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# Integrated Operation System of KDHC



**July 1, 2021**



**Korea District Heating Corp.**

1. Who is KDHC ?

2. Energy- Linked Operation

## Our History

- 1985 : Established Korea District Heating Corporation(KDHC)  
(ADB Loan USD 32 Million, Repaid in 2003)
- 1987 : Launched Heat Supply Service in Seoul
- 1992 : Converted into a Public Corporation  
(In accordance with the Integrated Energy Supply Act)
- 1997 : Built **First CHP** in Daegu(44MW)
- 2002 : Supplied District Heating to 1 Million Houses  
(As of 2020 : 1.6 Million)
- 2021 : Operating 19 Branches Nationwide

# 1. Who is KDHC ?

## KDHC is the Largest District Energy Provider in South Korea

(As of 2019)

| Division                    | Households   |
|-----------------------------|--------------|
| Number of National DH Users | 3,157,900    |
| Number of KDHC's Users      | 1,623,500    |
| <b>Market Share</b>         | <b>51.4%</b> |



<19 Branches in South Korea>

# 1. Who is KDHC ?

## Financial Status (as of 2020)

### Capital and Shareholder Status

As of the end of 2020,  
as of closing date of stockholder's list

Capital

**50.6** million USD

※ Authorized capital of USD 175 million

**75% Government Ownership**

Government

**34.55%**

Others **25%**

- Foreigners 1.58%
- Employee ownership 4.12%
- Others 19.3%

Public institutions and municipalities

**40.45%**

- Korea Electric Power Corporation 19.55%
- Korea Energy Corporation 10.53%
- Seoul city 10.37%

# 1. Who is KDHC ?

## Main Business (2019)

- District Heating
  - Capacity : 8,980 Gcal/h
  - Customers : 1.62 million Households
  
- District Cooling
  - Capacity : 636,404 USRT
  - Customers : 1,009 Buildings
  
- Electricity
  - Capacity : 2,418 MWe
  - Supply : 11,821 GWh
  
- Renewable Energy
  - Supply : 193 GWh
  - Waste energy, biomass, wind, Photovoltaic, fuel cell, etc

| Business (2019)  | Sales (USD mil) | Portion (%) |
|------------------|-----------------|-------------|
| District Heating | 991             | 42          |
| Electricity      | 1,302           | 56          |
| District Cooling | 40              | 2           |
| <b>Total</b>     | <b>2,333</b>    | <b>100</b>  |



# 1. Who is KDHC ?

## Capacity of Energy Facilities

| Division          | Heat (MWth)   | Electricity (MWe) | Quantity(Unit) |
|-------------------|---------------|-------------------|----------------|
| CHP               | 2,362         | 2,418             | 11             |
| Boiler            | 4,924         | -                 | 30             |
| Heat Storage Tank | 2,922         | -                 | 67             |
| External Heat     | 455           | -                 | -              |
| <b>Total</b>      | <b>10,663</b> | <b>2,418</b>      | <b>108</b>     |



### ○ Dongtan Branch

- The **Biggest** Capacity of Facility
- Electricity : **768** MWe
- Heat : **620** MWth

# 1. Who is KDHC ?

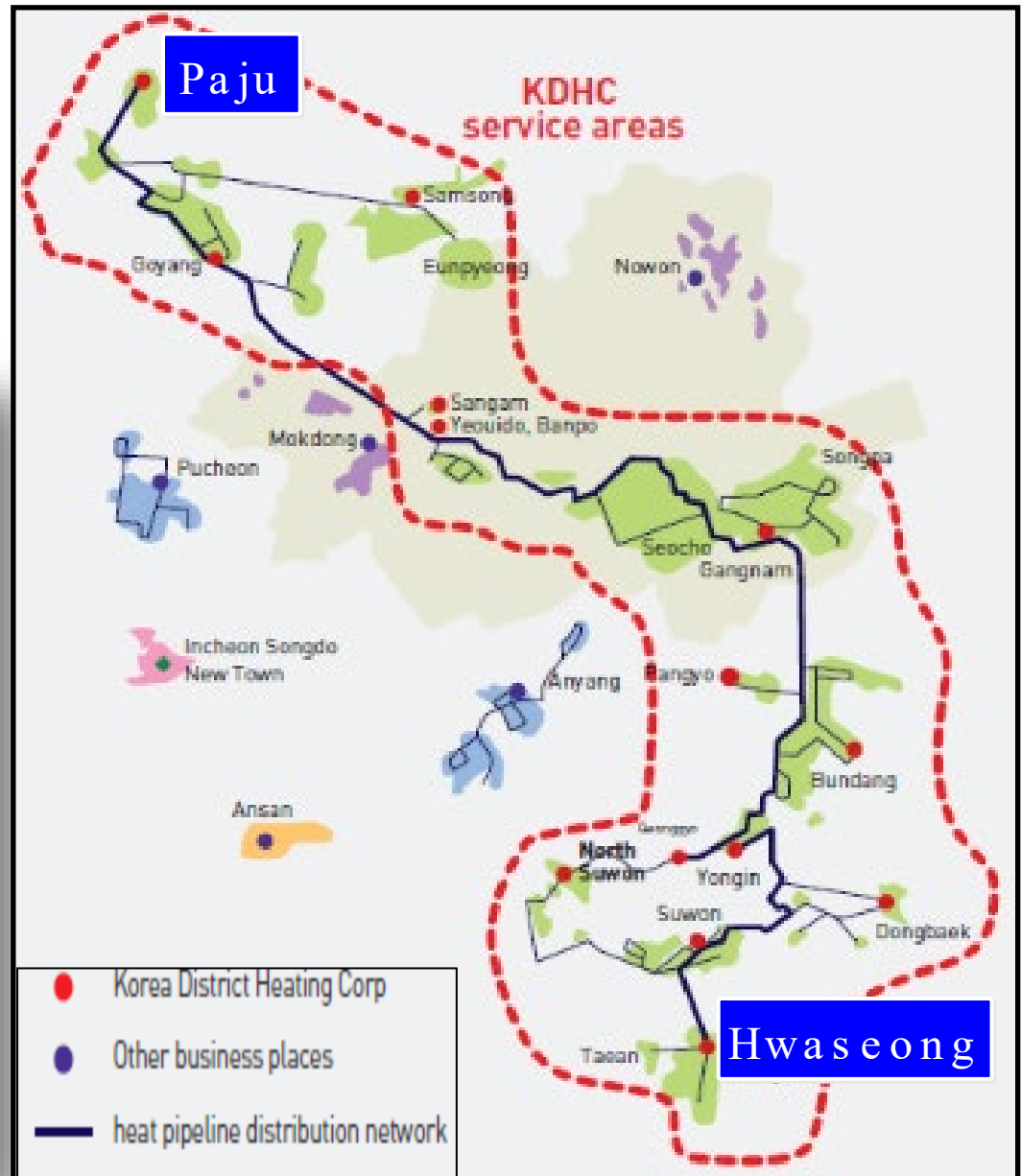
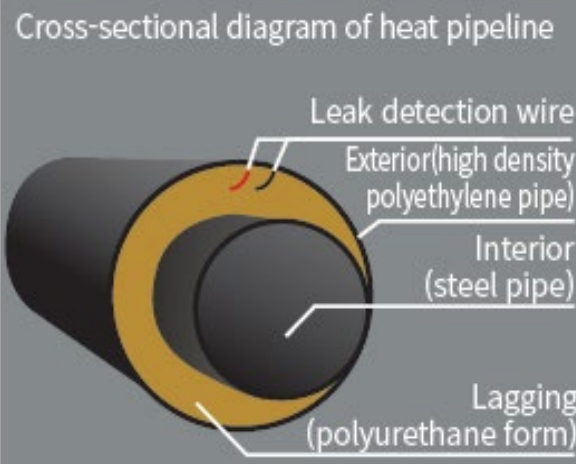
## Heat Transmission Pipe in Seoul Metropolitan Area

**4,622 km (2,311 km x 2 rows)**

For Supply & Return Lines

**3,654km (1,828 km x 2 rows)**

From Paju to Hwaseong





### KDHC Integrated Operations Center (KIOC)

- KIOC was established in June 2011 for the Purpose of Cost Reduction / Facility Stability / Work Efficiency



### KIOC Purpose

- Cost Reduction
  - Optimum production of heat and electricity by scientific analysis
  - Heat energy's interconnected operation between branches
- Facility Stability Enhancement
  - Quick response in emergency by real-time monitoring
  - Systematic management plan for facilities
- Work Efficiency Improvement
  - Work simplification by automatic data management
  - Data application field widened through system's various operation records

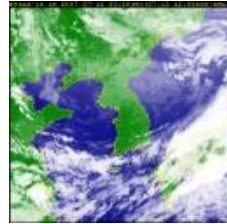
# 2. Energy- Linked Operation

## KDHC Integrated Operation System Diagram

The National Weather Service



Market Analysis  
Operation Plan  
(Heat energy)

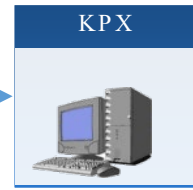


Headquarter  
Manager

Result Analysis &  
Management



Electric Market Plan & Bidding

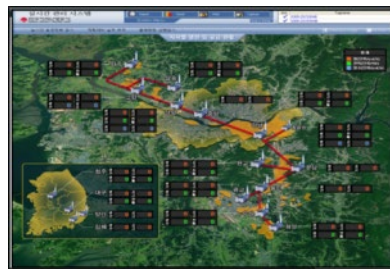


Korea Power Exchange



Plant Monitoring

Cooperation

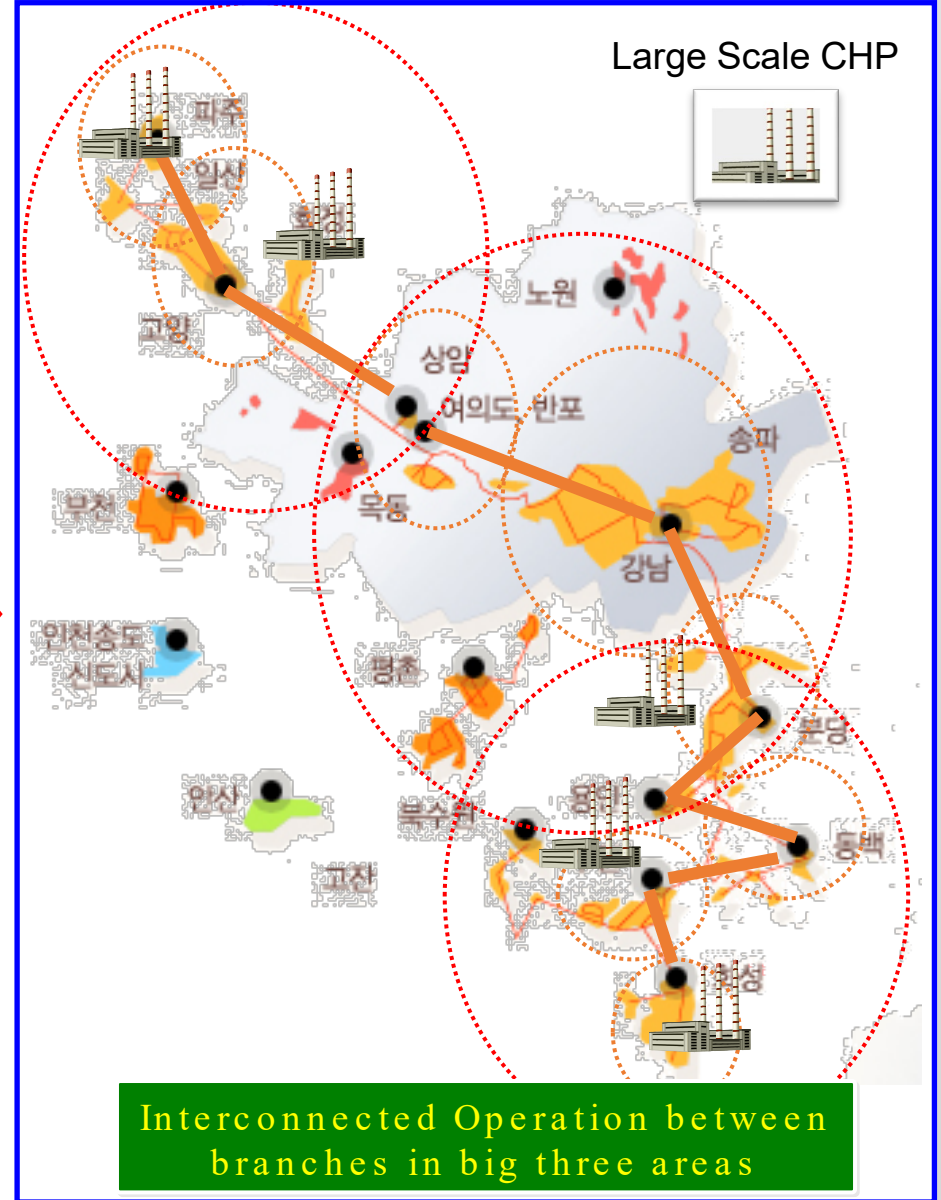
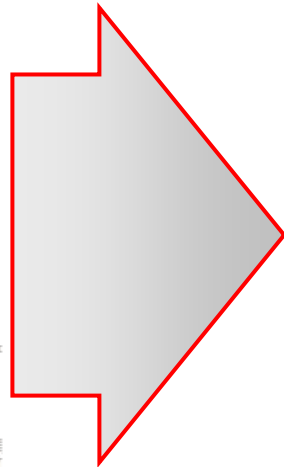
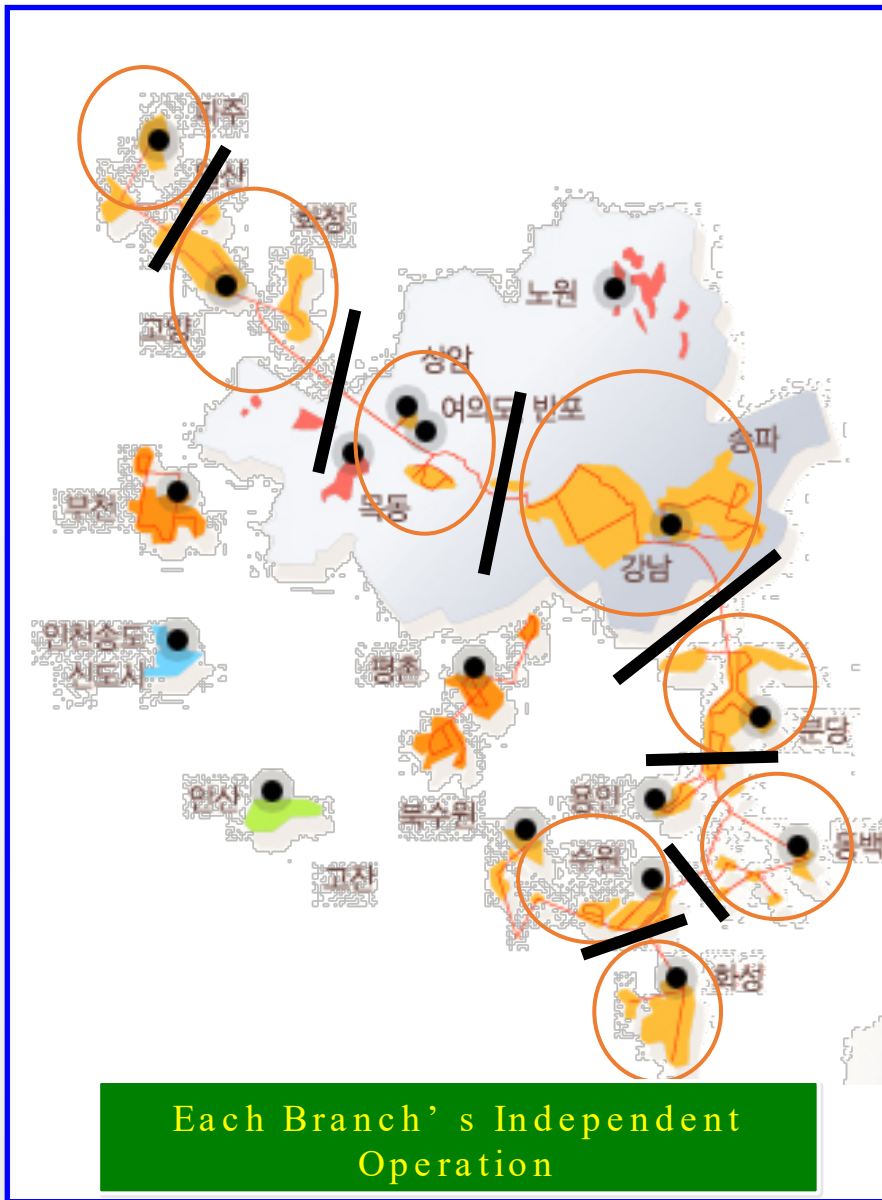


Plant  
Manager

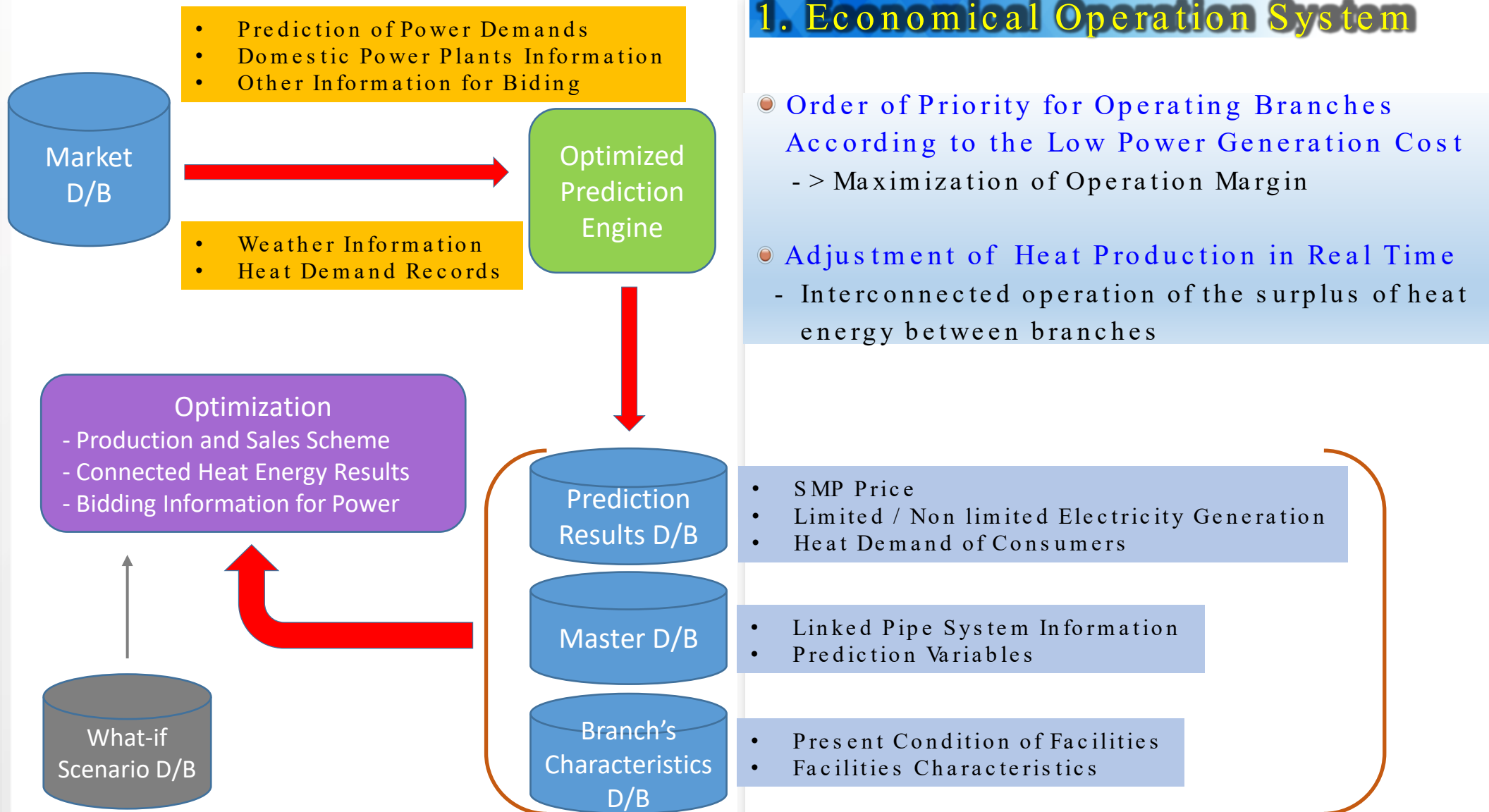


# 2. Energy - Linked Operation

## The Diagram for KDHC Interconnected Operation of Heat Energy



## KIOC Main Function



## KIOC Main Function



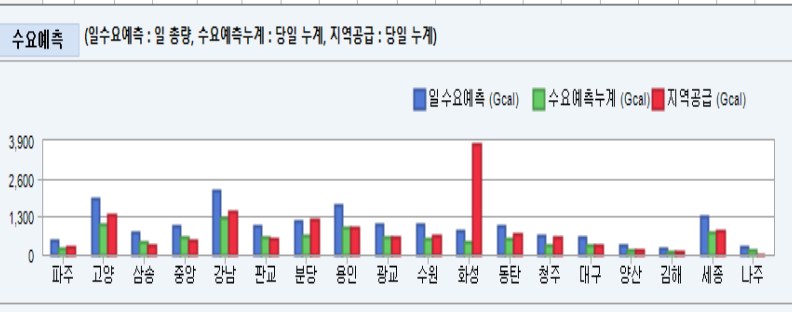
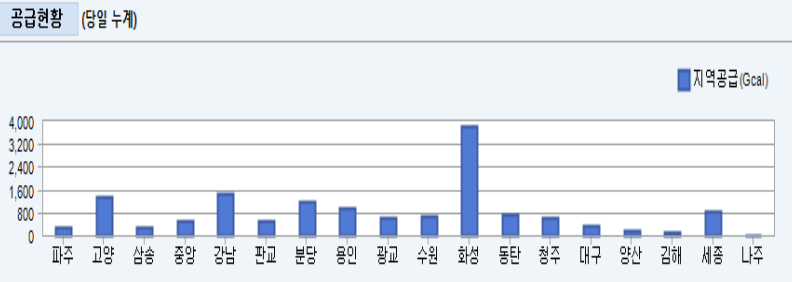
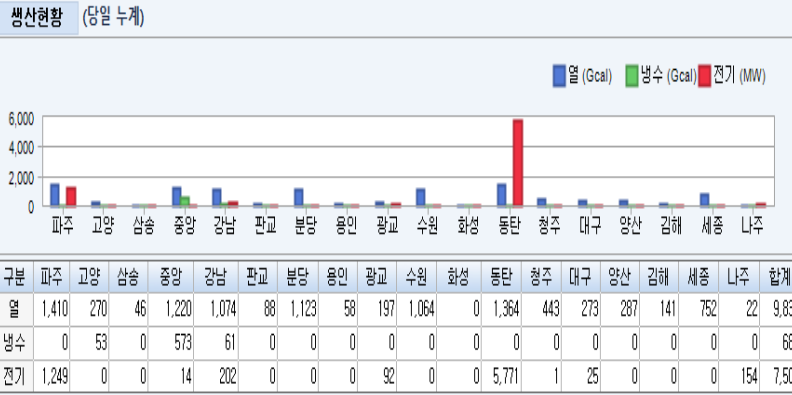
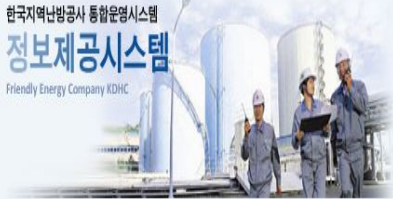
## 2. Real-Time Monitoring System

- Real Time Monitoring of Facilities in All Branches
- Quick Response in Emergency - Cooperation among KIOC & branches
- Real Time Comparison between Target Values by Economical Operation System & Actual Values by Branches



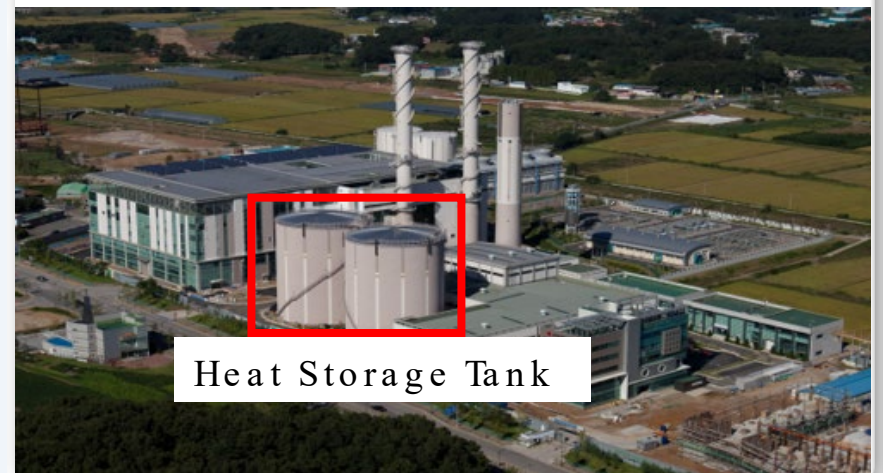
# 2. Energy - Linked Operation

## KIOC Main Function



## 3. Records Management

- Various Operation Data from All Branches
  - Available heat energy amount in heat storage tanks of all branches
  - Heat production and supply situation of all branches
- Utilization of Statistics & Analysis
  - Daily, monthly and yearly heat production and cumulative values
  - Comparison of various values current and previous year

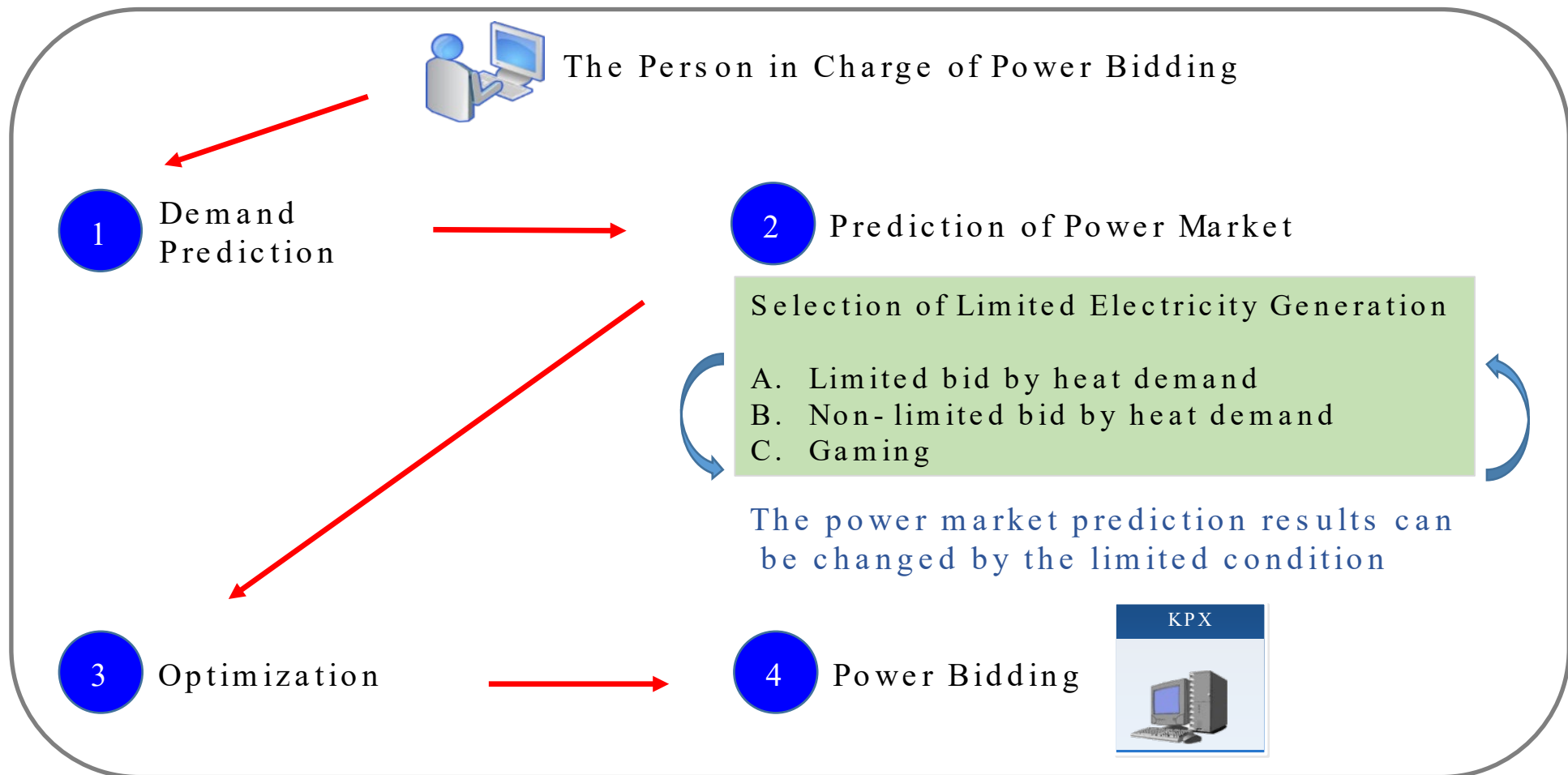


Heat Storage Tank

## KIOC Main Function

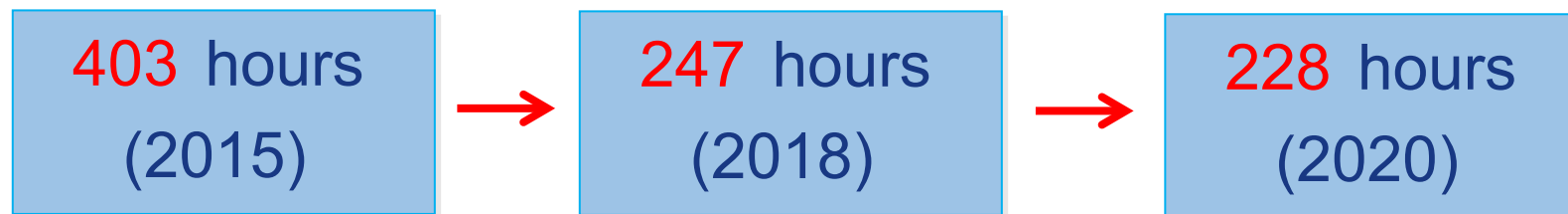
### 4. Electricity Trading System

- Prediction of Electricity Demand => Actual Electricity Generation Scheme
- Bid, Change, Calculation for Electricity Trading



### Operation Effects of KIOC

- **Cost Reduction & Energy Saving (As of 2019)**
  - **USD 88 Million of Cost Saving Effect a Year**  
through the Real Time Economic Operation
  - > the Energy Saving and the Greenhouse Gas Reduction
- **Mechanical & Electrical Stability Enhancement of Facilities**
  - Decrease of Facilities Start & Stop' s Frequency
  - Regular Maintenance on Long Term Schedule
  - Observation of CHP' s Performance and Condition
- **Decrease of Breakdown Time**



\* Breakdown Case & Cause : Main/ Auxiliary Facilities' Sudden Stop and Malfunction



# Thank you