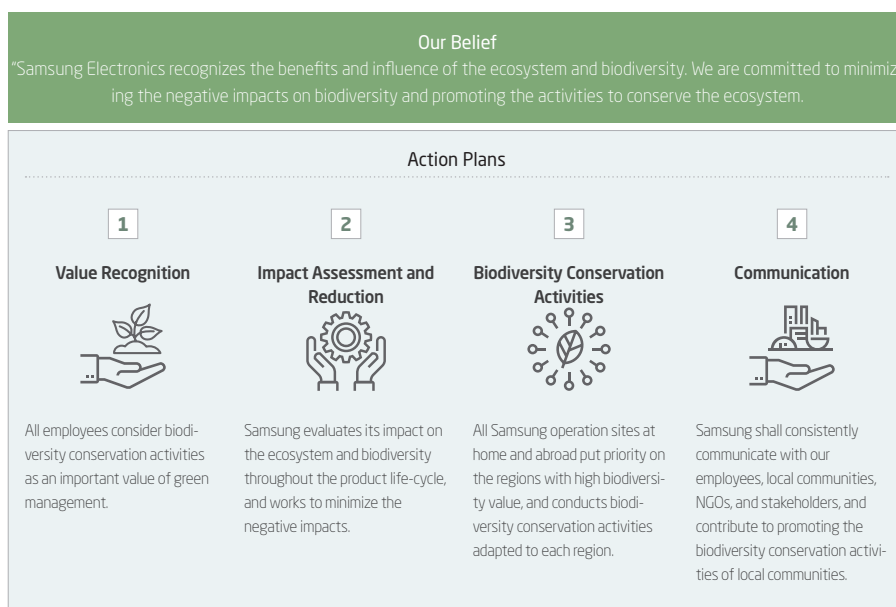
Samsung strives to prevent all potential sources of soil pollution by storing chemicals used in the production processes separately in impermeable storage facilities. In Korea, the company analyzes the soil pollution level every year. In addition, we analyze the components of landfill waste and lawfully process them with legally-designated waste-processing companies. We also regularly visit the waste-processing companies to monitor their compliance with regulations and our standards.

**Conservation of Biodiversity**

**Biodiversity Conservation Policy**

Since the adoption of the Convention on Biological Diversity in 1992, there has been an increased expectation from stakeholders for businesses to actively participate in the conservation and sustainable use of biodiversity. Accordingly, Samsung established the basic idea and action plans to conserve biodiversity by promoting the importance of biodiversity conservation with its employees and by reflecting them in business plans.

**Conservation of Biodiversity**



**Conservation of Aquatic Ecosystems and Water Quality Improvement Activities**

Samsung releases all of the wastewater generated at operation sites into streams after treatment permitted as per all regulations. We also monitor wastewater from worksites that have internal treatment facilities. When there are cases of worksites located inside an industrial complex, we treat wastewater through internal facilities first and again at a terminal treatment plant outside the company before releasing it. We continuously monitor water quality and the aquatic ecosystems of streams where our wastewater is released, and regularly conduct conservation activities for stream ecosystems together with local NGOs, family members of employees, and students of local schools.



### World Water Day Event

Samsung conducts preservation activities for streams and marine ecosystems at each manufacturing site around the world to commemorate World Water Day every year. Each worksite carries out purification activities for nearby streams together with local governments, local NGOs, and students. It also conducts preservation activities that include releasing native fish and planting aquatic plants, as well as campaigns and education initiatives for preserving the ecosystems and saving water.



1 A stream purification activity led by the Onyang facility, Korea  
 2 A beach purification activity led by the Samsung Mexicana S.A. de C.V. in Mexico  
 3 A stream purification activity carried out by the Samsung India Electronics of Product in India

### Research on the Impact of Business on Aquatic Ecosystems

Samsung continuously manages the impact on water quality of nearby streams and ecosystems caused by the company's release of wastewater and rainwater. Worksites periodically request external testing institutions to check the water quality of streams using indicators such as COD, BOD, and pH scale. In particular, semiconductor production sites calculate their impact on aquatic ecosystems jointly with local universities to conduct improvement activities.

#### Ecological Impact Analysis on Streams

Woncheonrichon Stream, Hwaseong	Osancheon Stream, Giheung	Gokgyocheon Stream, Onyang
Overseer: Kyung Hee University	Overseer: Korea Ecology & Environment Institute (Korean Federation for Environmental Movement Osan)	Overseer: Chungnam National University
<ul style="list-style-type: none"> <li>Water temperature: As the temperature of the effluent is similar to that of the stream there is no ecological impact.</li> <li>Fish: 383 fish, 12 species verified (minnow 35.5%, carp 20.4%)</li> <li>Ecosystem: Benthic invertebrates verified (midges 78.2%, Branchiura sowerbyi 11.5%)</li> <li>Ecotoxicity: The measurement of effluent shows no impact on the stream.</li> </ul>	<ul style="list-style-type: none"> <li>Water temperature: As the temperature of the effluent is similar to that of the stream there is no ecological impact.</li> <li>Fish: 662 fish, 14 species verified (crucian carp 27.3%, bass 18.9%)</li> <li>Ecosystem: Benthic invertebrates verified (non-insects 62.5%, Diptera &amp; Odonata 12.5%)</li> <li>Ecotoxicity: The measurement of effluent shows no impact on the stream.</li> </ul>	<ul style="list-style-type: none"> <li>Water temperature: As the temperature of the effluent is similar to that of the stream there is no ecological impact.</li> <li>Contamination factor: The measurement of BOD, COD, TOC, and SS shows no impact on the stream.</li> <li>Eutrophication: The measurement of TN and TP shows almost no impact on the stream.</li> </ul>

### Activities to Protect the Habitats of Endangered Species

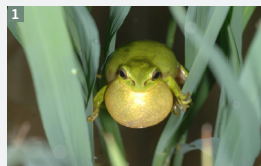
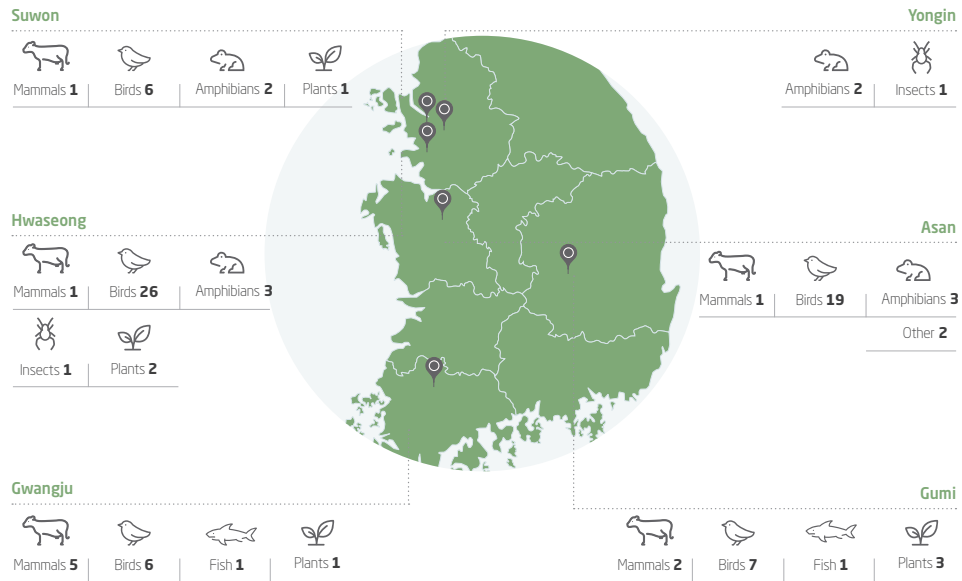
Samsung determines which species are endangered and which habitats are threatened in regions where its domestic manufacturing sites are located. It also researches the connection to and impact on the company's worksites to support related research and preservation of habitats.

#### Water Quality Surveys on Streams



- Suwon ..... Woncheonrichon
- Hwaseong .. Woncheonrichon
- Giheung ..... Osancheon
- Gumi ..... Yigyecheon
- Onyang ..... Gokgyocheon

Endangered Species in Regions around Domestic Worksites



- 1 Suwon worksite's support for the preservation of the Suweon tree frog\*
- 2 Gumi worksite's support for the multiplication of white-naped cranes
- 3 Onyang worksite's support for the preservation of coastal sand dunes

\* Photo courtesy of the Ministry of Environment

Activities to Preserve Endangered Species and Protect Habitats

Research on the Preservation of the Suweon Tree Frog

The Suwon worksite has conducted habitat restoration and research on the preservation of the Suweon tree frog, a Class I endangered species, jointly with the Suwon Research Institute (SRI) since 2013. As a result, they have succeeded in the restoration of Korea's first artificial habitat for the Suweon tree frog.

Multiplication of the White-naped Crane and Preservation of a Habitat for Migratory birds

After the Gumi worksite signed partnership agreements for preserving biodiversity with the Korean government, a local government, and a university for the first time in Korea, it has continuously supported the restoration of the ecosystem in the Haepyeong Wetlands, a habitat for migratory birds, as well as a project to multiply and train the white-naped crane, a bird native to the region.

Preservation of Coastal Sand Dunes

Since 2008, the Geum River Basin Environmental Office and Onyang worksite have supported eco-learning facilities and activities, such as the purification of the sea and the removal of ecology-disturbing plants in order to preserve coastal sand dunes where endangered species such as the Chinese egret and the Mongolian racerunner inhabit.

Violation of EHS Regulations

(cases)



2013 2014 2015

Violation of Rules and Regulations

Samsung applies stricter internal standards than legal requirements to comply with EHS regulations in Korea and abroad. In addition, the company monitors the establishment and revisions of EHS regulations to proactively reflect them through internal standards, while managing risks by examining potential violations of EHS regulations that might occur during employees' various work processes.