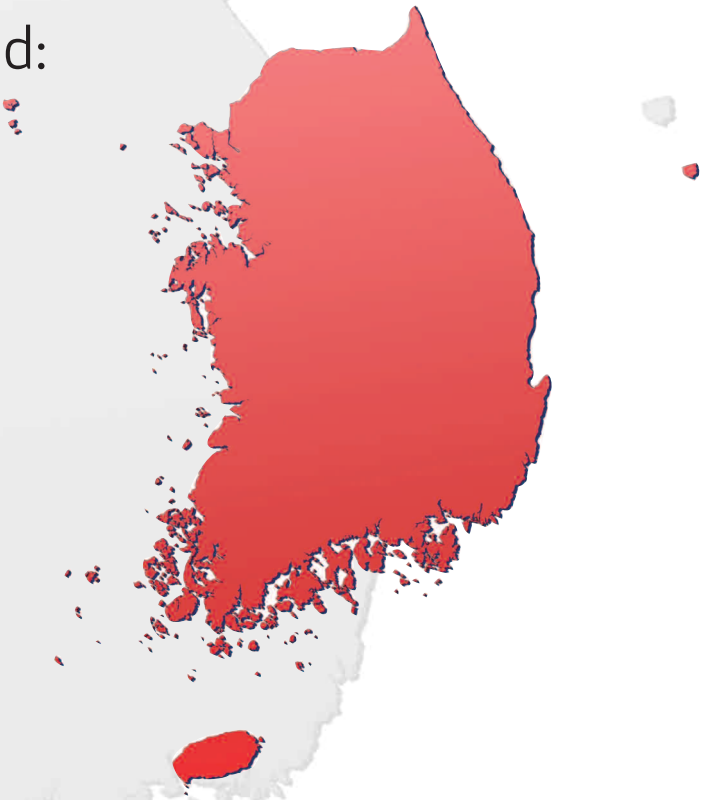
The International CHP/DHC Collaborative

Advancing Near-Term Low Carbon Technologies

CHP/DHC Country Scorecard: Republic of Korea

Energy is rising on the agenda of the government of the Republic of Korea (ROK) as it tries to reconcile economic growth with increasing energy prices and stricter environmental targets. The government works closely with research institutes and private companies in creating policy and developing new energy technologies to achieve these aims. Combined heat and power (CHP) is firmly embedded in energy policy, largely through its application in district heating and cooling (DHC). The government already supports CHP through its planning policy and tax incentives, and further measures are under development.



Energy Overview

Since its rapid development in the 1970s and 1980s, the ROK has become a major economic and industrial power in East Asia. This growth has been accompanied by a surge in energy demand, met mostly by imports – the country is 96.6% energy dependent.[1]

Primary energy demand is projected to grow at an average rate of 2.7% annually to 2020,[2] while electricity demand is projected to increase by 2.5% per year.[3] The residential and commercial sectors will account for most of the new demand, with CHP DHC having a potentially major role.

The power sector is dominated by coal and nuclear, which together account for over 70% of the total 403 TWh produced.[4] Liquefied natural gas (LNG) accounts for 20% of power generation, and CHP accounts for 8%, most of which is based on DHC applications.[5] Industry accounts for almost half of electricity demand, which rose 8.1% from March 2007 to March 2008. Residential demand increased by 5%, and now represents 24% of total use.[6] The government plans to expand the share of nuclear power and increase the supply of LNG for heating and electricity generation, including in CHP plants.

Electricity prices are regulated. Residential tariffs are broadly cost-reflective and are increase with consumption to incentivise efficient use of power. Industrial prices are low, and unlike residential tariffs do not increase with use. Wholesale gas prices are market-based, although local regulation of profit margins of city gas companies can have an impact on retail prices.

1. Korea Energy Economic Institute (KEEI), *Energy Scene and Policy Direction in Korea* (2008).
2. Id.
3. Ministry of Commerce, Industry and Energy, *The 3rd Basic Plan for Long-Term Electricity Supply and Demand (2006 – 2020)* (2006).
4. KEEI, *Energy Scene and Policy Direction in Korea* (2008).
5. KEEI, Response to the Questionnaire for Country Submissions for the 2005/2006 SLT/CERT Annual Review of Energy Policies, 2005.
6. KEEI, *Korea Energy Review Monthly* (June 2008).

Climate Change Context

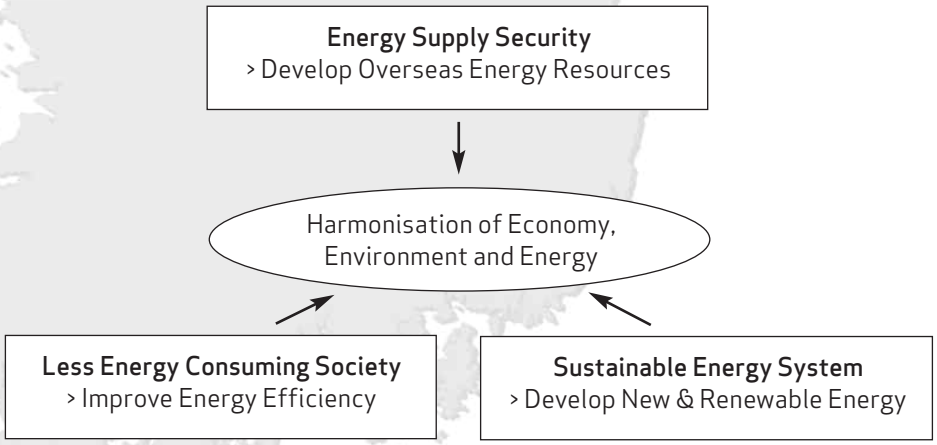
The Republic of Korea joined the UN Framework Convention on Climate Change (UNFCCC) in December 1993, and ratified Kyoto Protocol in November 2002. As a non-Annex I country, the ROK has not committed to a mandatory GHG emissions target, but the government recognises the importance of addressing climate change through energy saving and emissions reductions.

Climate change policy, alongside energy supply security, underpins the Republic of Korea's efforts to create a "less energy-consuming society." In this context, it aims to reduce energy intensity from 0.34 toe/million US$ to 0.30 toe/million US$ by 2012, and to increase the share of renewables from 2.2% to 5.0% by 2011.[7] The Korea Energy Management Corporation (KEMCO) is the main government agency responsible for implementing climate change policy. In July 2005, it launched the Korea Emission Reduction Registry Centre (KERRC) to monitor the country's progress towards its targets.

Energy Policy Drivers

The Republic of Korea's energy policy aims to strike a balance between economic growth and environmental sustainability. The three main policy drivers are energy supply security, energy conservation and sustainability (Figure 1).

FIGURE 1:
MAIN ENERGY POLICY DRIVERS IN THE REPUBLIC OF KOREA
SOURCE: KOREA ENERGY ECONOMIC INSTITUTE, ENERGY SCENE AND POLICY DIRECTION IN KOREA (2008).



CHP Status – Technology, Applications and Market Activity

According to the latest available data, the ROK had over 5 800 MWe CHP in 2007 (8.3% of total electric capacity), mostly supplying to DHC applications (see Table 1). Industrial CHP, in an environment of low electricity tariffs, accounted for most of the remainder. Many urban areas are already supplied by DHC CHP systems, so growth opportunities for commercial and residential CHP systems are modest.

7. KEEI, *Energy Scene and Policy Direction in Korea* (2008).

TABLE 1
CHP GENERATION AND CAPACITY IN THE REPUBLIC OF KOREA[8]

	Number of Sites	Electricity Generation (GWh)	Electricity Capacity (MWe)
DHC CHP (Power sector)	3	NA	2 188
DHC CHP (Dedicated plant)	13	4 798	1 847
Industrial CHP	20	7 116	1 641
Commercial CHP[9]	153	NA	172
Total	>189	>11 914	>5 848

SOURCE: KOREA ENERGY MANAGEMENT CORPORATION (2007).

Industrial Applications

Korea has a strong industrial base, and its petrochemical and metal industries have a good potential for CHP. Many factories have installed CHP; industrial capacity stood at 1 640 MWe in 2007.[10] Activity in this market segment is, however, relatively low because low and flat electricity tariffs and high gas prices often make it cheaper for industries to use grid electricity and on-site heat boilers instead of CHP.

Industrial CHP

The STX Energy CHP Business

STX Energy is an independent power producer that specialises in CHP. Its two plants supply electricity and process steam to commercial and industrial facilities, thereby optimising the energy supply in industrial parks.

The government supports industrial networks, as they can help reduce energy demand, limit energy costs for consumers and strengthen the competitiveness of the industrial sector.

Case Study. STX Energy CHP Plants[11]

	Banwol CHP Plant	Gumi CHP Plant
Technology	Steam Turbine	
Fuel	Coal, Heavy Fuel Oil	
Electricity Capacity	78 MWe	97 MWe
Electricity Generation	674 GWh/yr	851 GWh/yr
Customers	>200	>60
Estimated CO_2 Saving[12]	350 000 t/yr	450 000 t/yr

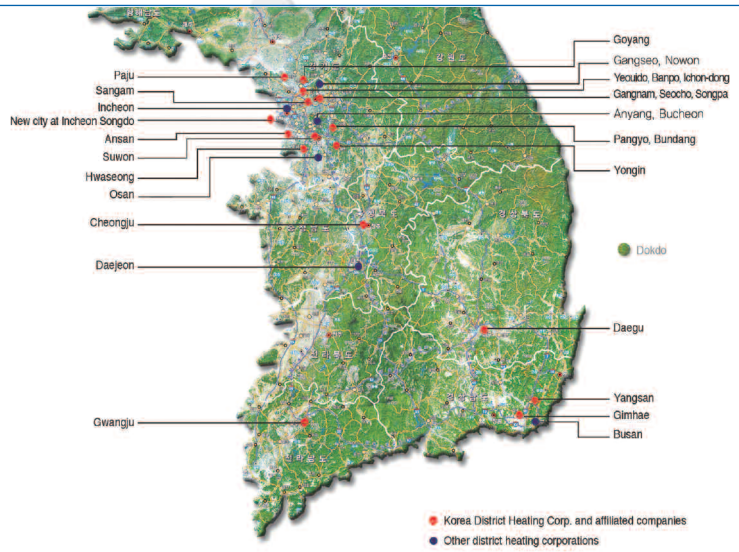
8. KEMCO, *2008 Source Book of Integrated Energy Supply*. Data for 2007.
9. KEMCO, *Annual Report 2007*. Data for 2007.
10. KEMCO, *2008 Source Book of Integrated Energy Supply*. Data for 2007.
11. STX Energy, "Combined Heat and Power" <http://www.stxenergy.co.kr/english/business/steam.aspx> (2008).
12. Based on an average energy savings of 31%.

District Heating and Cooling Applications

DHC is the main market for CHP in the ROK, and has emerged strongly since the first plant was built in 1985. It supplies 1.6 million households with heating and cooling. By 2007, 26 areas had DHC CHP, and the market continues to expand.[13] DHC schemes are usually initiated by the government as a part of the development plan for new urban areas, creating dedicated DHC zones with a single supplier, as it can be difficult to create a competitive market in local heat supply because of the fixed supply infrastructure.

FIGURE 5: DISTRICT HEATING SCHEMES IN THE REPUBLIC OF KOREA (REPRESENTATIVE)

SOURCE: KDHC, 2008



District Heating and Cooling CHP

The Korea District Heating Corporation (KDHC)

The Korea District Heating Corporation (KDHC) is the main DHC CHP company in Korea. In 2007 it had 22 DHC CHP plants serving over 940 000 customers. Its 2007 sales totalled over 10 million Gcal, 9 million of which was to residential users. This makes it the largest DHC company in the world.[14]

KDHC owns and operates the CHP systems serving the Metropolitan Heat Supply Network in the Seoul area. It has added four new CHP plants since 2005. The KDHC is currently building one 500 MWe CHP system and two medium size plants (~200 MWe each) in other new urban developments near Seoul.

Case Study. Paju New Town DHC CHP

In 2007, the KDHC commissioned its new CHP plant in the Paju New Town development near Seoul. The plant supplies heat and power to 59 000 households in the area, and is connected to the metropolitan DHC network of Seoul.

Electricity Capacity	515 MWe
Thermal Capacity	396 Gcal/h
Estimated Fuel Saving[15]	1.25 million toe
Estimated CO_2 Saving	5.6 million t/yr

13. KEMCO estimate, 2008.
14. KEMCO estimates, 2008.
15. KDHC, *Status and Prospects of CHP/DHC in Korea* (2007), presented at the IEA International CHP/DHC Collaborative launch meeting (March 2007). Based on the average performance of KDHC's CHP plants.

Small Commercial and Domestic Applications

At the end of 2007, commercial and residential CHP capacity was 172 MWe.[16] The market for CHP in commercial and public buildings (units <1 MWe) is modest because many potential sites are served by DHC systems. Commercial companies outside these areas mostly use individual gas boilers, which were strongly promoted by city gas companies when LNG became available from 1990. Rising fuel bills have now sparked new interest in commercial CHP, and several companies have recently invested in it.

Biogas CHP

Biogas production is currently restricted to landfill gas sites and industries that produce methane as a by-product.

- Korea has 10 large landfills, and many smaller ones. Most suitable sites already use their gas for power generation and some for CHP if a suitable heat-load is available (see box below).
- Over 100 methane-producing facilities have power generation systems, including some CHP schemes.
- Agricultural biogas production is limited, because Anaerobic Digestion technology is not common and many farmers are not aware of the opportunity.

Case Study. Sudokwon Landfill

Sudokwon Landfill Gas CHP Plant

The Sudokwon landfill is the largest in the Republic of Korea, and processes most of Seoul's waste. The site produces 45 000 m^3 of gas per hour, which is collected, cleaned in an activated carbon filter, and partly used in an on-site CHP plant. This installation consists of nine units – five 1.3 MWe engines, three 1.1 MWe engines and a smaller 370 kWe unit.

The heat and power generated in the CHP plant supplies the buildings and installations on-site, while excess electricity is exported to the network.

Clean Development Mechanism (CDM) Support for Expanding the System

The 10 MWe CHP system can only process 15% of the landfill gas produced by the site, leaving 85% to be flared. The Sudokwon Landfill Site Management Corporation therefore planned to expand the installation by another 50 MWe[17] and applied for CDM registration for funding in 2006. The feasibility study suggested that this could reduce GHG emissions from the landfill by 13.7 million tonnes CO_2-eq. from 2007 to 2016. The project was approved by the CDM Executive Board and registered on 30 April 2007.

16. KEMCO, *Annual Report 2007*.
17. This unit will produce power only.

Government CHP Promotion Policies

Through the government's **Integrated Energy Supply Policy** (IESP), the most significant support for CHP uses urban planning policy to designate new developments as Integrated Energy Supply Areas (IESAs), thereby creating a captive market for DHC CHP.

Other financial incentives also aim to promote a wider use of CHP:

- Tax incentives and low-interest loans are available for businesses installing CHP equipment.
- CHP plants over 100 MWe can buy natural gas directly from the Korea Gas Corporation (KOGAS) at the wholesale price.
- Renewable electricity, including biomass and biogas CHP, is eligible for feed-in tariffs (see below).

Integrated Energy Supply Policy

Under the IESP, the Ministry of Knowledge Economy (MKE) can designate an area as an IESA. After this designation, the construction plan must include the heat supply network and all buildings and apartments on site are obliged to connect to the 'Integrated Energy Facility' (IEF).[18]

The Integrated Energy Supply Act specifies three types of IEFs:

- District heating and cooling
- Heat supply for industrial complexes
- Community Energy Systems (CES)[19]

Private companies bid for the right to supply heat and electricity in an IESA, and the winner receives the exclusive right to do so. This law therefore creates a captive market for CHP and the provision of heat. It does not offer a direct financial incentive, but this is still an effective support for DHC CHP in the Republic of Korea, and drives activity in this market.

Financial Support Mechanisms

Tax reduction on CHP investment costs

The three types of IEF are eligible for a tax reduction on the investment costs for developing the schemes, under the Restriction of Special Taxation Act. The support allows registered businesses to deduct 10% of the investment in IEFs from their taxable profits in the first year of operation. Since the corporate tax rate in Korea is 27.5%, the value of the support is 2.75% of the total CHP investment. The support runs until 31 December 2008, after which the government will review its effectiveness.

Soft loans for CHP investment

Companies investing in CHP can receive a government loan from the Fund for the Rational Use of Energy. Loans cover up to 80% of investment costs for private companies and 90% for small and medium enterprises and public institutions. The annual interest rate is 5% (instead of the normal 7%) and the repayment period is seven years, with an eight-year grace period. This opportunity runs until 31 December 2008, after which the government will review its effectiveness.

Wholesale fuel price for CHP

Since the amendment of the Oil Business Act in 1998 (now related to the City Gas Business Act), eligible large gas users can import LNG themselves or buy gas from KOGAS at wholesale prices. This has helped create liquidity in the market, and shields large gas users from high retail prices.

In this scheme, CHP plants over 100 MWe are 'eligible consumers,' so individual plants can buy their fuel through bilateral supply contracts with KOGAS, while companies with a portfolio of plants, like the KDHC, can also import LNG themselves. Access to the wholesale gas market has made systems over 100 MWe more attractive than smaller plants. Many plants just below the threshold are therefore considering expanding their capacity to enable them to qualify.

Biomass feed-in tariff

Biomass and biogas plants under 50 MWe, including CHP, are eligible for a feed-in tariff to compensate for the additional costs over fossil-fuel generation. Plants can choose between a fixed tariff and a market-based tariff, relative to the System Marginal Price (SMP) of the Korea Power Exchange (KPX). The fixed tariff is generally lower, but offers predictable revenue, while the benefit of the market-based tariff can be higher, but its value is subject to electricity market trends. In 2007, the market-based tariffs were around KRW 10 to KRW 15 per kWh higher than the fixed tariffs. Plants can receive these tariffs for a period of 15 years.

The tariffs became first available in 2002 and the programme runs to 2012. Table 2 shows the tariffs after the adjustment in October 2006. These tariffs do not distinguish between power-only generation and CHP, and therefore provide no extra incentive for making the additional investment to achieve a higher efficiency.

18. An Integrated Energy Facility (IEF) is "a CHP or massive-scale heat generation facility equipped with pollution-prevention facilities that economically generation energy (heat or heat and electricity) and supplies it to a multitude of users such as apartment buildings, businesses and commercial facilities, and industrial complexes" (KEMCO, *Annual Report, 2007*).
19. A CES is any system that supplies a group of buildings in a building-dense area with heat and electricity from the same source – effectively a small DHC CHP scheme.

TABLE 2.
FEED-IN TARIFFS FOR BIOGAS AND BIOMASS IN KOREA

Fuel and Technology		Eligible Capacity	Feed-in Tariff (KRW per kWh)		Annual Reduction
			Fixed Tariff	Market-based Tariff*	
Waste-to-Energy		<20 MWe	-	SMP + 5 (-€c 5.3 per kWh)	-
Landfill Gas		20 - 50 MWe	68.07 (€c 4.3 per kWh)	SMP + 5 (-€c 5.3 per kWh)	-
		<20 MWe	74.99 (€c 4.7 per kWh)	SMP + 10 (-€c 5.8 per kWh)	
Biogas		150 kWe - 50 MWe	72.73 (€c 4.6 per kWh)	SMP + 10 (-€c 5.8 per kWh)	-
		<150 kWe	85.71 (€c 5.4 per kWh)	SMP + 15 (-€c 6.2 per kWh)	
Solid Biomass		<50 MWe	68.99 (€c 4.3 per kWh)	MP + 5 (-€c 5.3 per kWh)	-
Fuel Cells	Biogas	>200 kWe	234.53 (€c 14.7 per kWh)	-	3%
	Other Fuels		282.54 (€c 17.7 per kWh)	-	

* Based on average 2007 System Marginal Price (SMP) of KRW 83.5 per kWh.

Micro-CHP and Fuel Cell Strategy

The Second Basic Plan for New and Renewable Energy Development and Deployment (2003) outlines the government's activities and targets for hydrogen and fuel cell R&D. It covers the period from 2003 to 2012, and has a budget of US$11.8 billion. The Ministry of the Knowledge Economy is responsible for the policy, and KEMCO coordinates the research.

The Second Basic Plan aims to support the development of a 250 kWe fuel cell CHP system for commercial buildings, and a 3 kWe fuel cell generation system for residential use. Product development and testing will continue until 2012, after which mass production will start. The government hopes to reduce the technology gap with other countries developing fuel cell systems, including Japan and Germany.

KOGAS is testing residential fuel cell CHP systems as part of the government programme, while the Pohang Iron and Steel Company (POSCO), Korea's main steel manufacturer, is taking the lead in production and use of fuel cells for commercial and industrial applications.

Stakeholders

Government

The **Ministry of Knowledge Economy** (MKE) is responsible for energy policy, led by its Director General of the Energy Industry. MKE deals with energy policy planning, energy industry regulation, climate change issues, energy sector reform and energy price control.

MKE's Korea Electricity Commission is in charge of regulating the power sector. The MKE has a central role in developing and supporting new and efficient energy technologies, including CHP. It is therefore responsible for various support mechanisms. Provincial governments are responsible for regulating retail energy supply, covering roughly the same tasks that MKE has nationally.

Public research institutes support ministries with analysis and development of policy measures, including:

- **Korea Energy Economics Institute (KEEI)** – KEEI's activities include modelling and forecasting of energy trends to support the development of National Energy Plans and Energy Policy. It deals with the electricity and gas sectors, and has teams specialised in CHP and renewable energy.
- **Korea Institute of Energy Research (KIER)** – KIER tests new energy technologies as part of the certification process of the government.
- **Korea Energy Management Corporation (KEMCO)** – KEMCO is responsible for collecting data on the energy sector, as well as developing energy policy for the government. This includes DH and CHP.

The government also partially owns the wholesale energy production and supply companies, including the Korean National Oil Corporation (KNOC), KOGAS and KEPCO.

Industry

Korea District Heating Corporation (KDHC) – The KDHC is the main DHC CHP company in Korea, and has been closely involved in supporting its further development.

Korea Gas Corporation (KOGAS) – KOGAS is the dominant wholesale supplier of natural gas in the ROK, with exclusive responsibility for LNG import, storage, and gas transmission. KOGAS also conducts research on gas-related technologies, and is currently testing various micro-CHP units.

Korea Electric Power Corporation (KEPCO) – KEPCO is responsible for power transmission, distribution and sales, while five private companies have been operating its previous generation assets since the power sector reform in 2002. Around 50 licensed independent power producers exist, but together they have only a 10% share of the generation market.

Pohang Iron and Steel Company (POSCO) – POSCO is the main iron and steel producer and has recently increased its energy-related business. It has a number of power plants and CHP installations at its factories, and is developing fuel cell CHP plants.

STX Energy – STX Energy is an independent power producer that operates CHP plants in Banwol and Gumi, supplying commercial and small industrial facilities with process steam and electricity.

Non-governmental Organisations

Korea Integrated Energy Network – The KIEnergy.net promotes integrated energy supply in Korea, including CHP and DHC, and provides data and policy information on its status and development.

Hydrogen Economy and Fuel Cell (H2FC) – H2FC promotes and supports the development of hydrogen and fuel cell technology to build expertise in Korea and widen their application.

Barriers to Increased Use of CHP

Regulated Electricity Prices

Some aspects of the existing electricity tariff structure make it more difficult for CHP project development; for example:

- The industrial CHP market has flat tariffs that do not recognise or reward efficiency measures, so that industrial CHP is often not economic.
- DHC CHP and commercial CHP are less affected, because commercial and residential heat revenues and electricity prices are higher than for industries, and can therefore compensate for high gas prices.

The government intends to slowly increase electricity prices and reduce differences between tariffs. Tariff reform could also come in the medium term – the government has asked KEEI to investigate options.

High LNG and City Gas Prices

Gas prices in Korea have increased rapidly since 2007, further worsening the economics for CHP. As the ROK imports almost all its gas, tariffs will continue to follow the upward trend of global market prices, so the situation is unlikely to improve. Heavy fuel oil used for CHP used to be exempt from import duty, but this was abolished in February 2008.

Monopoly in the Gas Market

The KOGAS monopoly in the wholesale market and the regional monopolies of city gas companies can prevent gas prices falling as fast as they might. This is in part offset by the strict regulation on the profit margins of gas suppliers.

Renewable Energy Feed-in Tariff Provides No Incentive for CHP

CHP systems using biomass or biogas are eligible for the feed-in tariffs for renewable energy, but receive the same price as power-only generation. This gives plant developers little incentive to make the additional investment necessary for installing CHP systems.

Urban Air Quality Regulation

Urban air quality regulation bans the burning of solid or liquid fuels in urban areas, so only gas CHP is allowed in cities. Solid biomass-based systems are not.

High gas prices and emission reduction targets have led to calls for exempting biomass CHP from the regulation, provided systems meet emission standards.

CHP Potential

No comprehensive CHP potential study exists, but the Third Basic Plan for Long-term Electricity Supply and Demand (2006 – 2020) provides projections for CHP capacity additions to 2011.

TABLE 4
PROJECTED CHP CAPACITY ADDITIONS TO 2012 (MW)

Application	2008	2009	2010	2011
Power Sector	15 MWe	52 MWe	-	-
District Heating	16 MWe	397 MWe	-	28 MWe
Industry	2.6 MWe	-	29 MWe	60 MWe
Commercial	98 MWe to 2017			

MINISTRY OF COMMERCE, INDUSTRY AND ENERGY, 2006

While these projections are preliminary in nature, they suggest that DHC CHP will continue to offer the best opportunities. Industrial CHP is less attractive, but benefits from the proposed emissions trading scheme could provide additional revenue to encourage CHP development in this sector as well.

Industrial Applications

Many large industries have already developed CHP, but some technical potential for industrial CHP still exists. However, little of this is economic under electricity tariff current conditions. Most capacity additions in Table 4 are therefore extensions of existing CHP facilities, rather than new plants.

District Heating and Cooling Applications

The growth of urban populations creates an excellent market for DHC CHP, and the Integrated Energy Policy facilitates this by creating a captive market. Commercial gas tariffs, higher residential electricity prices and avoided heating costs help to make plants viable. The best potential for new DHC CHP schemes is in Integrated Energy Supply Areas – five of which are planned in Seoul and surrounding areas for the coming years.

Small Commercial and Domestic Applications

Interest in commercial CHP is growing, driven by rising domestic gas prices, which have improved the viability of small CHP systems compared to individual gas boilers. In addition, KEMCO provides soft loans for commercial businesses installing CHP to help spread CHP (units <1 MWe) to commercial and public buildings.

The wide coverage of DHC in urban areas limits the potential for CHP in individual buildings, as suitable sites in the IESAs already receive CHP heat and electricity, and are not allowed to switch to individual heating or CHP systems. However, individual CHP systems can serve offices, apartment blocks and public buildings in existing cities, where building new DHC schemes may not be economic.

Biogas CHP

Korea has good biomass and biogas resources, particularly wood, waste and agricultural residues that could be used for CHP. KIER has been testing biomass and biogas CHP systems to license them for the Korean market. Biogas production from industrial and municipal waste processing is on the increase, supported by government subsidies, research programmes and feed-in tariffs. Growing amounts of biogas should therefore become available for CHP over the next five years.

Achieving the Potential

Main Policy Recommendations

- Consider restructuring the electricity tariff system to promote efficient use of energy
- Examine further specific CHP support options
- Assess the costs and benefits of introducing a favourable fuel price for CHP
- Explore the possibility of a bonus for CHP in the Renewable Energy Feed-in Tariff
- Consider allowing the use of solid biomass for CHP in urban areas, provided it meets emission standards
- Develop expertise in biogas production and biogas CHP technologies

Consider Restructuring the Electricity Tariff System
The price regulation structure is the main factor holding CHP back in Korea, and an alternative approach to tariff setting could encourage further development, particularly in industry. Industries could be incentivised to adopt energy efficiency measures, like installing CHP, through an electricity tariff structure that discourages excessive use.

Examine Further Specific CHP Support Options
CHP support mechanisms can be effective in rewarding its additional carbon saving and efficiency benefits, and can incentivise energy companies and industries to install CHP systems. Feed-in tariffs represent one proven means of accelerating CHP market uptake in some countries, but other support can be successful too. The government has introduced legislation to create an Emissions Trading Scheme, which can incentivise CHP if it recognises the efficiency benefit.

Assess the Costs and Benefits of Introducing a Favourable Fuel Price for CHP
The import tax exemption was an effective support mechanism for large CHP plants using oil until it was abolished in February 2008. Considering that high LNG prices are a major barrier to CHP, such a measure could be effective for LNG CHP plants too. Promoting the efficient use of LNG also helps reduce dependence on energy imports.

Explore the Possibility of a Bonus for Biogas CHP in the Renewable Energy Feed-in Tariff
The renewable energy feed-in tariff offers the same incentive to both CHP and power-only plants. A CHP bonus could adjust this, and help to ensure that renewable energy sources are used more efficiently.

Consider Allowing the Use of Solid Biomass in Urban Areas
The ban on burning solid fuels in urban areas prevents CHP schemes from switching to renewable fuels. This is a major obstacle to increasing the amount of biomass CHP, because many large DHC CHP plants in cities could easily switch to biomass – the KDHC has already shown interest in doing so. Exempting modern biomass CHP systems with appropriate air pollution controls would support these schemes to switch to renewable fuels. This could reduce GHG emissions without threatening urban air quality.

Develop Expertise in Biogas Production and CHP
A more comprehensive approach to developing expertise in biogas production and CHP technology, combined with an effective deployment strategy, could foster a strong biogas sector to develop these opportunities, and export its expertise in the future.

CHP/DHC Scorecard

To aid in comparing amongst countries, the IEA has developed a scorecard of national CHP/DHC policy efforts that takes into account three criteria:

- The effectiveness of past policies in developing the CHP/DHC market over the last 5 years;
- Statements and commitments of intent in respect of future CHP/DHC policy, for example through the creation of national growth targets; and
- The existence today of meaningful policy incentives that are already causing significant market growth or that are likely to do so in the near future.

Each country is given a scorecard rating as follows:

No material policy effort or intent to promote CHP/DHC. The market is not expected to grow for the foreseeable future. ★☆☆☆☆

Some minor recognition of the role of CHP/DHC, but policies are not fully effective or are otherwise insufficient to influence market development. ★★☆☆☆

There is a clear recognition of the role of CHP/DHC, accompanied by the introduction of some measures to accelerate the market, but CHP/DHC are not high priorities compared to other energy solutions. In addition, the country lacks an integrated CHP/DHC strategy. As a result, market growth is likely to be modest. ★★★☆☆

CHP/DHC is at or close to the top of the list of energy policy priorities and a series of effective policies are being implemented as part of a coherent strategy. Important growth is expected in CHP/DHC markets. ★★★★☆

A world leader in prioritising CHP/DHC, with a clear and proven strategy for bringing about significant market development and the implementation of at least one global best-practice policy measure. ★★★★★

Republic of Korea's Rating: ★★★☆☆

The International CHP/DHC Collaborative

The **International CHP/DHC Collaborative** was launched in March 2007 to help evaluate global lessons learned and guide the G8 leaders and other policy makers as they attempt to assess the potential of CHP as an energy technology solution.

The Collaborative includes the following activities:
- collecting global data on current CHP installations
- assessing growth potentials for key markets
- developing country profiles with data and relevant policies
- documenting best practice policies for CHP and DHC
- convening an international CHP/DHC network, to share experiences and ideas

Participants in the Collaborative include the Partners, mentioned in the acknowledgments, as well as the Collaborators, a group of over 40 government, industry and non-governmental organisations that provide expertise and support. The Collaborative Network, the larger group that is informed about meetings, publications and outreach, has almost 300 participants.

If you are interested in participating in the Collaborative or want more information, please visit www.iea.org/G8/CHP/chp.asp.

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Questions and comments about this document should be sent to:

Tom Kerr
International Energy Agency
9, rue de la Fédération
75739 Paris Cedex 15
France

Email: tom.kerr@iea.org

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