

Description of integrated pilots/demonstrations/field tests/existing practices

1. Name of the case: Cogeneration systems developed for the university buildings

2. What is integrated with DSM

DG

Energy storage

Smart grid technologies

3. What is the level of commercialization

Research project

Demonstration

Field test

Existing practice

4. Where to find more information?

- Contact person: Mr. Woon Sik Hyun
- Company: Samchully (One of the regional city gas suppliers)
- web-site: <http://www.samchully.co.kr>
- references: you@samchully.co.kr

5. Objectives of the case

Avoid the construction cost of transmission lines for supplying electric powers

Save the operation cost by reducing contracted demand capacity of electric power and develop the energy supply security by replacing the role of emergency generator and diversifying heat supplying facility.

Empirical demonstrations for the education of commercial independent generations and air pollution reductions

6. Business rationale/model

Description of integrated pilots/demonstrations/field tests/existing practices

Cogeneration systems can be extended to build the community energy systems that can be possible to develop in the area of highly populated buildings such as, hotels, department stores by supplying the integrated energy of electricity, heating, cooling.

As of March 2008, Korea plans to widespread the construction of community energy systems, and the government acknowledged about 25 construction sites to the business entities who want to enter into the community energy supplying businesses. Currently community energy system is built and operated in one site located in Seoul.

7. Technologies used

Combined Heat and Power (CHP)

8. Short description of the case

Function of the building: research facilities, dormitory, subsidiary facilities, etc.

	Research facilities	Dormitory and subsidiary facilities	sum	Remarks
Area	25,210 m ²	22,602 m ²	47,812 m ²	research center building
Share	52.7%	47.3%	above 18 stories, under 1 floor	

Operation schedules of facilities

- a. Summer(from June to Sep.): chiller operation(95 celsius → 80 celsius), Supply space cooling by using the preheat boiler and steams
- b. Other seasons excluding Summer: Supply heat and hot water to the research center building
- c. When generator shut down: Supply necessary heat loads through the absorption heat pumps and steam boilers (2.0 Gcal/h × 3 units, 600RT × 3 units)

Descriptions on the facility details

		Capacity	Purpose
Power	Grid connection facilities	3,750 kVA	To KEPCO

Description of integrated pilots/demonstrations/field tests/existing practices

Apparatus	Generators	846kW×1unit	Independent or emergency
Mechanical Facilities	Heat recovery system (CHP/preheat boiler)	472Mcal/h (preheat water) 846kg/h(steam)	Space cooling & water heating
	Absorption Chiller	600RT×1unit	cooling(drained heat use in summer)
	Turbo chiller	600RT×3units	Space cooling & heating
	Preheat water HP	2ton/h×3units	Space & water heating

9. Achieved/expected results (operational savings, CO₂, efficiency enhancement)

			Unit	Conventional	CHP Installation	Comparison	INDEX
Energy Use	Power	Receive	kWh	9,567,425	6,788,059	▼2,779,366	▼29.1%
		Self gen.	kWh	-	2,779,366		
		Peak	kW	2,627	1,842	▼785	▼29.9%
	City gas	Heat&cool	N m ³	1,032,363	685,851	▼346,512	▼33.6%
		CHP	N m ³	-	700,826	▲700,826	-
		Sum	N m ³	1,032,363	1,386,677	▲354,314	▲34.3%
Energy Cost	Power	Capacity rate	1000KRW	185,046	129,750	▼255,296	▼29.9%
		Use rate	"	565,487	399,958	▼165,529	▼29.3%
		Sum	"	750,533	529,708	▼220,825	▼29.4%
	City gas	Heat&cool	"	442,939	262,179	▼180,760	▼40.8%
		CHP	"	-	292,993	▲286,235	-
		Sum	"	442,939	555,172	▲105,475	▲23.8%
	Total		"	1,193,472	1,084,880	▼108,592	▼9.1%

10. Lessons learnt

Currently a variety of CHP system have been installed according to the space heat and hot water supplying hierarchy that might be optimally configured the technical preference on the energy efficiency, cost saving and customer's desire.

Description of integrated pilots/demonstrations/field tests/existing practices

Now, small scale CHP has been diffused among the newly constructed apartments in Korea. In this point the energy costs of purchasing city gas or oil compared to the electricity tariff are great concerns for the active operation of CHP in residential sectors.

< Installed small scale cogeneration system (as of March 2008) >

	apartment	Industrial building	Commercial building	sum	
Site	111	4	38	153	
Units	153	6	61	220	
Capacity	(kW)	47,670	29,700	94,802	172,172
	(%)	27.7	17.3	55.1	100