Toward a Sustainable Future

Hyundai Heavy Industries I 2010 Environmental Report

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

Hyundai Heavy Industries hopes that we can lead by example and help create a better future for every one

Contents

Min Keh – sik
Chairman & CEO

Lee Jae - seong
President & CEO

CEO`s Message

Hyundai Heavy Industries Co. Ltd. (HHI), as a global leader in heavy industries, has made continuous efforts to minimize pollution and maximize resources and energy conservation to provide a higher quality of life and a sustainable future.
HHI also accomplishes the company's social responsibility through actively responding to more diversifying environmental issues, including climate change.

HHI promotes clean production processes by minimizing emissions during manufacturing processes.
Especially, HHI positively participates in renewable energy business that takes the lead green industry.
HHI has also focused on the development of environmental technologies for eco- friendly products such as eco- friendly ships, high efficiency engines and eco- friendly construction equipment.

This report demonstrates HHI's environmental performances in keeping with our 'Green Growth' policy according to various environmental management strategies.
We hope this report helps stakeholder's better understand HHI's environmental management.

HHI recognizes that the environment is a key factor in global competitiveness and we promise to build a sustainable future through continuous improvement of environmental performance.
In the years to come, HHI has been a global leader in 'Low- carbon and Green Growth'.

Min Keh – sik
Chairman & CEO

Lee Jae - seong
President & CEO

Company Overview

· Head office and Ulsan main yard

· Offshore & Engineering Division yard

· Gunsan Shipyard

· Eumseong Solar cell-producing Plant

Company	HYUNDAI HEAVY INDUSTRIES
CEO	Chairman&CEO Min Keh-sik, President & CEO Lee Jae-seong
Work force	Number of employees- 25,000
Land area	Yard Capacity-5,940,000㎡
Establishment Date	1972. 3. 23
Address	1, Jeonha-Dong, Dong-Gu, Ulsan, Korea 682-792









Business divisions

Division	Major Products
Shipbuilding Division	Containerships, LNG Carrier, LPG Carriers, VLCCs Drillships, Chemical Tankers, Bulk Carriers
Offshore & Engineering Division	FPSOs, FPUs, TPLs, Fixed Platforms Pipelines & Subsea Facilities
Industrial Plant & Engineering Division	Combined-Cycle Power Plants, Thermal Power Plants Co-Generation Power Plants
Engine & Machinery Division	Diesel Engines, HiMSEN Engines, Propellers, Diesel Power Plant, Industrial Robots, Crankshafts
Electro Electric Systems Division	Transformers, Circuit Breakers, Switchgears Photovoltaic Systems, Wind Turbine Systems
Construction Equipment Division	Excavators, Wheel Loaders, Forklifts Skid Steer Loaders

Sales

Division	Sales (unit: billion won)	Portion
Shipbuilding Division	9,003	42.6%
Offshore & Engineering Division	3,424	16.2%
Industrial Plant & Engineering Division	1,898	9.0%
Engine & Machinery Division	2,772	13.1%
Electro Electric Systems Division	2,712	12.8%
Construction Equipment Division	1,190	5.6%
Others	143	0.7%
Total	21,142	100%

Company History

2009

Launched Korea's first hybrid ship
Delivered the first ship equipped with a ballast water treatment system
Completed wind turbine system plant in Gunsan
Received the President's Award for Labor Relations Grand Prix of 2009
Completed the drydock, specializing in FPSO production

2008

Awarded "The Best Industrial Relations Company"
Completion of Solar Module & Cell Factory in Eumseong
Organ donation campaign (participants: 15,315 participants)
Achieved 80 million bhp in marine engine production

2007

Production of the world's most powerful marine diesel engine
Received Korean's Top-Class enterprise award for the fifth consecutive year
Awarded $10 Billion Export Tower Award
Selected as "The best workplace in Korea" by Hewit

2006

Delivered 1,800 ton class submarine, "Son Wonil"
Received Korea's Top-Class Enterprise Award for the fourth consecutive year

2005

Secured newbuilding order for ultra – large 10,000TEU containerships
Hyundai 7-Series model of excavator selected as "World's Best Construction Equipment" by Construction Equipment magazine
Awarded $7 Billion Export Tower Award

2004

Crankshaft selected as a "World-Class product"
World's largest propeller(106.3 ton) produced

2003

`Chosen "The best workplace in Korea"
Excavator selected as a "World-Class Product"
Advanced health care center completed

2002

HiMSEN engine named "Korea's Top Ten New Technologies"
Delivery of 1,000th ship

2001

Delivered the world's largest FPSO (343,000DWT)
Acquired OHSAS-18001 certificate

2000

Developed Korea's first in-house marine diesel engine ("HiMSEN")
Selected as the main contractor for Korea's next-generation submarine

1997

Acquired ISO-14001 certificate

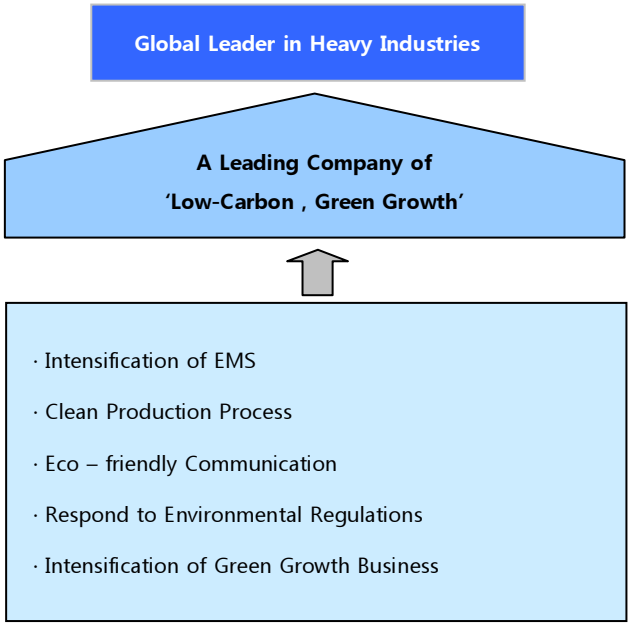
Hyundai Heavy Industries always thinks environment and practices action first.

Environmental Management

Vision & Strategies

HHI, as a global leader in heavy industries, practices environmental management and promotes sustainability through the 'Low-Carbon, Green Growth" policy.
Subsequently, HHI positively drives forward environmental management as below.

◇ Environmental Vision



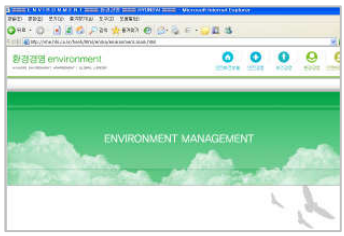
◇ Environmental Strategy

Strategy	Action Plan
Intensification of EMS	· Build systematic inspection system · Establishment of environmental information system · Strengthen environmental education
Respond to Environmental regulations	· Respond to climate change convention · Respond to global environmental regulations · Respond to Korean environmental regulations
Clean Production Process	· Reduce material and energy use · Adoption of resource recycling system · Operate pollution control facilities · Reduce use of hazardous materials
Eco-friendly Communication	· Participate in environmental preservation activities and campaigns · Participate in Voluntary agreements · Disseminate environmental reports
Intensification of Green Growth business	· Eco-products development · Enlarge renewable energy business

Environmental Management System

Since 1995, HHI has an environmental management system that meets ISO 14001 standards. Three levels of environmental management standards have been formulated: a manual, procedures and sub-procedures.

We have obtained ISO-14001 certification which guarantees the clarity and objectivity of the EMS (Environmental Management System) from the certifying authority (DNV-QA) in 1997.
After receiving OHSAS-18001 certification, HHI currently operates HSE (Health, Safety and Environment) management systems as part of an integrated environmental and safety/health management system.



- HSE Management System Homepage

◇ HSE Policy

Hyundai Heavy Industries Co., Ltd. (HHI) will become a world-class heavy industries company by recognizing the environment, health and safety as integral to our success. We at HHI hereby declare to sustain our performance and development of HSE policies as follows:

▷ Positioning of Corporate Identity as Eco-friendly Company
- Continuous development of environmental pollution prevention and conservation technologies
- Observance of domestic and international laws, conventions and regulations

▷ Achievement of Accident-free Workplace
- Promotion of safe practice programs to prevent accidents
- Educating employees on work standards and regulations

▷ Promotion of Employee Health
- Active campaign of health programs against diseases
- Continuous improvements to create healthy and safe working environment


DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
HYUNDAI HEAVY INDUSTRIES CO., LTD.

- IS0-14001 Certificate DNV-QA

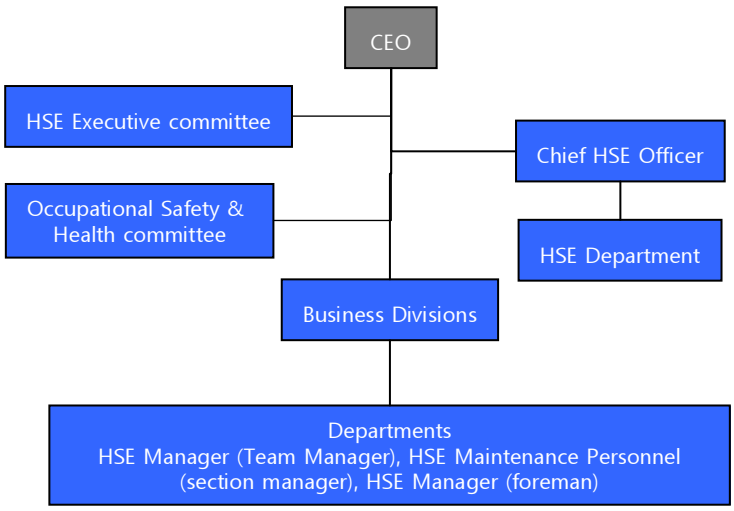

DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
HYUNDAI HEAVY INDUSTRIES CO., LTD.

- OSHAS-18001 Certificate DNV-QA

■ HSE system organization

For efficient, systematic HSE management, our HSE organization consists of HSE Executive Committee and Occupational Safety & Health Committee, both under the supervision of the Chief Executive Officer connected each business division.

The HSE Department manages HSE management system and supports each business division under the charge of the Chief HSE Officer.



■ Environmental Education

・ Environmental Education

HHI provides environmental education programs to raise the environmental awareness of employees and to foster responsibility with regard to the environment.

To minimize problems for and streamline the operation of pollution control facilities, a specific environmental education program has been initiated for pollution control facility operators.

We promote employee's accessibility to the latest environmental information and training materials through the company's internal webpage.

Environmental engineers keep up-to-date about internal and external environmental policies through professional environmental education, seminars and workshops.

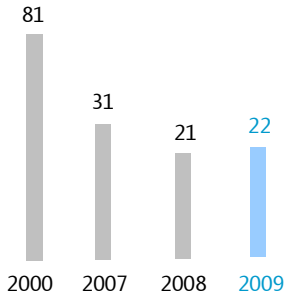
New techniques from the education and workshops are then applied to performance of environmental works.

■ Environmental Audits

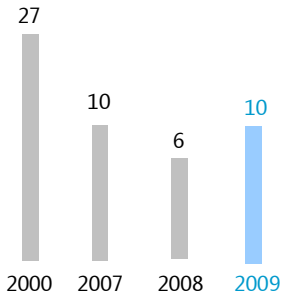
HHI performs internal environmental audits every year to identify potential environmental risks, and to inspect the relevance and validity of environmental management systems according to ISO 14001 certification.
In 2009, HHI carried out internal environmental audits in 166 departments, 22 of which were recommended to take corrective measures due to nonconformity.

To maintain ISO 14001 certification and objective evaluation of EMS (environmental management system), HHI undergoes periodic audits or renewal audits from a certifying authority every year.
As for External Periodic Audits, 63 departments were inspected in 2009, 10 of which were recommended to take corrective measures due to nonconformity.
The number of nonconformity in 2009 showed a 63% decrease from the base year of 2000. These improvements are due to effective implementation of the HSE management system and the full cooperation of employees.

• Internal environmental audits



Internal Audit Results
(Unit: Nonconformities)



External Audit Results
(Unit: Nonconformities)

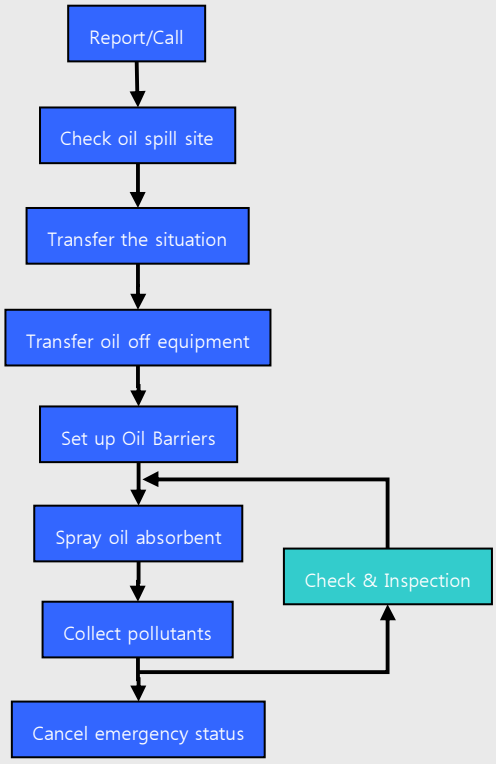
Emergency Response System

To prevent environmental pollution, HHI regularly carries out inspection activities in the shipyards.
HHI also regularly carries out environmental emergency response training to ensure a prompt response in case of an environmental emergency.
Through regular training, each department builds hands-on experience in responding to different environmental emergency situations.
We use employee feedback to discover weak points and problems in the training scenarios, and improve them accordingly.

Due to our location, preventing pollution to the sea has always been a top priority.
We have strict rules about the operation of offshore facilities and ships.
We have strict guidelines for the proper disposal of oil, hazardous chemicals, and waste.

· Environmental emergency response training

◇ Emergency measures of oil spill flow chart



Environmental Investment

HHI continually invests in clean production processes that minimize emissions of pollutants.

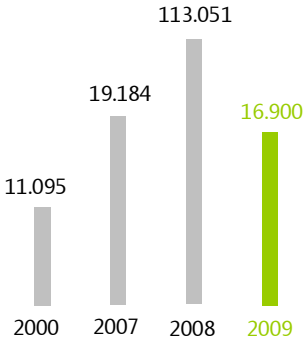
Investments include costs for air and water protection, treating waste materials and installing pollution prevention facilities and addressing demands from the government and other stakeholders concerning the environment.

For environmental management system efficiency, these investments are classified into four categories: pollution prevention, environmental burden reduction, environmental risk management and social cost.

In 2009, total environmental investment from HHI reached 16.9 billion won.

Environmental investment has decreased this year because there was no a large investment in 2009. To reduce VOCs emissions, a large investment was conducted as build of new painting shops in 2008.

· New facility



Environmental Investment

(Unit: billion won)

Environmental Performance Evaluation

HHI uses EPE (Environmental Performance Evaluation) method to continually improve environmental performance and make objective inspection standards.
According to ISO-14031 and GRI table, environmental performance indicators were selected to measure HHI's environmental performance. Each indicator was applied as a barometer of evaluation and weight.

◇ Environmental Performance Evaluation

Categories	Subcategories	Number of Indicators
Management Performance	EMS and Conformity	9
	Organization Management	4
	Environmental Costs	4
	Stakeholders Relationship	5
Operational Performance	Resource and Energy Consumption	7
	Air Emission	4
	Wastewater Discharge	6
	Waste Generation	3
Environmental Condition	Atmosphere Air Quality	4
	Inshore Seawater Quality	3

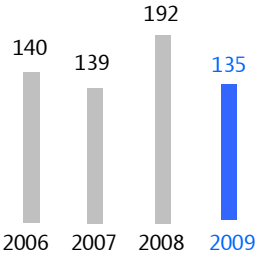
The average EPE (Environmental Performance Evaluation) results of 2009 show an improvement of 35% over the base year of 2000.

To measure environmental management performance, 22 performance indicators were created across 4 categories:
1) EMS (Environmental Management System) and Conformity,
2) Organization management,
3) Environmental investment,
4) Stakeholders relationships.
Performance in the "EMS and Conformity" category in 2009 was 46% higher than in the base year of 2000. Performance in "Stakeholders Relationships" in 2009 was 59% higher than in the base year of 2000.

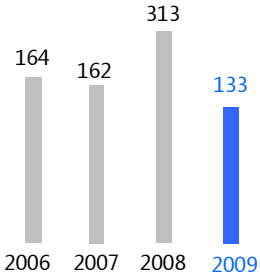
To measure environmental operational performance, 20 performance indicators were created across 4 categories:
1) Resource and energy use,
2) Air emission management,
3) Wastewater management,
4) Waste management.

To evaluate operational performance quantitatively, operational indicators were derived from the total amount of steel used per year with consideration of the characteristics of the heavy industries.
Especially important is performance in the "Air Emission Management" category in 2009; 74% higher than in the base year of 2000.
Performance in the "Wastewater Discharge" category in 2009 was 90% higher than in the base year of 2000.

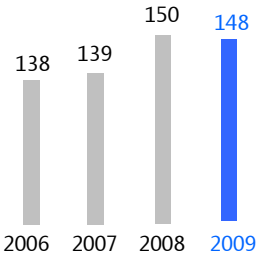
To evaluate environmental conditions, 7 environmental condition indicators were used. Inshore seawater quality and local atmosphere air quality were the main categories evaluated.
We will continually monitor the environmental quality of the local area, and continue our efforts to improve environmental conditions.



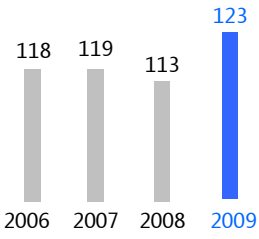
Average EPE Results
(Unit: increase or decrease compared to 100 points at the base year)



Management Performance results of EPE
(Unit: increase or decrease compared to 100 points at the base year)



Operational Performance results of EPE
(Unit: increase or decrease compared to 100 points at the base year)



Environmental Condition results of EPE
(Unit: increase or decrease compared to 100 points at the base year)

Hyundai Heavy Industries always efforts to minimize our environmental traces during business

Environmental Performances

Climate Change

Climate change is the most important environmental issue facing business and the public today. In response to global warming, the world is stepping up efforts to reduce greenhouse gas emissions.

Industrialized nations have introduced and are likely to tighten regulations to control greenhouse gas emissions. Such measures include CO2 caps, CO2 taxes, and CO2 labeling.

Global climate change trends indicate that Korea is an important greenhouse gas emissions country, and Korea is expected to be included in the Annex-1 group of countries for the second commitment period of 2013.

In Korea, the basic law for low-carbon, green growth was passed in April 2010. It includes mandatory reporting of greenhouse gas emissions in the workplace and emissions reduction targets.

■ HHI`s Response

For these reasons, HHI recognizes the growing need to take action and to prepare countermeasures for climate change as a global leader in heavy industries.

HHI has replaced bunker-C oil and kerosene with LNG as fuel for major equipment, with an emissions reduction of 25%. In 2005 we concluded a voluntary agreement with the Ministry of Knowledge Economy for reducing energy consumption.

Shipbuilding is still our core business, and greenhouse gas emissions from ships have become a global issue.

The best way to curb greenhouse gas emissions from ships is to reduce their reliance on fossil fuels.

HHI conducts R&D to come up with ways to boost fuel efficiency, such as optimization of hull form, eco- friendly propulsion systems, high efficiency engines and high efficiency propellers.

Moreover, HHI recognizes climate change is an opportunity, not a crisis, and will continue to invest in renewable energy business (solar power, wind power business) and further reduce our own reliance on fossil fuels.

HHI will analyze potential GHG reduction levels and establish greenhouse gas reduction targets.

We will continue to reduce greenhouse gas emissions through improved manufacturing processes and reduction of energy use.

· Voluntary Agreement to Conserve Energy and Reduce Greenhouse gas emissions

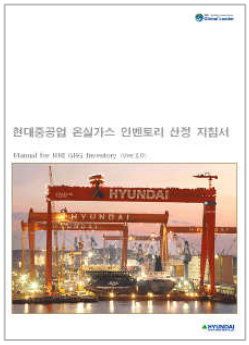
■ Greenhouse Gas Inventory

HHI's greenhouse gas emissions amounted to 751,442 tCO2e in 2009. Scope1 amounts were 356,617 tCO2e and scope2 amounts were 394,825 tCO2e. (the head office and Ulsan main yard)

The main sources of emissions are electricity use and heating facilities. Electricity accounts for 53 percent of total greenhouse gas emissions.

Through improvement of processes and energy efficiency, HHI`s greenhouse gas emissions were reduced by 3.1% compared to last year, nearly double the shipbuilding industry target level last year.

※ Greenhouse Gas Inventory: a statistical system that checks how much greenhouse gases a company emits

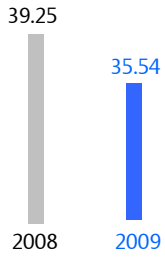


・HHI GHG Inventory Guideline (Ver 1.0)

◇ Greenhouse Gas Emissions (The head office and Ulsan main Yard)
Unit: tCO2e/yr

	Scope- 1	Scope- 2	합계
2008	382,283	393,565	775,848
2009	356,617	394,825	751,442

Scope- 1: Stationary combustion, Module combustion, Emissions of process
Scope- 2: Purchasing electricity, Purchasing Steam



Greenhouse Gas Emissions Basic Unit
(The head office and Ulsan main Yard)
(Unit: tCO2e/Sales[billion won])

◇ The Third Party Verification of Greenhouse Gas Inventory

HHI calculates greenhouse gas emissions based on the feasibility, completeness, consistency, transparency and accuracy. And we voluntarily performed third party verification to enhance credibility of the inventory.

According to international standards. HHI obtained a statement validating our greenhouse gas inventory data for the period 2008-2009 by Korean Standards Association on May 19.

・Statement about Verification of Greenhouse Gas Inventory

· Verification Organization : Korean Standards Association
· Scope of Verification : 2008 - 2009 Greenhouse Gas Inventory,
HHI head office and Ulsan main yard
· Standard and Guide of Verification : WRI/WBCSD GHG Protocol,
KS Q ISO 14064-1,
IPCC Guidelines (2006),
HHI GHG Inventory Guideline (Ver 1.0)

■ GHG Emission Reduction Project with Government (KVER)

· 1.65MW wind turbine in the Ulsan main yard

To obtain domestic CER (KCER, Korea Certified Emission Reduction), HHI conducts GHG emission reduction project which includes building a 1.65MW wind turbine in the Ulsan main yard.

Project assessment is now complete and HHI has requested registration with Korea Energy Management Corporation.

After this project passes registration and verification, HHI will secure emissions credits worth 2,200 tons (KCER) per year.

◇ KVER (Korea Voluntary Emission Reduction Program)

Its objective is to elicit active participation of Korean companies and to build capacity to respond to climate change.

Though reduction projects, carbon credits (KCERs, Korea Certified Emission Reductions) are purchased from the government.

■ Strategy for Responding to Climate Change

Phase 1 (2010~2011)
Constructing the platform for low carbon management system

- GHG inventory at HHI Ulsan main yard and verification
- Securing emissions credits (KCER)
- Analyzing potential GHG reduction levels
- Participating in CDP (Carbon Disclosure Project)
- Building GHG emissions reduction targets
- Climate change & GHG Response committee

↓

Phase 2 (2012~2013)
Establishing low carbon management system

- GHG inventory at all of HHI yards and plants, and verification
- Internal verification system about GHG inventory
- Participating in domestic emissions trading scheme

↓

Phase 3 (2014~)
Maintenance of Low carbon management system

- Construction of GHG management system for HHI group
- Launching low-carbon environmental campaign with neighborhood
- Support low-carbon management system with suppliers

Air Emissions

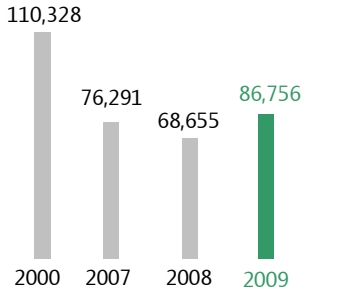
■ Air Pollutants

Air pollutants from HHI consist mainly of dust from blasting pant, material processing plant and volatile organic compounds (VOCs) generated when painting ships, engines, construction equipment, etc.

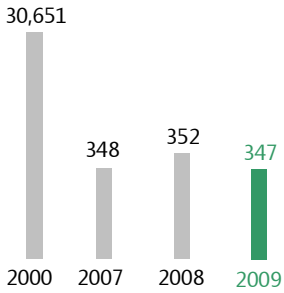
To protect air quality and reduce air pollutants, HHI uses strict air pollution control equipment. Moreover, we have set our own environmental air emissions standards, which are 50% stricter than legal requirements.

As a result, SOx emissions have largely decreased because fuel of heating facilities was changed from heavy oil to LNG.

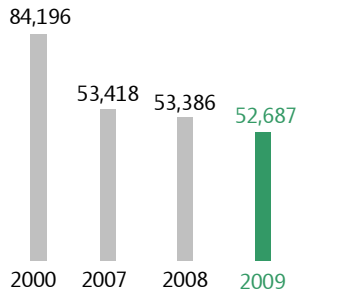
To reduce VOCs emissions, HHI conducts to installing RTO, using eco-friendly paints, improvement of painting process and building new painting shop.



Dust Emission (Ulsan main yard)
(Unit: : Kg/yr)



SOx Emission (Ulsan main yard)
(Unit: : Kg/yr)



NOx Emission (Ulsan main yard)
(Unit: : Kg/yr)

■ Air Pollution Control Equipment

• Air pollution control equipments

HHI operates 233 air pollution control units in its all yards and plants. Air pollution control equipment includes Bag-Filters, Scrubbers, A/C Towers, RTOs, Electric precipitators and SCRs.

142 of Bag-Filters and 70 of A/C Towers account for most of the air pollution control equipment.

We regularly check the equipment to optimize operations, replacing unsatisfactorily operating equipment on a regular basis.

※ RTO Facility

HHI operates 4 RTO (Regenerative Thermal Oxidizer) facilities to remove THC.

An RTO facility is a device used to incinerate (around 800℃) VOCs. This facility's VOCs removal efficiency is greater than 99 percent, therefore THC emissions have decreased dramatically.

The facilities heat combustion reuse rate of more than 95 percent also decrease fuel consumption.

Waste Management

HHI minimizes waste generation through promoting the efficient use of raw materials and the reuse or recycling of waste.
Various wastes and hazardous materials that are generated from the manufacturing process are being legally treated through a strict management system.
To reduce the level of wastes, HHI will continue to reduce resource use and improve waste recycling.

■ Waste treatment method

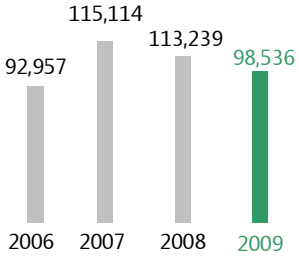
HHI has established an eco-friendly separate collection system at waste generation places. We carry out a primary separate collection in the product process and secondary separate collection in the resource recycling shop.
Separated wastes are treated at in-house facilities or by waste treatment and recycling contractors.
In-house treatment method is incineration in HHI's own incineration plant, and inspections of wastes treatment and recycling contractors' facilities are carried out to prevent illegal waste treatment.
Wastes are being managed based on the recognition that they are also resources. So HHI recycles 100 percent of recyclable wastes (metal scraps, waste oil, waste paints, sands, papers etc) through separate collection.

◇ Waste Manifest System
HHI monitors every stage from waste generation to final waste disposal, in real-time via the `Waste Manifest System`. This ensures that all waste is lawfully and transparently disposed.

◎ Waste treatment method

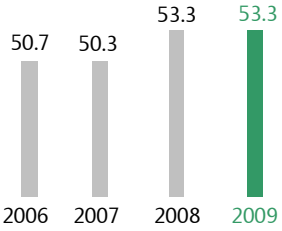
	Recycling	Incineration	Landfill
Rate	53.30%	37.90%	8.00%

· Wastewater Treatment and Storage Facility



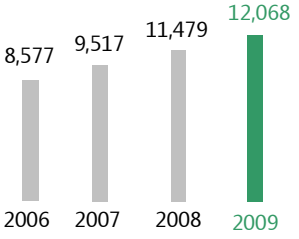
General Waste Generation

(Ulsan main yard, Unit : Ton/yr)



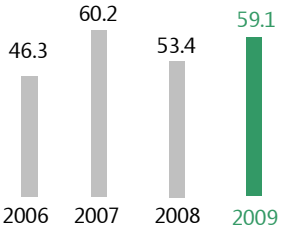
All Waste Recycling Rate

(Ulsan main yard, Unit : Ton/yr)



Hazardous Waste Generation

(Ulsan main yard, Unit : Ton/yr)



Hazardous Waste Recycling Rate

(Ulsan main yard, Unit : Ton/yr)

■ Waste Incineration Plant

· Waste Incineration Plant

HHI has operated a waste incineration plant since 1996.

Specification of Facility

-Incineration type: Stoker Type

-Incineration facility: Incinerator (200ton/day×2machines),
Waste heat boiler (29.5ton/day×2machines)

-Air pollution control equipment: Electric precipitator, Scrubber, SCR

-Wastewater treatment plant: physical and chemical method

-Stack height: 100m

◇ Concentration of Incineration plant discharge gas

Item	Legal Standard	2007	2008	2009
CO	50	3.6	1.0	2.0
NOx	80	47.7	48.0	47.8
HCL	30	0.0	1.0	0.5
DUST	30	5.2	8.0	10.3

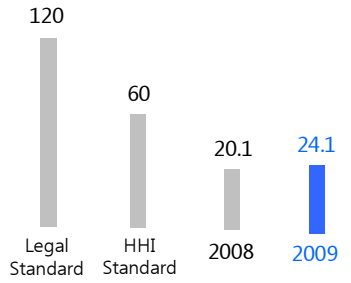
Water Quality

HHI treats water resource that thoroughly separates sewage from wastewater.
HHI treats factory wastewater in wastewater treatment facilities operated by the yard or sends factory wastewater to independent wastewater treatment companies. Sewage is sent to a sewage treatment plant operated by Ulsan City.
HHI has also changed the focus of water resource management from "controlling-end-of-pipe" approach to a "reduction-at-the-source" approach.

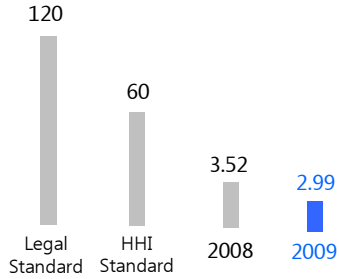
· Wastewater Treatment Facility

■ Wastewater Treatment

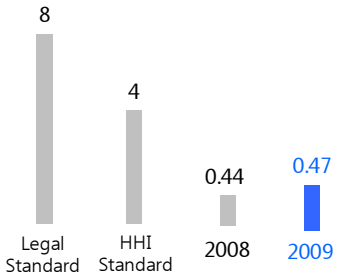
HHI reduces wastewater through reuse and improved production processes. HHI operating two wastewater treatment facilities within the Ulsan main yard.
And wastewater treatment facilities use physical and chemical method.
Wastewater discharge was reduced by 57% compared to last year in the Ulsan main yard.
HHI's water pollutant standards are 50% stricter than legal requirements.
We also carry out water analysis twice a month to monitor effluent discharges.



COD in Effluents (Ulsan main yard)
(Unit: : mg/L)



SS in Effluents (Ulsan main yard)
(Unit: : mg/L)



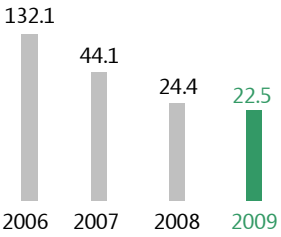
T-P in Effluents (Ulsan main yard)
(Unit: : mg/L)

■ Sewage Treatment

HHI completed construction of `Vacuum Sewage System` in 2008 for sewage generated in the shipyard.
Vacuum sewage system uses the QUA-VAC technique that consists of vacuum pipelines. Through this system, all sewage will be sent to the Bang-eo-jin sewage treatment plant operated by Ulsan City for processing.
Through this system, all sewage that generated in HHI (Ulsan yard) doesn't discharge into the sea and river

· Vacuum Sewage System

Chemical Management



Hazardous Chemical Use
(Ulsan main yard, Unit : Ton/yr)

■ Chemical Management

HHI strictly controls chemical use for the protection of the environment and the safety of employees.

HHI follows strict procedures with regard to chemicals from storage to use to disposal by conducting periodic inspections of all relevant facilities to prevent chemical emergencies. HHI has also prepared emergency equipment and procedures in case of a chemical emergency.

MSDSs (Material Safety Data Sheet) for the safe handling of toxic chemicals, are prepared in relevant facilities, and regular training is provided for all personnel involved in the handling of toxic chemicals.

HHI separately handles hazardous chemicals, such as cryolite, hydrogen chloride, nitric acid and sodium hydroxide.

In an effort to reduce hazardous chemical use, the amount of hazardous chemicals used was decreased by 40% compared to last year.

■ Eco-friendly Antifouling Paints Use

In the past, ships were coated with TBT (Tributyltin) antifouling paint to discourage the growth of barnacles, weeds, and other water life on the submersed hull of ship. As water life on the submersed hull of ship reduces the ships speed thus leading to an increase in fuel consumption to compensate.

In studies it has been found that TBT is harmful to the marine environment as biocide, and international agreements the use of TBT antifouling paint was prohibited.

Accordingly, HHI don't use antifouling paints containing TBT. HHI uses eco-friendly non-toxic antifouling paint and reduces air pollutants and energy use by implementing a new and more efficient antifouling paint application method.

■ REACH (Registration, Evaluation and Authorization of Chemicals)

The EU promulgated the REACH regulations, which came into effect on June 1, 2007, affecting companies exporting to the EU.

However, HHI exports products to the EU market such as ships, transformers and excavators are exempt from the regulations.

In cases where the regulations do apply, HHI is prepared to fully comply with the regulations and will continue to monitor changes in environmental regulations.

Soil Management

■ Soil Pollution

HHI's soil contamination facility follows strict soil pollution management procedures. 62 soil contamination management facilities are located within HHI`s Ulsan main yard.

The soil contamination facility helps prevent tank leakage. HHI uses soil pollution control equipment, including corrosion inhibitors, drainage and leakage measuring instruments.

All facilities are regularly checked for soil pollution by independent organizations.

◇ Soil Pollution Inspection (2008~2009, Ulsan main yard)

1) BTEX detection

Point	Standard (mg/kg)		Total of BTEX detection (mg/kg)
	Regulation 1 (low –risk)	Regulation 2 (high-risk)	
1	80	200	Not Detected (Less than 0.5)
2	80	200	Not Detected (Less than 0.5)
3	80	200	Not Detected (Less than 0.5)

2) TPH detection

Point	Standard (mg/kg)		Total of BTEX detection (mg/kg)
	Regulation 1 (low-risk)	Regulation 2 (high-risk)	
1	2000	5000	Not Detected (Less than 10)
2	2000	5000	Not Detected (Less than 10)
3	2000	5000	Not Detected (Less than 10)
4	2000	5000	Not Detected (Less than 10)
5	2000	5000	Not Detected (Less than 10)
6	2000	5000	Not Detected (Less than 10)
7	2000	5000	Not Detected (Less than 10)
8	2000	5000	Not Detected (Less than 10)
9	2000	5000	Not Detected (Less than 10)

· Soil contamination facility

Environmentally Friendly Products

■ Renewable Energy business

The renewable energy business is closely connected with 'Low-Carbon, Green Growth'. HHI views renewable energy as an opportunity for great growth and is a driving force in green technology

◇ Solar power business

HHI entered the solar power business in 2005, producing 20MW of solar modules, and received a $60 million contract to provide a solar power facility in Europe that same year.

HHI constructed solar cell-producing plant, in Eumseong, Korea, in 2008, manufacturing 30MW of solar cells and 70MW of photovoltaic modules.

Since then HHI has invested 300 billion won, and constructed a second solar cell-producing plant in 2009. The new plant has a production capacity of 330MW in solar cells and 300MW in photovoltaic modules, making HHI the top producer of solar cells in Korea.

As poly-silicon production is an essential raw material in the production of solar cells, HHI set up a joint venture with KCC Corp. in March 2008.

By 2010 HHI intends to manufacture 100MW of ingots/wafers, thus becoming a total provider of solar energy solutions from poly-silicon to ingots/wafers, solar cells, modules and systems.

※ Total solar energy solutions

Product area	Schedule
Poly silicon	Poly silicon – producing joint venture with KCC Corp.
Ingot/Wafer	Produce 100MW of Ingot/Wafer by 2010
Module	Produce 300MW of module
Solar cell	Produce 330MW of solar cell
System	Solar power plant design, manufacture to trial run as construction of turn key type

◇ Wind power business

The global wind market is emerging rapidly as one of the most promising in clean renewable energy.

HHI produced its first generator for wind turbines in 1988 and has exported transformers and converters for wind power plants to the USA and Europe. HHI is the leading player in the manufacture of generators, transformers and circuit breakers, all core parts of wind power systems.

HHI completed Korea's biggest wind turbine manufacturing plant in Gunsan, South Korea in 2009. HHI invested 105.7 billion won for the 132,000 square meter plant. It produces 1.65MW-class wind turbines and has an annual capacity of 600MW.

The plant's capacity will be expanded to 800MW by 2013, diversifying the product line to 2.0-2.5MW class onshore and offshore wind turbines. HHI plans to export most of the wind turbines produced in this plant to the USA and Europe.

■ Eco-friendly Ship Technique

◇ Hybrid Ship

HHI built Korea's first hybrid ship, the 3,000 ton patrol vessel named "Taepyungyang9" for Korea Coast Guard in 2009.

The ship is 112.7m long and 14.2m wide with a top speed of 28 knots. It is Korea's first environmentally friendly ship which uses an electric motor when sailing at under 12 knots.

This ship improves fuel efficiency by 25 percent at low speeds and reduces CO2 emissions by 100,000 tons per year compared to conventional vessels.

HHI also added a 750kW class electric motor to this vessel improving fuel efficiency and reducing vibration and noise. Traditionally, petrol vessels only use two 10,000bhp diesel engines.

・Hybrid Ship

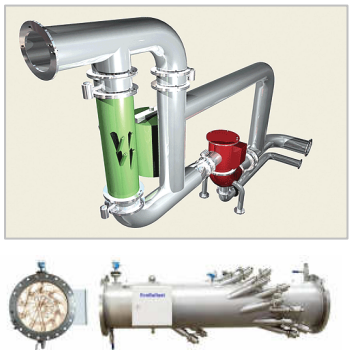
◇ A Ballast Water Treatment System

HHI has developed a ballast water treatment system for ships, tentatively named "Eco-Ballast". It is the first time a ballast water treatment system has been developed in a shipyard.

"Eco-Ballast" will protect the marine environment from the transfer of foreign organisms via ballast water. According to industry studies, 5 billion tons of seawater is transferred by ballast tanks every year. It is composed of two main units, the filter and the UV reactor. The filter can significantly reduce the sediment load in the ballast water. The UV reactor is specially designed for this ballast water treatment application to reduce the eco-footprint and to maximize the efficiency of the system.

The system is a chemical-free system avoiding potential harm to the ship, the ship's ballast tank coating, the crew, and the marine environment. The system is controlled by a programmable logic controller, installed in the control panel.

Following IMO ratification, a ballast water treatment system must be installed on all the ships which will be built from 2012 and all ships already in service by 2017



・Ballast Water Treatment System

◇ Thrust Fin

HHI developed the world's first Thrust Fin, delivering the first 8,600TEU containership equipped with a Thrust Fin to Hapag Lloyd.

The Thrust Fin is an airfoil-shaped device that is attached to the rudder behind the propeller, maximizing thrust force. It produces thrust from the rotational flow, with the theory of lift generation in aeronautics applied to its design.

A large containership consumes approximately 300 tons of fuel per day. If it is equipped with a Thrust Fin, the annual savings in fuel expenses could total $2.4 million. With an average ship lifetime of 25 years, this amounts to $60 million in savings per ship. Obviously, emissions of air pollutants as SOx, NOx and greenhouse gases (CO2) are decreased.

・Thrust Fin

■ Eco-Friendly Engine

· Eco-Friendly Engine

HHI produced world's first Eco-friendly engine meeting new IMO standards.

HHI finished the trial run for the marine engine which reduces Nox emissions by 15% and delivered it to client.

IMO tightened the regulations for NOx emissions of marine engines from 17g per 1kWh to 14.4g in October, 2008.

Under the new regulations, ships built from January 1, 2011 must be installed with marine engines that comply with the new emissions targets.

HHI began working on the environmentally friendly marine engine in 2008 and has since developed turbochargers, fuel valves, air coolers and refined engine design to meet the new regulations.

■ Eco-Friendly Construction Equipment

· Eco-Friendly Construction Equipment

HHI released new models of excavators, forklifts, wheel loaders (ROBEX 210W, 9-series etc) equipped with equipped with eco-friendly engine 'Tier-3'.

These models reduce emissions of carbon monoxide and fine dust by 23% while power generating capacity is improved by 15% over previous models. The Tier-3 engine also meets recently enacted gas emission regulations of Korea, U.S.A and E.U countries.

In addition, new models of wheel loader have Load Sensing System that control fuel use based on load weight, improving fuel efficiency by 13%.

HHI also improved safety and convenience features by reducing vibration and noise in the control cab and adding a rear camera and engine lock function.

For a sustainable future, Hyundai Heavy Industries has remarkably grown with Regional society

Stakeholder Partnership

Voluntary Agreements

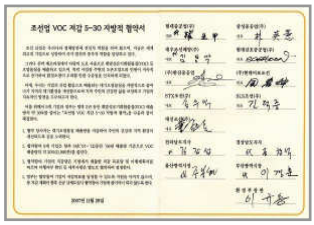
■ Voluntary VOC Reduction Agreements

Activities associated with shipbuilding result in the release of VOCs into the atmosphere. VOCs from painting operations are the most significant emissions from our manufacturing facilities.

HHI entered into a "voluntary agreement to reduce VOCs by 5-30 percent in the shipbuilding industry" with the Ministry of Environment and 8 shipbuilding companies in November 2007.

This agreement will help create a cleaner environment and improve local resident's health. According to the voluntary agreement, HHI will invest 120 billion won to install air pollution control equipment, eco-paint development, install spray pumps, and other measures over five years from 2007.

HHI's target is to reduce VOC emissions by 30.1% of 2006 levels by 2011.



· Voluntary VOC Reduction Agreements

■ Climate Change response team in the shipbuilding industry

HHI entered into a "Climate Change response team in the shipbuilding industry" in 2009, for establish countermeasures about reduction of greenhouse gas in shipbuilding industry.

"Climate Change response team in the shipbuilding industry" consists of Korea Energy Management Corporation, Ministry of knowledge economy, Korea shipbuilder's association, Shipbuilding companies, Academic fields.

Major activities include build up management greenhouse gas inventory about shipbuilding industry, review of greenhouse gas reduction method, intensification of cooperative system about climate change, education program about climatic change convention and greenhouse gas.

HHI plans to various efforts, to become leading company on climate change.

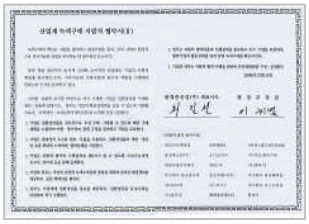
· Education of Climate Change response team

■ Voluntary Agreement for Green Purchasing

HHI recognizes green purchasing is important in the pursuit of environmentally sustainable growth.

Since 2006 we have implemented green purchasing management and on December 2006 HHI entered into a "voluntary agreement for green purchasing" with the Ministry of Environment.

We pledge to purchases eco-materials and eco-components to encourage the supply-side development of eco-friendly practices and growth of green industry. Our aim is to build a 100% Green Supply Chain.



· Voluntary Agreement for Green Purchasing

Environmental Conservation Activities

As an environmentally responsible corporate citizen, HHI recognizes the importance of conservation to the continued growth of our company and the wellbeing of our community.

Over the years we have spearheaded various environmental conservation projects dealing with the protection of our forests, rivers, and coastlines.

HHI will continue to increase environmental conservation activities

◇ One Company, One Community Cleaning Campaign

In regards to the environment, HHI has cooperated with the government over a long time through the "One Company, One Community Cleaning Campaign". HHI is in its tenth year of cooperation with the local community.

◇ Voluntary Environmental Preservation Activities

Many clubs and associations exist within HHI. These clubs and associations conduct environmental conservation activities at least once a month.

◇ Photography exhibition of maritime environment

In order to increase awareness of the sea and the importance of maritime preservation, photography exhibitions of maritime environment run by Ulsan Coast Guard are held at the HHI-head office.

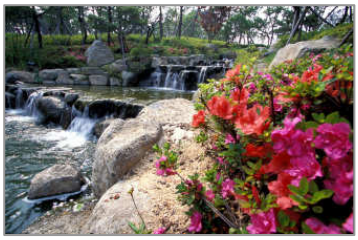
The exhibition includes winners from the maritime environment photograph contest, maritime environment painting contest and other photos featuring the sea.

・One Company, One Community Cleaning Campaign

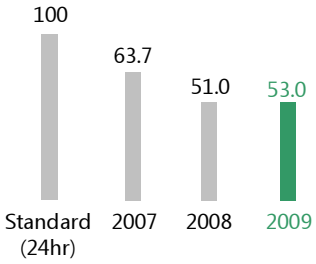
・Photography exhibition of maritime environment

Environmental Quality of Community

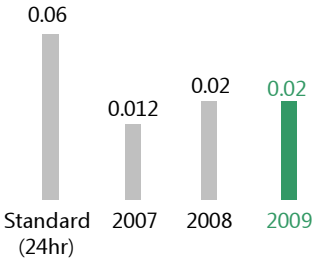
HHI is located in Bangeojin, Ulsan, on the southeast coast of Korea, and we make efforts to protect the local environment.
HHI continually monitors the environment of our local community. Monitoring results meet the legal standards for environment. Data shows that seawater quality and local air quality has been maintained.



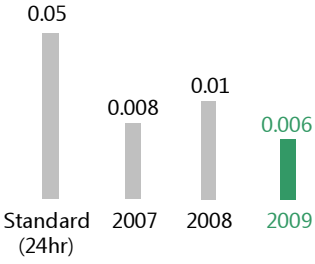
To prevent sea pollution, HHI has divided the adjacent sea into 20 areas of "Sea Pollution Prevention Management". We have also implemented regular emergency contingency drills and prevention activities in case of sea and air pollution emergencies



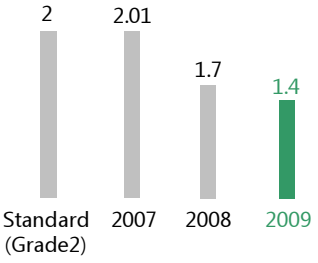
PM-10 Concentration in the Local Atmosphere (Unit : ㎍/㎥)



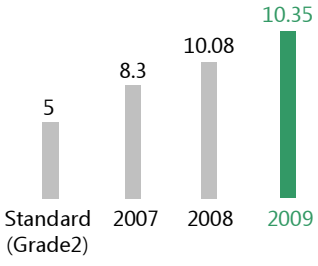
NO2 Concentration in the Local Atmosphere (Unit : PPM)



SO2 Concentration in the Local Atmosphere (Unit : PPM)



Average COD of Seawater (Unit : mg/L)



Average DO of Seawater (Unit : mg/L)

HYUNDAI
HEAVY INDUSTRIES CO.,LTD.

1 JEONHA–DONG, DONG-GU, ULSAN, KOREA 682-792 **TEL:** 052-202-5787 **FAX:** 052-202-3485 **E-mail:** no1glay@hhi.co..kr **www.hhi.co.kr**