

행복한 에너지 세상을 만듭니다

The Best Environment – Friendly Energy Company

Waste to Energy for Clean and Sustainable Asian Cities

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1. KDHC Introduction



<Long queue of line to buy oil>

• Two Oil Shocks in 1970s



- Negative growth
- High inflation
- Imbalance of external accounts
- Energy Efficiency?
- Energy Security?

1. KDHC Introduction

- **Establishment : 1985(Loan from ADB, US\$32M, Repaid by 2003)**

The screenshot displays the ADB website interface. At the top left is the ADB logo with the tagline "FIGHTING POVERTY IN ASIA AND THE PACIFIC". A search bar is located at the top right. A navigation menu includes "About ADB", "News & Events", "Data & Research", "Publications", "Countries", "Projects", and "Focus". Below the menu, a breadcrumb trail shows "Home > Projects > LN0765-KOR: Southern Seoul District Heating Project". The main content area features a sidebar on the left with "Projects" and "NAVIGATE PROJECT" sections, including links for "Overview", "Financing", and "Documents". The central content area is titled "LN0765-KOR: Southern Seoul District Heating Project" and "Project Data Sheet (PDS): Overview". It includes social media sharing options for Facebook, Twitter, and More. A table provides project details, and a right-hand sidebar offers "Project Data Sheets (PDS)" with "Print" and "Download" options, and "RELATED LINKS" including "Safeguard Categories" and "SEARCH/BROWSE PROJECT ARCHIVE".

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Home > Projects > LN0765-KOR: Southern Seoul District Heating Project

Projects

NAVIGATE PROJECT

- Overview
- Financing
- Documents

LN0765-KOR: Southern Seoul District Heating Project

Project Data Sheet (PDS): Overview

Facebook Twitter More

Country	Korea, Republic of
Project Number	17060
Project Type or Modality of Assistance	Loan
Status	Closed
Approval Number	Loan No. 0765
Approval Date	03 Dec 1985
ADB Financing (\$ thousand)	32,000
Sector / Subsector Classification	Energy / Electricity Transmission and Distribution

Project Data Sheets (PDS)

- Print
- Download

RELATED LINKS

- Safeguard Categories
- SEARCH/BROWSE PROJECT ARCHIVE

1. KDHC Introduction

Name

- Korea District Heating Corporation

Establishment

- 1985.11.1

Purpose

- To save energy, to reduce pollution and to increase the convenience of the public

Organization

- 1 CEO, 1 vice president, 2 headquarters, 14 divisions, 14 branches and 3 offices
- 1634 employees

Credit Rating

- International : A1(Moody's)
- National : AAA

Financial Status(as of 2014)

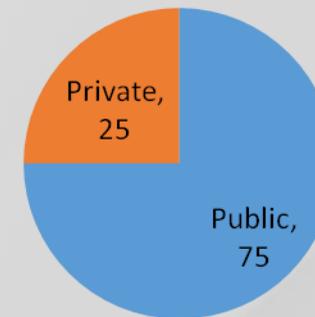
- Asset : USD 4.7 billion / Sales : USD 2.3 billion

Sales volume

- Heat : 1.303M households / Electricity : 1,631MW

Share Ownership

- Government & Public Companies : 75%
- Open to public in the stock market : 25%

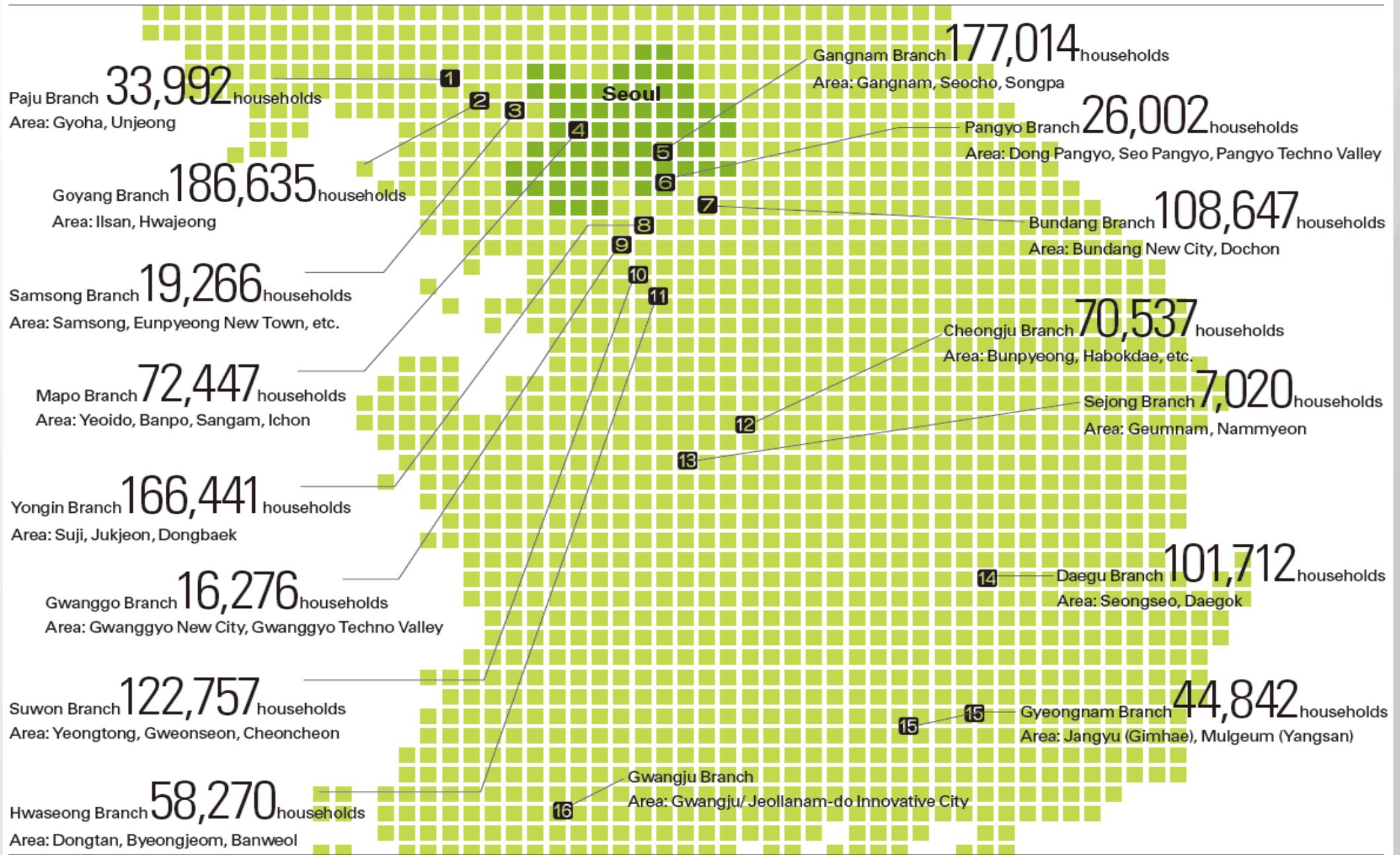


Major Business

- Integrated Energy : District Heating and Cooling
- Electricity
- Renewable energy

1. KDHC Introduction

▼ Area and number of households for district heating (Data based on December 2012)



2. Major Business Areas

Integrated Energy Business



District Heating

- 12 million Gcal Annual Sale
- 1,827km x 2 Pipelines



Electricity

- 13 CHPs(Cogeneration)
- 850~50MW(Total Capacity 2,400MW)



District Cooling

- 400,000 usRT(554 Bldgs.)

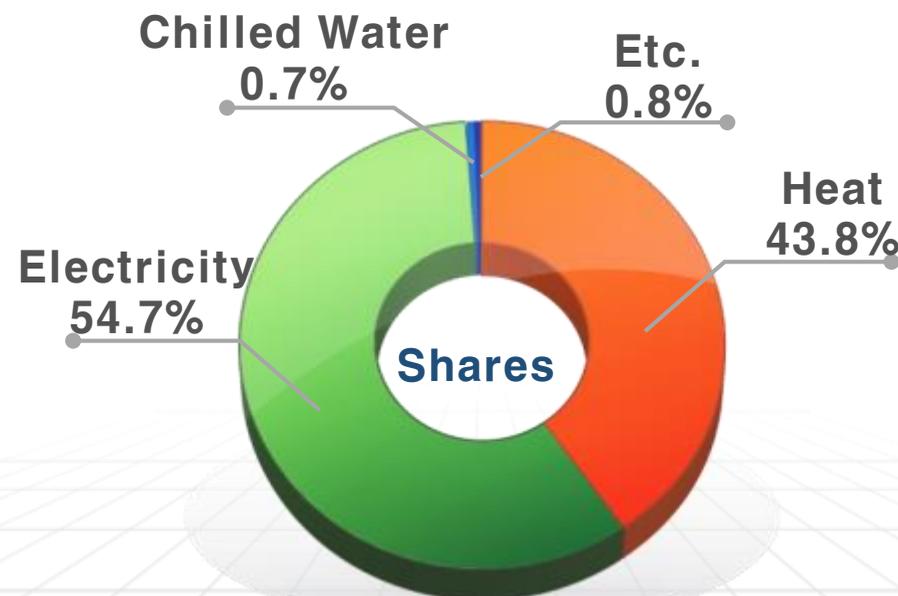


Renewable Energy

- Waste to Energy(LFG, RDF, Incinerator)
- Biogas(Sludge)
- Solar(PV, Thermal), Wind, Fuelcell

Shares by business areas

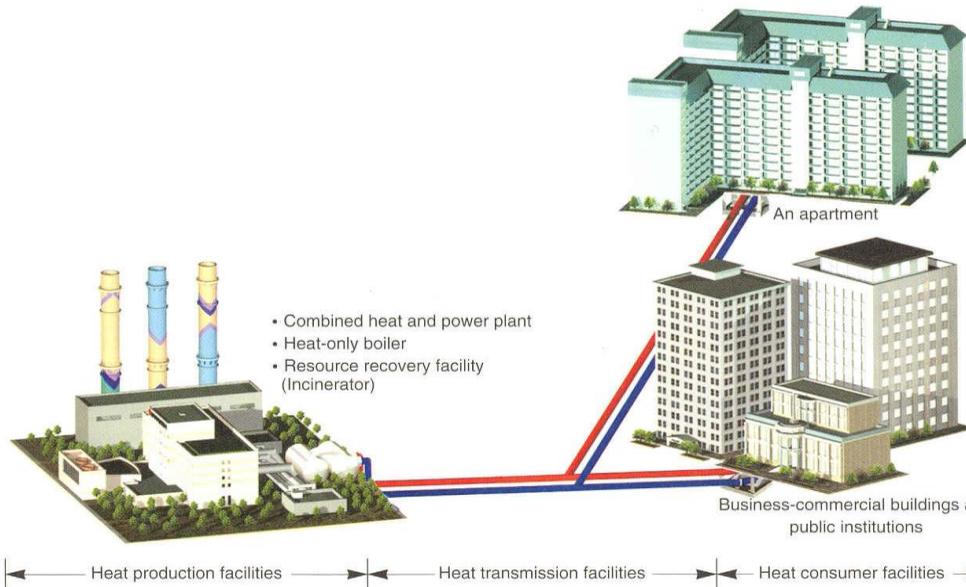
Area	Sales(as of '14)	Share(%)
Heat	943 Million USD	43.8
Electric	1,178 Million USD	54.7
Chilled Water	15 Million USD	0.7
Etc.	16 Million USD	0.8
Total	2,153 Million USD	100.0



2. Major Business Areas(Integrated Energy)

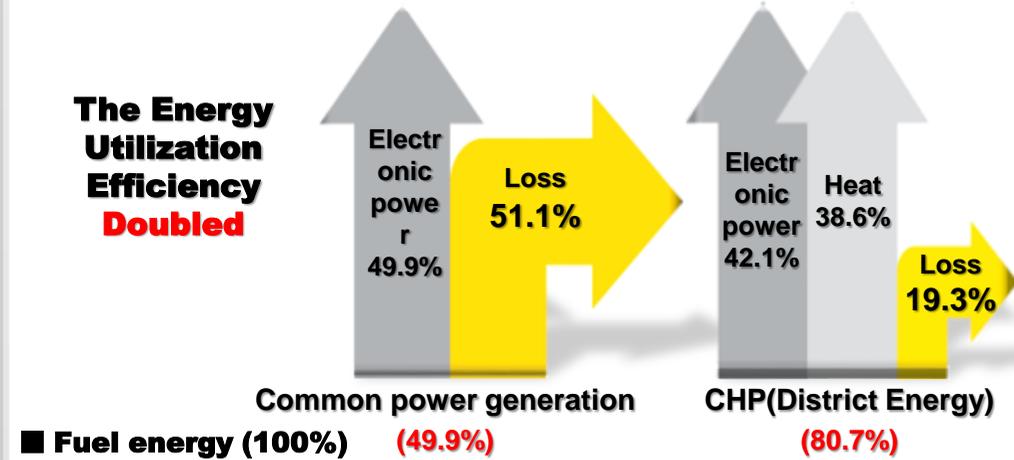
Integrated Energy

Conceptual Diagram



Energy-saving

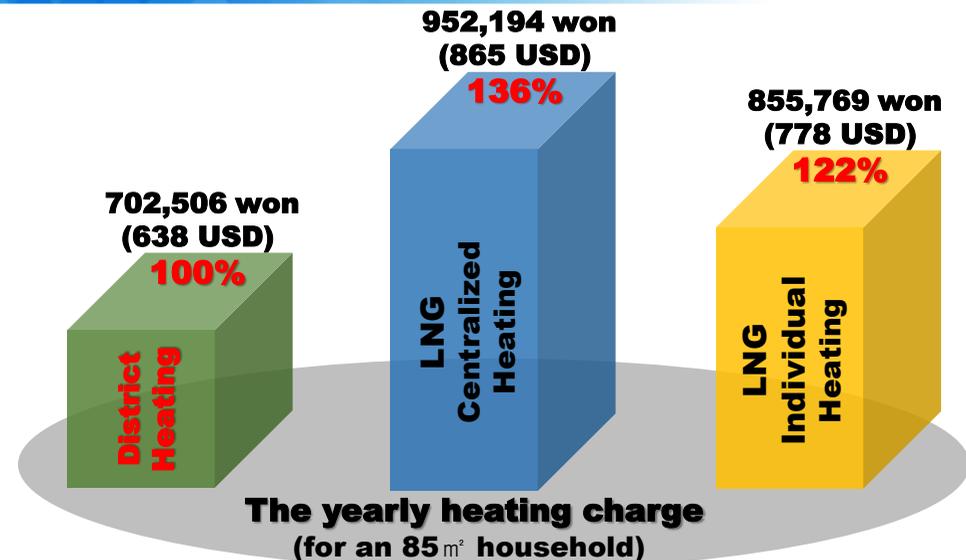
The Energy Utilization Efficiency **Doubled**



What is it?

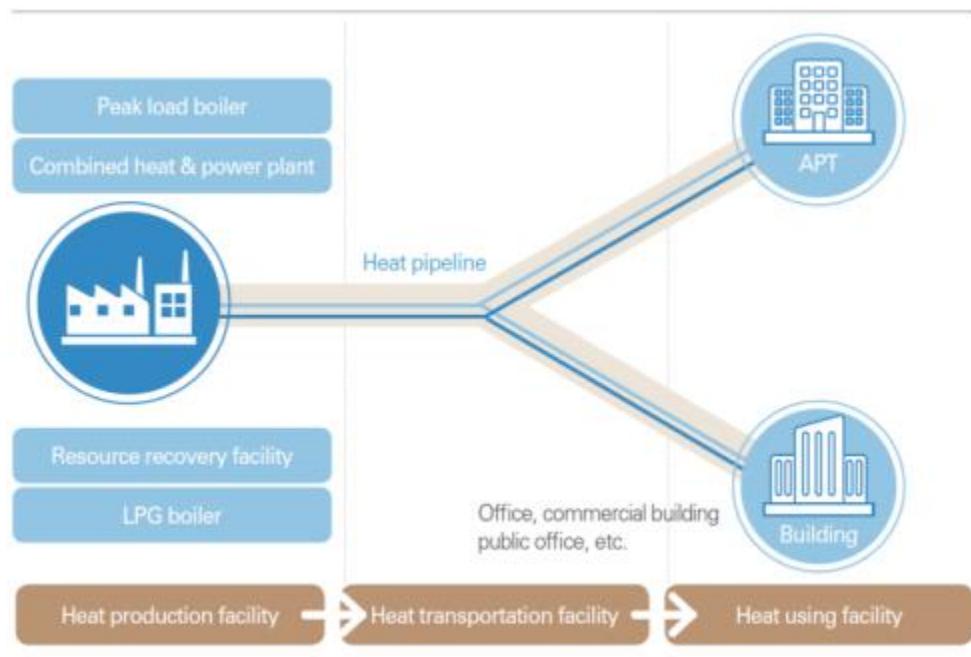
- A city-based business that supplies heating or cooling that is economically produced from large scale facilities such as CHPs, to a large scale area consisting of Apartments and commercial buildings.

Economic

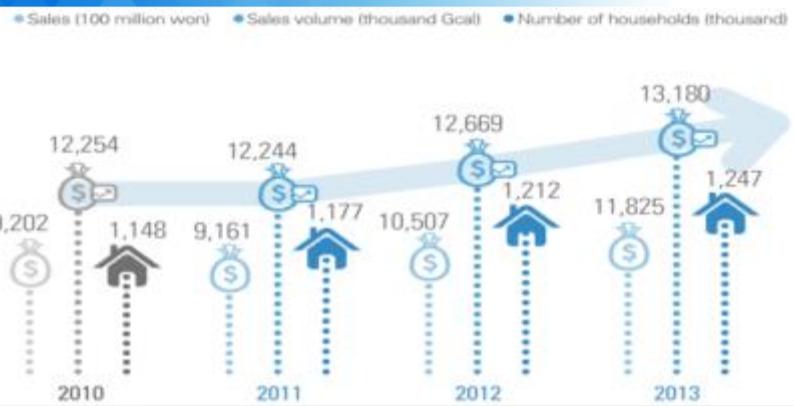


2. Major Business Areas(District Heating)

Distribution diagram for heat supply



Sales status



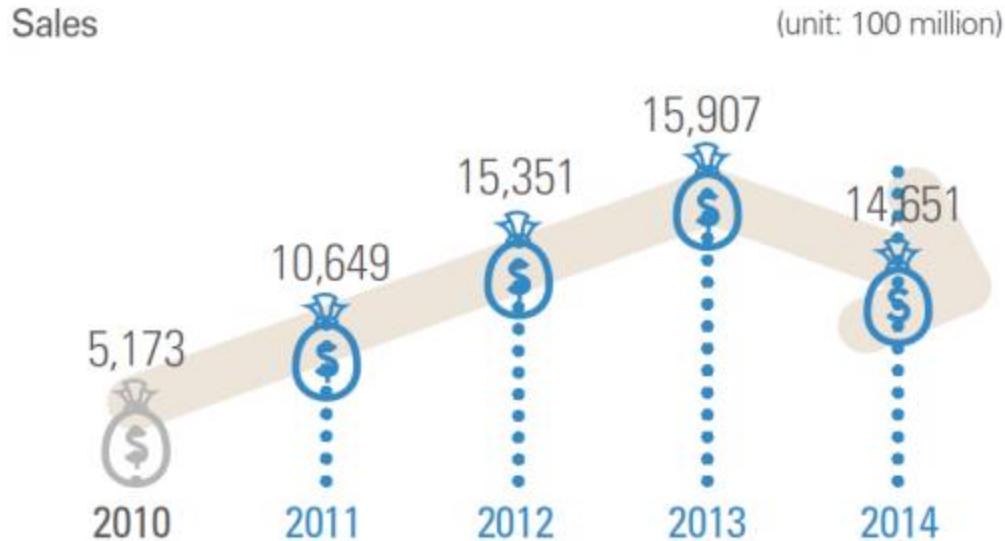
DH Networks in Seoul Metropolitan Area



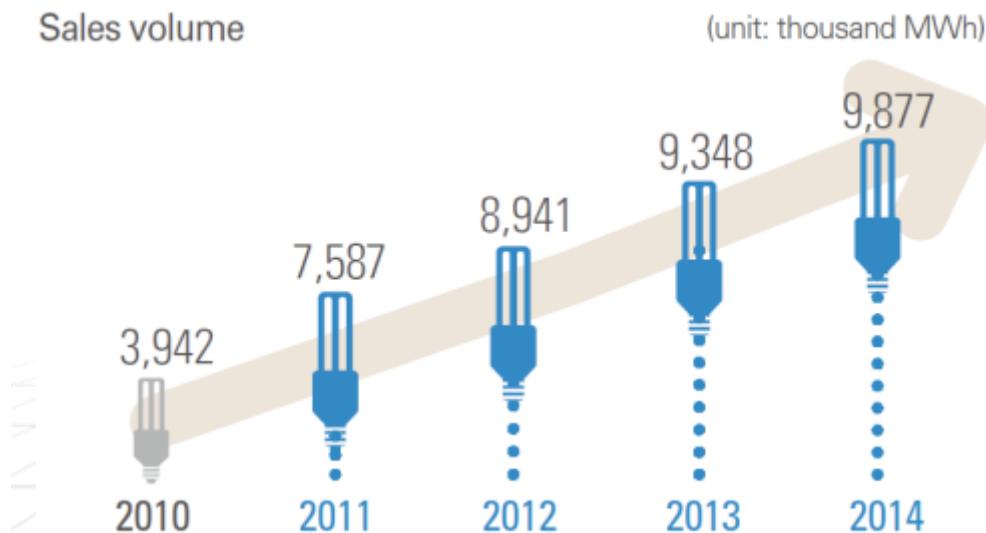
- The total length of our pipelines is 3,522km(1,762kmX2)
- Completed one-connected pipeline from Paju to Hwaseong, which makes efficient, economic operation of the plants

2. Major Business Areas(Electricity)

Sales



Sales Volume

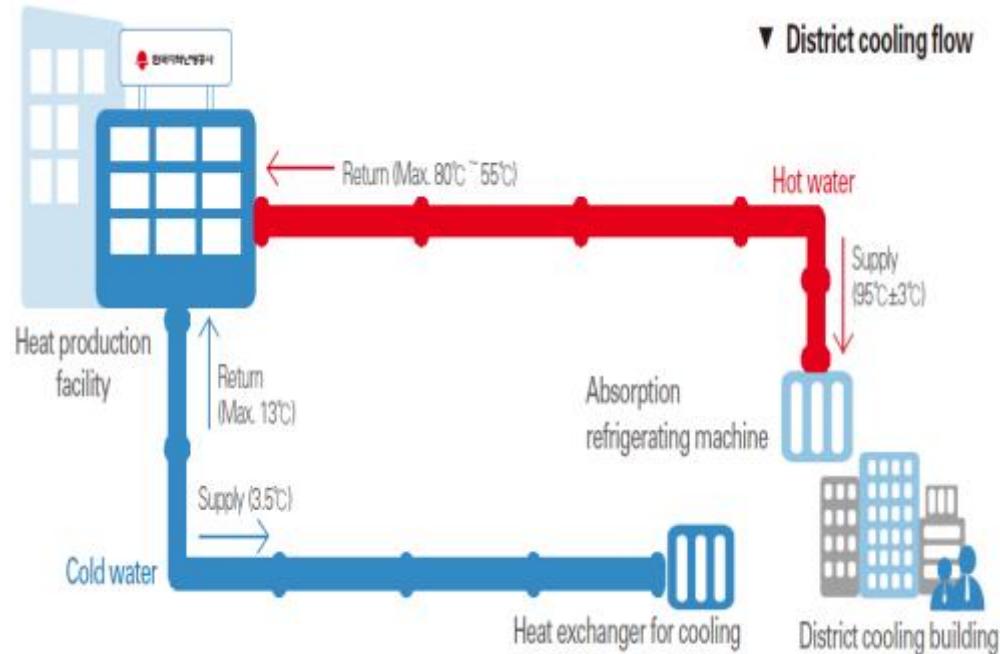


Energy source

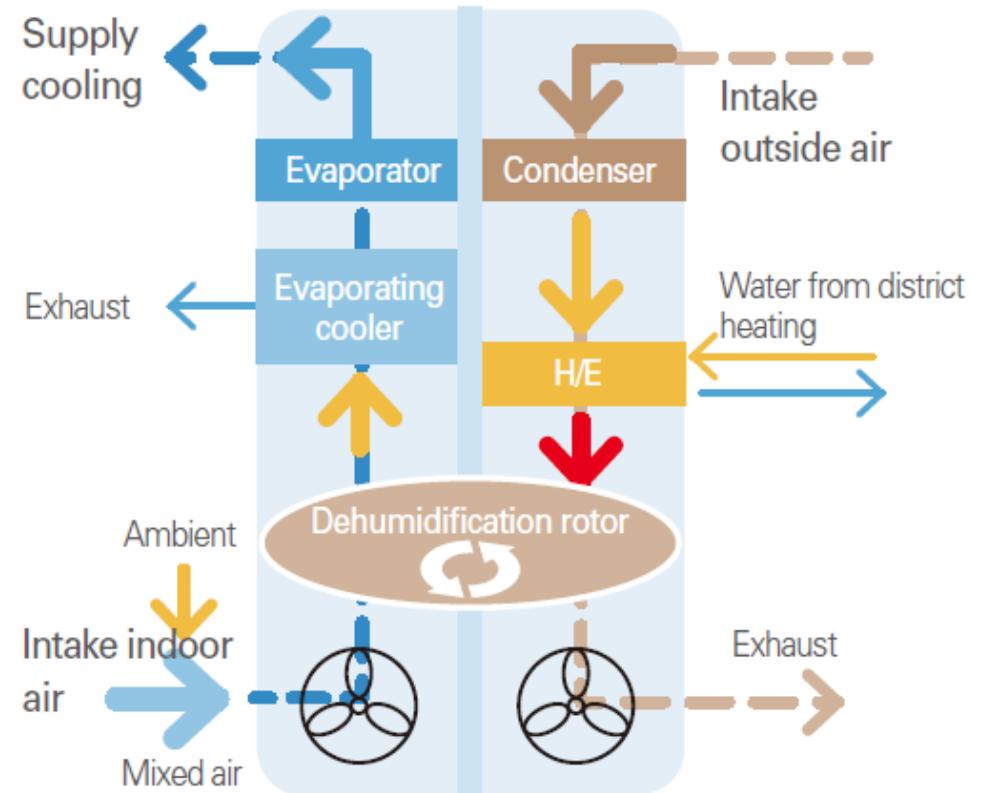
Area	Energy source	Capacity (MW)
Hwaseong	LNG	512
Paju	LNG	516
Pangyo	LNG	146
Gwanggyo	LNG	145
Daegu	Heavy oil	44
	Woodchip	3
Suwon	Heavy oil	43
Cheongju	Heavy oil	61
Gangnam	Incineration heat	13
Others	Photo-voltaic	1.9
District electricity	LNG	140

2. Major Business Areas(District Cooling)

District Cooling Diagram



Dehumidification and Cooling System



Sales status

Category	2010	2011	2012
Sales for cooling (thousand Gcal)	268	300	352
Supplied buildings (number of buildings)	331	369	393
Cooling capacity (USRT)	185,419	234,488	261,026

- **Comparison to a conventional air conditioner**
 - The cost of cooling is 36~53% lower
 - CO2 emissions were 38% lower
- **Reduce power shortages in the summer season**

2. Major Business Areas(Renewables)

Renewable Energy Facilities

Category	Branch	Capacity
Incinerator	12 Branches	238Gcal/h
Photo-voltaics	15 Branches	1,879kWp
Solar Thermal	Bundang Branch	0.36Gcal/h
Woodchips	Daegu Branch	3MW × 14.5Gcal/h
Biogas (Sludge)	Mapo Branch	3MW × 3Gcal/h
Biogas (LFG)	Sangam Branch	50Gcal/h

※ 1Gcal/h = 0.86MW

Production by Renewables

Category	Production	Share of total production
Heat	1,783,303 Gcal	14.7 %
Electricity	118,989 MWh	1.4 %

Projection on renewable energy business

- Since 2012, KDHC allocated 12.1% of its production to be sourced by renewable energy due to the newly established legal requirements that require KDHC to use a certain amount of renewable energy
- KDHC researched how to link District Energy and renewable energy, and it is carrying out efforts to overcome the changes in systems by promoting energy production plans, focusing on biogas, woodchip, and waste materials

▼ Linkage between District Energy and renewable energy

Category	Energy production plan	
Renewable energy in link with District Energy (97%)	RDF	144,202
	Biogas	44,660
	Woodchip	10,019
	Waste material, etc.	37,787
Others (solar, wind, etc.)	6,874	
Total	243,542	



2. Major Business Areas(Overseas Business)

KDHC's Global Business

Major ODA Projects

Project	Overview	Role	Achievements
Mongolia Baruun Urt Project	New installation of coal boilers and solar power generators (solar : 50kW, coal: 13G/h)	Project management consulting including project management and dispatch of experts	<ul style="list-style-type: none"> Analysis/solution on reason of project delay Overall inspection and testing related to installation of equipment and boiler water pressure testing
East Timor Project	New installation of solar power generator and desalination facility (solar: 120kW, desalination: 240 tons/day)		<ul style="list-style-type: none"> Supply of power generated from renewable energy Supervision of construction Assistance for process, project management, and transfer of advanced technology (on-site training) Water supply of 240 tons/day •Completion of construction (December 2012)
2nd Ulanbaator Project	Replacement of 42 decrepit district heating substations including main machineries, and pipes		<ul style="list-style-type: none"> Installation of equipment, test drive, etc. Transfer of advanced technologies (trainee invitation, on-site training) Supported Korean heat pipeline supplier on market survey in Mongolia

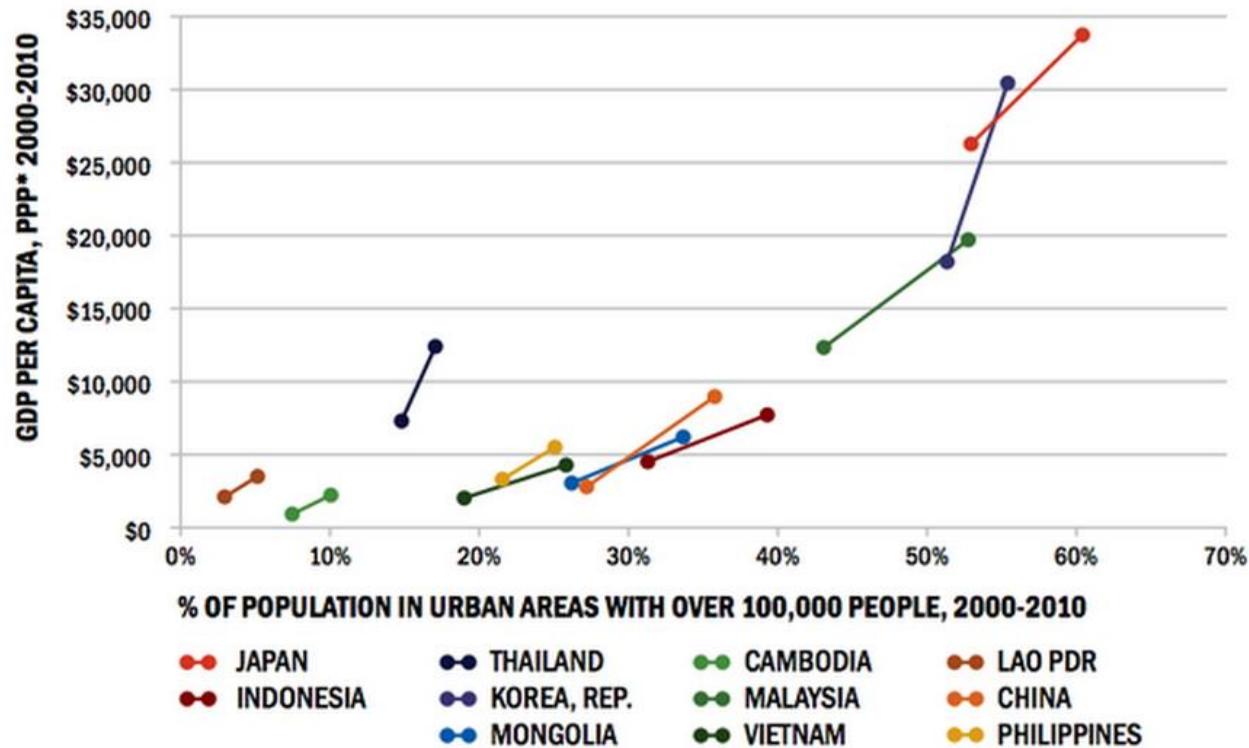
KDHC is planning to actively search and promote consulting projects, O&M projects, and joint ventures in CIS nations, Southeast Asia and South America after careful review based on KDHC's experience obtained from the China Qinhuangdao Coal-fired Plant Project and ODA projects, our 30 years of expertise accumulated in the field of district energy and our renewable energy technologies.



3. Why Waste-to-Energy?

Current Situation of Asian Cities

**FIGURE 1:
CHANGES IN PROPORTION OF URBAN POPULATION (URBANIZATION RATE)
AND GDP PER CAPITA (2000-2010)**



Source: Study team, incorporating WorldPop data and World Bank Open Data
*PPP: Current International \$



3. Why Waste-to-Energy?

Benefits

- Reduce dependence on fossil fuel
- Increase energy security
- Create green jobs
- Reduce GHG emissions
 - Avoided methane emissions from landfills
 - Avoided CO2 emissions from fossil fuel combustion
- Reduce Waste stream costs
 - Tipping fees of disposal
 - New landfill cell opening fees
 - Transportation, labor costs
- Valuable by-products for use in other area
 - Bottom ash, biogas, etc.

Process

The Energy-from-Waste Process



1
It starts with trash from the home that is put curbside for disposal.



2
A truck picks up MSW from around the community and unloads at an EW facility.



3
Waste is combusted at a high temperature, creating steam that turns turbines to generate electricity.



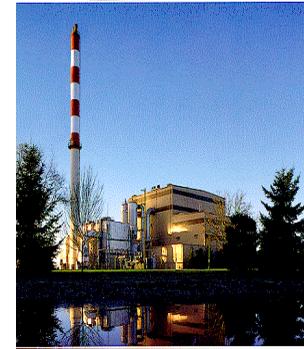
4
The result: For every 10 tons of MSW, 5,200 kWh of power are generated and 500 lbs of metal are recycled.



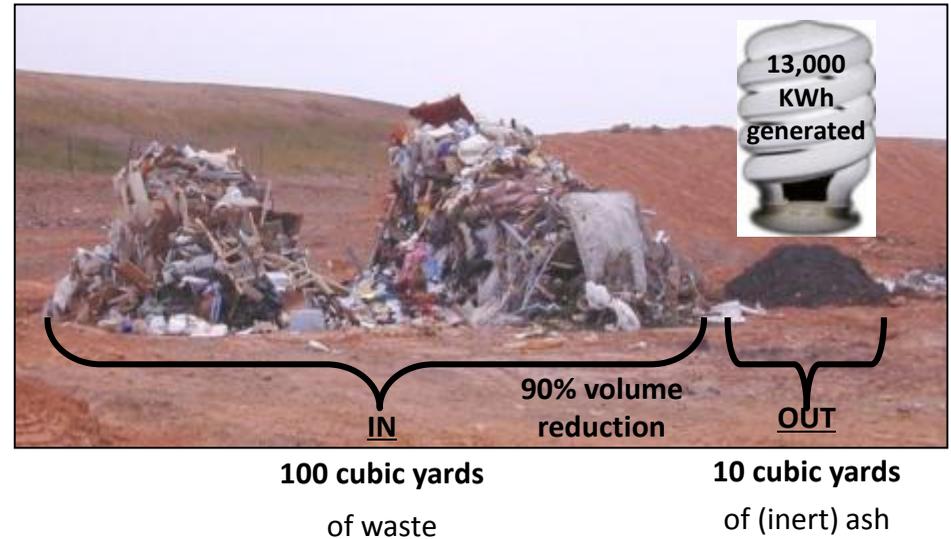
5
Electricity is fed back into the grid and is used to power homes and businesses.

Energy source

Municipal Solid Waste
1 ton



- Power: up to 750 kWh
- Metal: 45 kg
- Ash: 10% of original volume



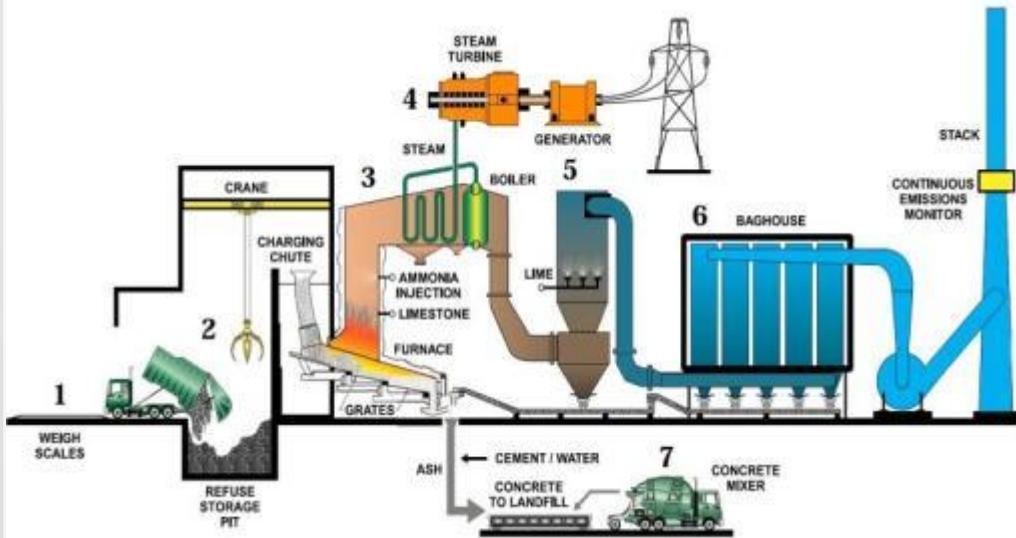
4. Case of Seoul City

Worldcup Park(Nanji-do)



5. WtE Incinerating Plants of KDHC

Incinerator Diagram



Emission, Tele-Monitoring System

- Subject to emission caps for the air pollutants of Nox, Sox, and Particulate Matters(PMs)
- The tele-metering system installed on 1,280 stacks of 506 large emitters controls emission and supports emission charges.

KDHC

Branch	Heat from INC (Gcal/h)	Share of Total Capacity(%)
Goyang	16(150t/d × 1)	2.10
Bundang	27(300t/d × 2)	3.26
Suwon	27(300t/d × 2)	5.13
Yongin	4(35t/d × 2)	0.06
Daegu	27(200t/d × 3)	7.02
Cheongju	14(200t/d × 1)	4.10
Gimhae	9(200t/d × 1)	6.08
Sangam	34(250t/d × 3)	20.11
Yangsan	15(100t/d × 2)	18.07
Pangyo	4(40t/d × 2)	1.15
Samsung	4(48t/d × 2)	1.28

6. Landfill Gas(LFG) Plant of KDHC

Location of Sangam Branch and LFG parks

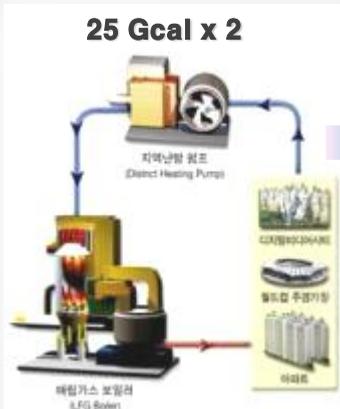


LFG Extraction Holes



District Cooling

District Heating



LFG Boiler

115 Nm³/min x 1



Blowers(Two)

40 Nm³/min x 1



460 Nm³/min

Scrubbers(Two)



LFG Accumulator

8. New Investment Project of RDF CHPs

Project Title

- RDF fueled CHP Plant

Capacity

- CHP : 19.3MW + 45.8Gcal/h

Investment

- USD 250 million

Scheduled Completion Date

- December, 2016

Location

- Gwanju-Jeonnam Innovation City



Structure Planning

- Total Flow



- CHP Schematic Diagram



Benefits

- **Leadership : Government and Small- and Medium sized companies**
- **Zero-tolerance to Corruption**
- **A Strong Sense of Responsibility**
- **Excellent Credit Rating**

A person is walking away from the camera in a vast, green field towards a bright sunset. The sky is filled with soft, golden clouds, and the sun is low on the horizon, creating a warm, glowing atmosphere. The person is wearing a light-colored shirt and shorts.

*Trustful Partner for
Cleaner and Sustainable Asia*

Thank you!

Linus S.H. Lee

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