

USING THE WASTE HEAT FROM REFUSE INCINERATION PLANT

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Table of Contents

- ▣ ESCO in Korea
- ▣ Project Background
- ▣ Project
- ▣ Results
- ▣ Conclusions

ESCO in Korea

- Introduced in 1992. The market size has been growing and currently is about 200 billion KRW(USD 167million).
- It has been applied to facilities for Co-generation system, lighting, process innovation, utilization of waste heat, HVAC, etc.
- Out of 161 companies registered, 44 companies are actively involved.

Project Background

- ▣ Seong Lim Industry Co., Ltd.(SLINDUS)
 - Address:
#1015 Ace High End Tower
235-2, Guro-dong Guro-ku,
Seoul 152-740, Korea
 - Business area :
ESCO, Energy Consulting,
Construction & Engineering



Project Background

- ▣ Incheon Total Energy Company (e-Inteco)
 - Location : Songdo, Incheon
 - Company Overview
 - Supplies district heating and cooling to 10,832 housings and 26 buildings (1,910,819^m²) in Songdo area of Incheon city
 - Will supply heating and cooling to all Songdo area after completion of Co-generation plant whose capacity is 206,000KW power and 376Gcal/h heat supply in 2011.
- ▣ Greensco Co., LTD
 - Location : Songdo, Incheon
 - Company Overview
 - Annually incinerates 28,220 ton of municipal and industrial waste from Namdong industrial park of Incheon city

Project Background

▣ Current State

- Before the completion of Co-generation plant, the area to supply heat is 2,112,838m² requiring 252Gcal/h of heat.
- The heat has to be supplied by using HOB or mobile boiler. The heat-production cost is inevitably high.
- According to year 2008 data, heat-production cost is 78,275 KRW/Gcal while price for heating is 70,223 KRW/Gcal, which means e-Inteco will be in deficit.

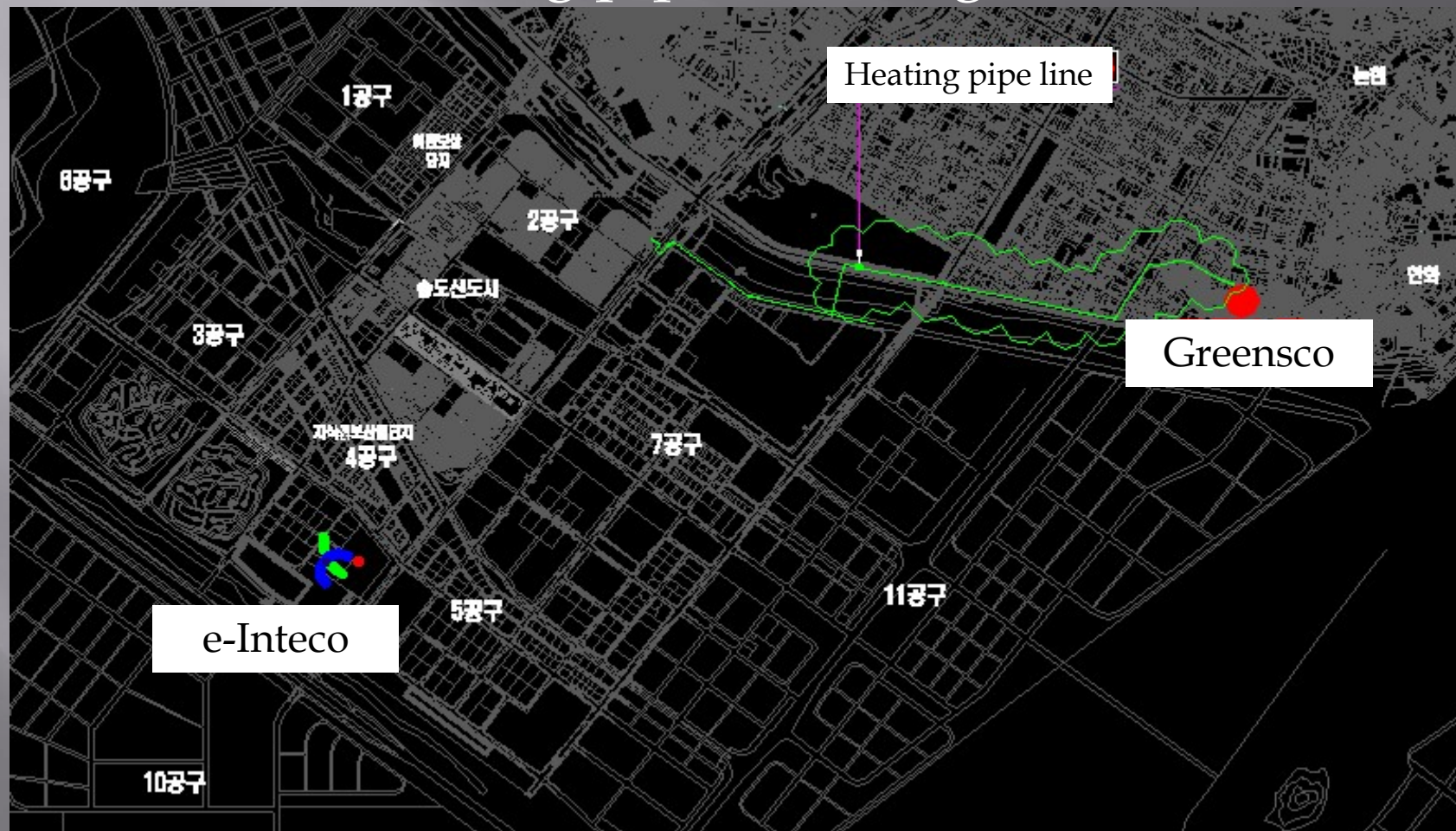
Project

▣ Project Overview

- Title of the Project: Greensco ESCO
- Construction Period: 2008. 10 – 2009. 2 (5month)
- Budget: 4,900 billion Korean Won (USD 4.1 million)
- Summary
 - ▣ e-Inteco plans to use the waste heat from incineration at nearby Greensco for district heating.
 - ▣ The facilities (heat exchanger, pump, etc.) and underground pipe line of 6,578m is installed to recover waste heat. SLINDUS invested and constructed all.

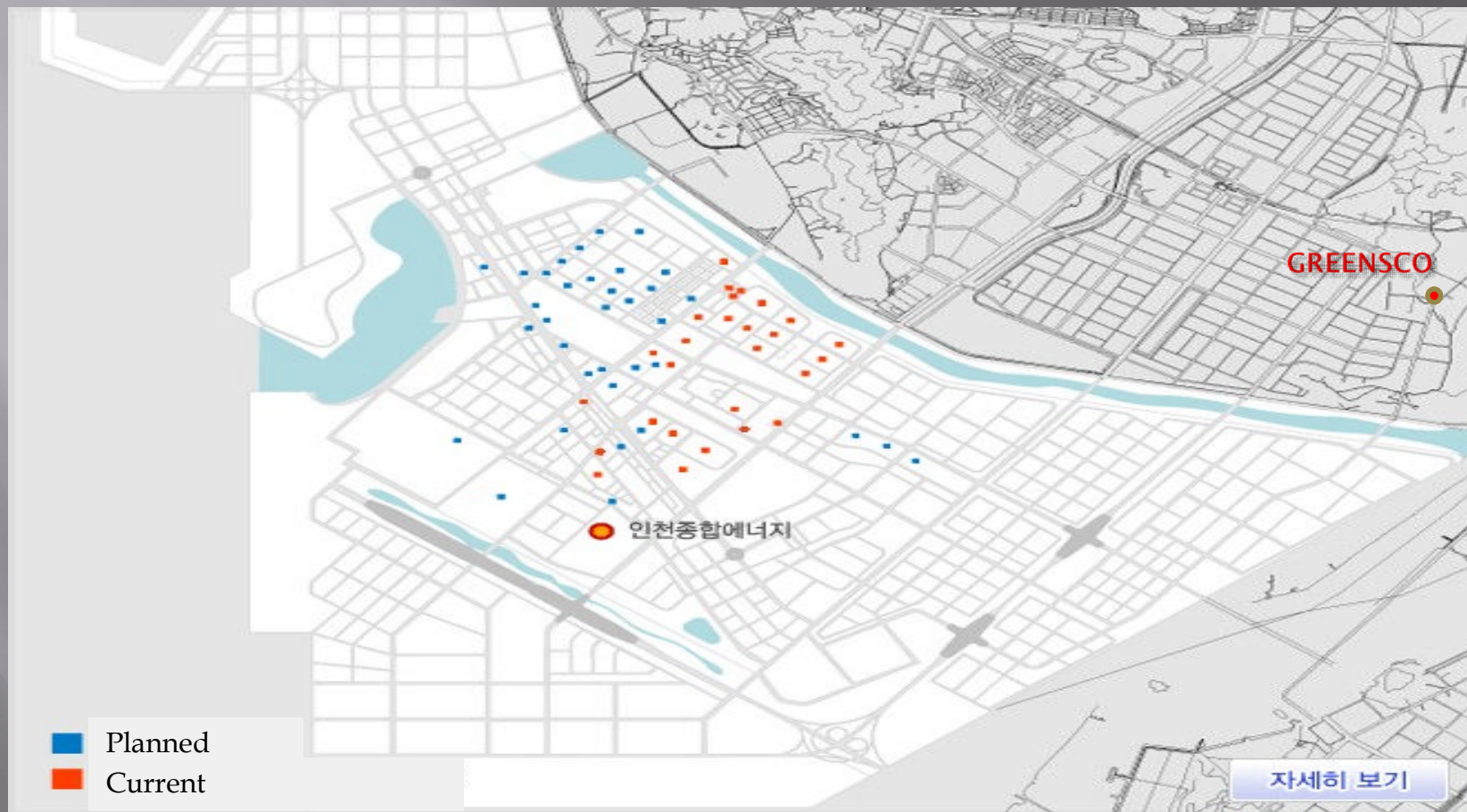
Project

▣ e-Inteco heating pipe line diagram



Project

- ▣ Heat supply by e-Inteco



Project

▣ Overview of e-Inteco Co-generation plant



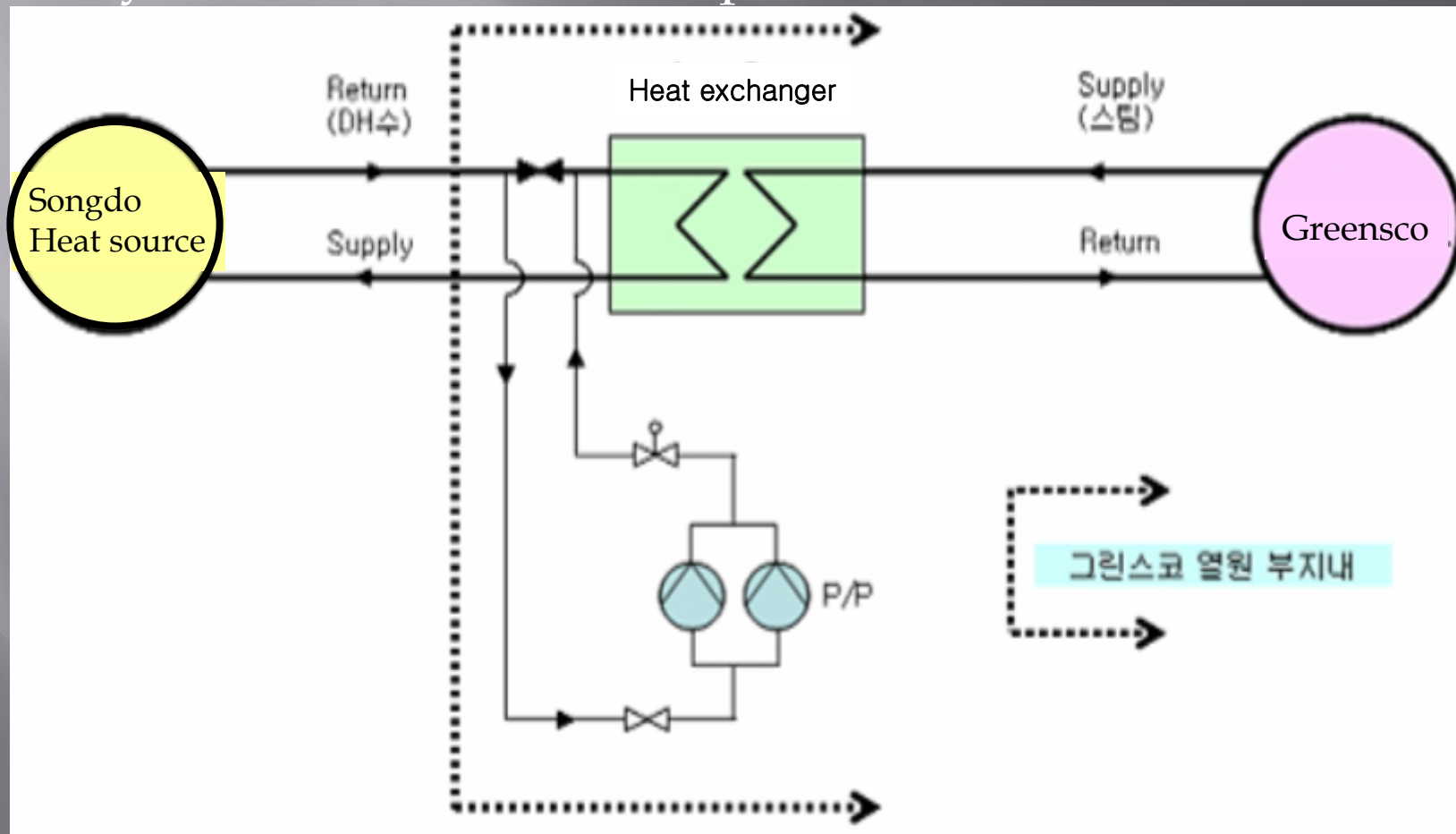
Project

- ▣ Construction site of e-Inteco Co-generation plant



Project

- Heat exchange diagram between District heating system and Incineration plant



Project

- ▣ Greensco heat exchanger room



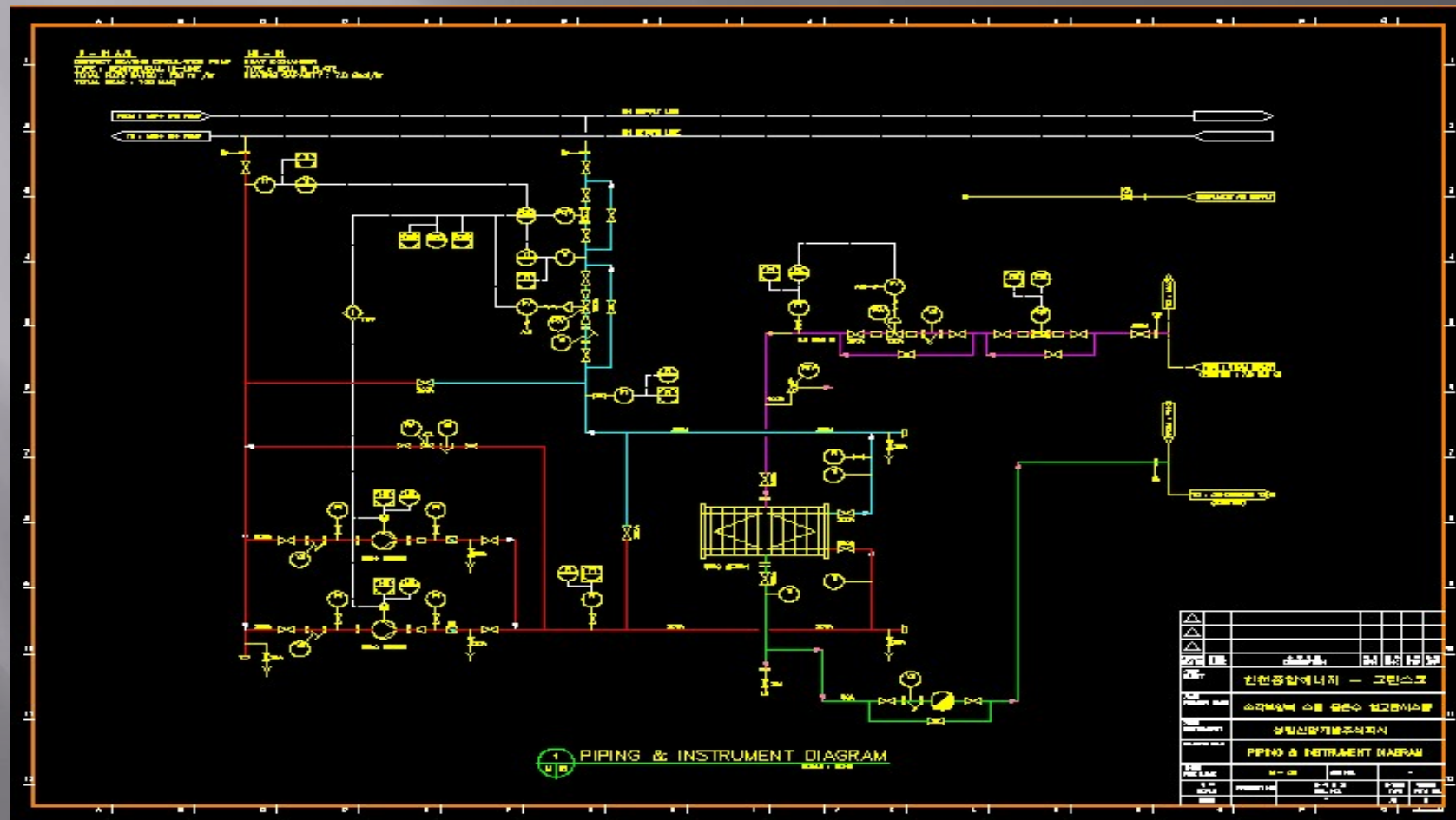
Project

- ▣ Installation of heat supply pipes



Project

▣ Piping & Instrument Diagram



Project

▣ Budget

(unit: million KRW)

Items		cost	percentage
Direct Construction cost	Material cost	1,177	
	labor	1,113	
	overhead	521	
	total	2,811	57.3%
Indirect overhead, insurance, etc.		493	10.1%
Pre-insulated piping cost		750	15.3%
Interest		401	8.2%
VAT		445	9.1%
Total		4,900	100%

Project



■ 성과배분 계획표(정액배분방식) - 총괄

● 실적내역

구분	실적내역	비고
연구개발비	108,887,883	2,348,281,000
연구개발비	108,887,883	2,348,281,000

● 실적내역계좌

구분	실적내역	비고
연구개발비	4,083,883,780	비고
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1년차	1가월	2가월	3가월	4가월	5가월	6가월	7가월	8가월	9가월	10가월	11가월	12가월	합계
연구개발비	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	
이자	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	60,804,948
연구개발비													-
연구개발비													-
연구개발비	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	

2년차	1가월	2가월	3가월	4가월	5가월	6가월	7가월	8가월	9가월	10가월	11가월	12가월	합계
연구개발비	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	
이자	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	60,804,948
연구개발비													-
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연구개발비	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	

3년차	1가월	2가월	3가월	4가월	5가월	6가월	7가월	8가월	9가월	10가월	11가월	12가월	합계
연구개발비	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	
이자	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	5,087,078	60,804,948
연구개발비													-
연구개발비													-
연구개발비	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	4,083,883,780	

4년차	1가월	2가월	3가월	4가월	5가월	6가월	7가월	8가월	9가월	10가월	11가월	12가월	합계
연구개발비	4,083,883,780	4,007,728,828	3,881,738,481	3,815,888,884	3,888,883,278	3,823,418,258	3,777,187,828	3,730,818,028	3,684,880,874	3,638,188,400	3,591,732,182	3,545,220,787	
이자	5,087,078	5,008,882	4,882,178	4,884,812	4,838,878	4,778,274	4,721,487	4,665,848	4,609,728	4,547,732	4,488,888	4,431,828	58,888,878
연구개발비	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	48,888,882	-
연구개발비	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	612,012,000
연구개발비	4,007,728,828	3,881,738,481	3,815,888,884	3,888,883,278	3,823,418,258	3,777,187,828	3,730,818,028	3,684,880,874	3,638,188,400	3,591,732,182	3,545,220,787	3,498,881,323	

5년차	1가월	2가월	3가월	4가월	5가월	6가월	7가월	8가월	9가월	10가월	11가월	12가월	합계
연구개발비	3,488,881,828	3,482,028,837	3,408,837,887	3,388,883,888	3,311,780,881	3,284,828,818	3,218,008,480	3,171,030,882	3,123,883,781	3,078,887,778	3,028,742,888	2,982,828,074	
이자	4,373,814	4,318,080	4,288,872	4,188,242	4,188,738	4,081,181	4,022,812	3,983,788	3,904,882	3,848,122	3,787,178	3,728,181	48,818,812
연구개발비	48,827,888	48,888,870	48,744,328	48,802,788	48,881,282	48,918,838	48,878,488	47,037,211	47,088,008	47,184,878	47,218,821	47,272,838	588,888,088
연구개발비	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	51,001,000	612,012,000
연구개발비	3,482,028,837	3,408,837,887	3,388,883,888	3,311,780,881	3,284,828,818	3,218,008,480	3,171,030,882	3,123,883,781	3,078,887,778	3,028,742,888	2,982,828,074	2,936,888,238	

Results

- ▣ The unit cost for supplying heat using this facility is 22,070 KRW/Gcal, which is 28.2% of the cost required by heat-only boiler.
- ▣ Annual saving is 2,831,000,000 KRW.
- ▣ It takes 1.69 year (21 months) to recover the investment money.

Conclusions

- ▣ We have expertise and experience in installing underground heat pipelines.
- ▣ This application of ESCO in utilization of waste heat for district heating was the first of its kind in Korea.
- ▣ We plan to develop and perform similar projects.

Thank You