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

1. Name of the case: Cogeneration systems developed for the complex building of Suwon railway stations

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 high voltage transmitted electric power through the independent generation and peak load management (154KV → 22.9kV)

   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.

   Public announcement of environment friendly energy supplying facilities and reduce the air pollutants

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: department store, railway station, theater, etc.

	Railway Building	Department Store	Theater	Parking Area, etc.	Sum
Area	13,818 ㎡	76,014 ㎡	8,595 ㎡	31,507 ㎡	129,933 ㎡
%	10.6%	58.5%	6.6%	24.3%	6 story building, Under ground 3 floors

Operation schedules of facilities

a. Summer(from June to Sep.): chiller operation(95 celsius → 80 celsius), Cool the railway building sectors → Supply hot waters to the railway building and department store

b. Other seasons excluding Summer: Supply heat and hot water to the railway building → Supply hot water to the department store

c. When generator shut down: Supply necessary heat loads through the preheated water boilers (2.0 Gcal/h × 2 units)

Descriptions on the facility details

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

			Capacity	Purpose
Power Apparatus	Grid connection facilities		14,000 kVA	To KEPCO
	Generator		1,438kW×3units	Independent or emergency
Mechanical Facilities	Heat recovery system		3,746Mcal/h	Space heat, water heat, space cool
	Chiller	Absorption Chiller	870RT×3units	Cooling department store
		Turbo chiller	870RT×3units	Cooling (emergency)
		Preheat Absop. chiller	327RT×2units	Drained heat from CHP for cooling
	Heat pump	Absorp. Chiller	400RT×1unit	Cooling & Heating (Theater)
	Boiler	Steam B	6ton/h×2units	Space & water heating (depart. Store)
		"	4ton/h×2units	"
		Preheat water B	2Gcal/h×2units	Heating and cooling tailway building (CHP spare)
		Electricity B	2.7ton/h×1unit	Add humidity

9. Achieved/expected results (operational savings, CO_2, efficiency enhancement)

			Unit	Conventional	CHP Installation	Comparison	INDEX
Energy Use	Power	Receive	kWh	31,012,186	26,443,900	▼4,568,286	▼14.7%
		Self gen.	kWh	-	4,568,286		
		Peak	kW	7,900	5,382	▼2,518	▼31.9%
	City gas	Heat&cool	N ㎥	2,043,379	1,814,807	▼228,572	▼11.2%
		CHP	N ㎥	-	1,072,705	▲1,075,705	-
		Sum	N ㎥	2,043,379	2,887,512	▲844,133	▲41.3%
Energy cost	Power	Capacity rate	1000KRW	689,265	469,611	▼219,654	▼31.9%
		Use rate	"	2,339,308	1,888,356	▼450,953	▼19.3%
		Sum	"	3,028,573	3,357,967	▼670,617	▼22.1%
	Oygas	Heat&cool	"	790,617	632,645	▼157,972	▼15.1%
		CHP	"	-	384,489	▲384,489	-

		Sum	“	790,617	1,017,134	▲226,517	▲28.7%
	Total			“	3,375,101	▼444,089	▼11.6%

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.

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.