GLOBAL CCS INSTITUTE

WorleyParsons resources & energy

Schlumberger

Baker & McKenzie

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Strategic Analysis of the Global Status of Carbon Capture and Storage

Report 3: Country Studies South Korea

Final Report

This page left intentionally blank

GLOBAL CCS INSTITUTE

WorleyParsons resources & energy

Schlumberger

Baker & McKenzie

EPRI ELECTRIC POWER RESEARCH INSTITUTE

Strategic Analysis of the Global Status of Carbon Capture and Storage

Report 3: Country Studies South Korea

Disclaimer

This report has been prepared by Baker and McKenzie on behalf of WorleyParsons Services Pty Ltd (WorleyParsons) for the exclusive use of The Global CCS Institute. It is subject to and issued in accordance with the agreement between The Global CCS Institute and WorleyParsons. Neither WorleyParsons nor Baker & McKenzie accept liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party.

Copying this report without the permission of The Global CCS Institute or WorleyParsons is not permitted.

Qualifications

This report:

1. *states the law current as at 31 March 2009*
2. *should not be relied upon as a substitute for specific legal advice*
3. *has links and references throughout that were current as at 31 March 2009*
4. *represents the views of Baker & McKenzie only and not of any person or agency that may have contributed to or reviewed any aspect of the report*

Contents

1. Executive summary

South Korea does not currently have any policies or legislation dedicated to encouraging the development of CCS technologies or regulating the conduct of CCS projects in South Korea.

However, South Korea began considering the development of CCS policies and legislation in 2008 and this policy development process continues.

The Government is currently promoting the development of technology for capturing CO_2. The legal basis for such government support is the Energy Basic Law.

2. Glossary

APP	Asia Pacific Partnership for Clean Energy and Climate
CCS	Carbon capture and storage
CDM	Clean Development Mechanism
CSLF	Carbon Sequestration Leadership Forum
Global CCS Institute	Global Carbon Capture and Storage Institute
KRW	South Korean won

3. CO_2 pricing

3.1 Introduction

Carbon cost imposition policies in South Korea are at an early stage of development, however they are under active consideration by the Government of South Korea. The draft legislation is still pending before the National Assembly.[1]

3.2 Mandatory cap and trade schemes

South Korea's National Assembly is currently considering a draft Basic Law on Low-Carbon Green Growth which would provide a broad framework for sustainability policies in South Korea. The new legislation will provide a foundation for a system for regulating GHG emission volumes and trading emission permits. The details of this scheme, including in relation to enforcement, would be set out in separate legislation. The specific content of such separate law cannot be verified at this stage.

3.3 CO_2 taxation schemes

There have been discussions on the introduction of a CO_2 tax, but no policy has yet been established.

3.4 Greenhouse gas emission and energy use reporting schemes

The Government of South Korea is also considering long term and short term plans for establishment of a national emission statistics system (inventory) in compliance with the international standards. Such an inventory would include:

- preparation of a system for managing GHG emission statistics at a national level;
- development and management of country-specific GHG emission or absorption indices; and
- active support for the establishment of a system for preparing GHG emission statistics by the local government agencies and corporations.

[1] A review of the draft prepared by the government is available at the official website of the Ministry of Government Legislation: http://inglaw.moleg.go.kr/PS/lbicInfoR.do?topMn=02& bicId=1000000001278&dataType=LMPLN#vmCncStpand the draft legislation is available at the official website of the Presidential Committee on Green Growth: available at: http://www.greengrowth.go.kr/userBbs/bbsView.jsp

4. Existing CCS initiatives

4.1 Introduction

New Growth Engine is a government policy related to the CCS. On 13 January 13 2009, in a meeting jointly held by the National Science Technology Committee and the Future Planning Committee and hosted by President Myung-bak Lee, the Korean government designated and announced a Vision and Development Strategy for New Growth Engine. Three New Growth Engine sectors and 17 New Growth Engine industries were also designated and announced. The three New Growth Engine sectors are green technology industry, high-tech fusion industry and high value added service industry. CCS and other CO_2 related policies fall under the category of green technology industry.

The purpose of the New Grown Engine is to expand the growth potential or the South Korean economy through the joint efforts of the public and private sectors. The policy term is about three to ten years, and the specific projects involve research and development, tax benefits, system improvement and human resource development. The government agency in charge of CCS is the Ministry of Knowledge Economy, in particular, the Energy Technology Division of the Office of Energy and Resources, headed by the Vice Minister for Trade and Energy.

The Government is currently promoting the development of technology for capturing CO_2. The legal basis for such government support is the Energy Basic Law. The annual technology policy goals under the Energy Basic Law are as follows:

- 2009
  - determine core R&D tasks;
  - prepare plans for connection with CDM businesses; and
  - continue development of core CO_2 technology.
- 2010 - 2015
  - develop CO_2 sequestration technology;
  - promote business for verifying overseas and domestic sequestration of the 5MW~100MW scale;
  - assess potential CO_2 storage capacity and procure storage spaces; and
  - develop CO_2 transport and storage processes.
- 2016 - 2018
  - procure innovative low cost technology;
  - expand the research foundation for a low cost sequestration verification plan;
  - procure low cost storage processes and lead the market; and
  - promote large-scale CCS verification business and enter into the international CDM market.

The Government also plans to enhance international cooperation with the CSLF, APP and Global CCS Institute.

In connection with the utilization of CO_2, the government plans to utilise the CO_2 in steel manufacturing processes and nuclear power generation processes.

Details of the specific policies have not yet been established.

4.2 Government funding

Approximately 105.6 billion KRW (US$82 million) will be provided under the New Growth Engine plan up to 2013 to develop CO_2 sequestration technology, recycling technology and value-adding technology.

In connection with the development of transport and storage technology, funding under the plan will contribute to:

- the establishment of a verification platform for storage and injection of 3 million ton scale;
- subsequently, for the purpose of procuring CO_2 injection technology, the assessment of the geological qualities of the region, quantitative assessment for each storage site and the modification, development and the completion of the GIS database engine by 2015; and
- the completion of the safety assessment for storage of CO_2 in marine sediment layers in accordance with the 1996 Protocol to the *Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972* by 2018.

4.3 Government-business joint ventures

Under the proposed Energy Basic Law, in connection with the development of technology for sequestration of CO_2 from electricity generating stations of 10MW or greater capacity, the Government plans to study and subsequently verify the amine absorption technology, dry absorption technology in collaboration with five power stations that are affiliated with Korea Electric Power Corporation and Doosan Heavy Industries & Construction Co. Ltd.

4.4 Evaluation

The New Growth Engine plan and amendments to the Energy Basic Law will provide a firm foundation for the development of CCS technologies in South Korea.

5. Capture of CO_2

5.1 Introduction

Korea is currently developing and establishing policies on CO_2 capture. With the exception of those mentioned above, no specific policies or laws have been announced.

5.2 General policy and legislation specific to capture of CO_2

It is not yet clear whether captured CO_2 would be treated as a waste or a pollutant under existing South Korean legislation.

5.2.1 Relevant pollution laws and policies

WASTE MANAGEMENT LAW

"Waste" is defined under South Korea's Waste Management Law as materials such as garbage, waste oil, etc., which has become unnecessary to people's living or business activities. Any person who intends to collect, transport, store or treat such materials would be required to submit a business plan to the Ministry of Environment and the city or provincial government.

Any person who intends to establish waste treatment facilities would be required to obtain the approval of the Ministry of Environment. A report may be sufficient for small-scale treatment facilities or facilities for research purposes. Waste management facilities should be inspected by the agency designated by the government and reports should be filed annually on its pollution and effect on the surrounding environment. Once the approval is obtained or report is filed in accordance with the Waste Management Law, the requirements of approvals or reports under the Atmospheric Environment Preservation Law, Law on Preservation of Water Quality and Ecosystem and the Law on Regulation of Noise and Vibration, would be deemed satisfied. Accordingly, separate approvals or reports would not be necessary.

Any person who has installed waste treatment facilities would be required to properly manage such facilities so that the surrounding environment would not be affected and to install leakage prevention facilities, etc. Further, a post-installation management performance guarantee deposit should be paid to the government. Once the waste deposition is completed and the facilities are closed down, the government may restrict the use of such land to parks, sports facilities and forests.

ATMOSPHERIC ENVIRONMENT PRESERVATION LAW

The Atmospheric Environment Preservation Law regulates the emission of air pollutants. The Atmospheric Environment Preservation Law defines GHGs as "substances in the gaseous state which absorb and emit infrared radiation to cause the greenhouse effect, such as CO_2, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluorides." It prescribes the permissible levels of emissions of air pollutants such as GHGs for automobiles, ships, etc., obligations to install emission prevention facilities and measurement devices, regular investigations of emission volumes conducted by the government, emission penalties, regulation measures such as cancellation of permits and the issuance of order for improvement.

5.3 Evaluation

It appears that it would be necessary to establish a comprehensive basic law that uniformly and systematically regulates the CCS project from the approval stage to the post-closure management stage. As the project will be led by the government, however, it is expected that such law will be established in the near future in order to meet the needs of the government.

To facilitate the deployment of CCS technology in South Korea, the South Korean Government will need to implement laws governing the capture of CO_2.

6. Transport of CO_2

6.1 Introduction

South Korea is currently developing and establishing policies on CCS. However, South Korea has an existing pipeline transport regime which may lend itself to regulation of CO_2 transport activities.

6.2 General policy and legislation specific to transport of CO_2

6.2.1 Licencing of transportation activities

PIPELINES

The High-Pressure Gas Management Law or the Urban Gas Management Law requires government permits for installation or modification of pipelines for high-pressure gases or urban gases. Separate permits would be required for installation of pipelines under roads. It is unclear, however, whether or not the CO_2 captured under the CCS project would be regarded as high-pressure gas, which is defined as liquefied gas that has the pressure of at least 0.2 MPa at room temperature or reaches 0.2MPa at 35°C. The Road Management Committee's examination would also be required for installation of high-pressure gas pipelines under roads.

Further, the Rules on Safety of Petroleum Mines provide details on oil well drilling, storage and pipelines. Different standards on the thickness, distance from the ground surface and other on-ground facilities, regular inspection of pipelines, and other conditions are prescribed for different types of pipeline installations (for example, underground, on-ground, below sea level and below road level). Such installations may be made by authorised entities only.

As the foregoing laws would be applicable to specific types of pipelines such as high-pressure gas, urban gas, or petroleum, they are not likely to be directly applicable to the CCS project. However, they may be used as models for CCS regulation in South Korea.

6.3 Taxation of CO_2 transport

It appears that no specific policies or laws on the taxation of CO_2 transport currently exist.

6.4 Evaluation

It may be possible to adapt South Korea's pipelines legislation to CCS pipeline transport. This could usefully be investigated by the South Korean Government.

7. Exploration of potential CO_2 storage sites

7.1 Introduction

South Korean laws that may be relevant to the exploration of potential sequestration sites for purposes other than CCS include the Aggregate Extraction Law, Mining Law, Maritime Scientific Investigation Law and the Submarine Mineral Resource Development Law. These legislative frameworks provide the general rights and obligations which could govern approval conditions, nature of the exploration rights, term of exploration rights, and installation of exploration facilities for CCS operations, however, it is unclear whether or not such laws would be applicable to CCS projects.

7.2 General policy and legislation with application to exploration of potential CO_2 sequestration sites

7.2.1 Exploration licencing

LICENCE TERM

Under the Mining Law, mining exploration plans should be submitted to the Ministry of Knowledge Economy prior to such explorations, and the exploration results should also be submitted within three years thereafter. For the actual extraction, mining licences should be obtained from the Ministry of Knowledge Economy, but no additional permits or licences would be necessary.

Undersea minerals explorations should be approved by the Ministry of Knowledge Economy in accordance with the Submarine Mineral Resource Development Law. The application for such approval should be accompanied by evidentiary materials for such things as the funding, business plan and equipment. The term of such exploration would be limited to 10 years. In order to conduct the actual extraction, a separate licence should be obtained from the Ministry of Knowledge Economy.

8. Injection and pre-closure of CO_2 storage formations

8.1 Introduction

Korea is currently developing and establishing policies on CCS. It appears that there are no specific policies, integrated or generally applicable laws governing the injection and pre-closure of CO_2 sequestration formations.

Laws that may be relevant to the injection, storage and pre-closure of sequestration formations for purposes other than CCS include the Waste Management Law, Law for Promotion of Recycling of Construction Waste, Radioactive Waste Management Law, and Hazardous Substance Safety Management Law. These laws provide the framework of rights and obligations which could govern the storage, installation of storage facilities, and pre-closure management in relation to CCS projects, but this would require adaptation.

The Radioactive Waste Management Law governs the transport, storage, treatment and disposition of radioactive waste, selection of the site, and the construction, management and operation of waste management facilities.

Further, the Nuclear Damage Compensation Law tends to hold the nuclear power providers strictly liable for any damage caused by nuclear power accidents and prescribes the maximum amount of damages. The statute of limitation for such claims would be three years after the day on which the responsible party was identified or 10 years after the date of accident (30 years in the case of bodily injury, death and disease), whichever is earlier.

The foregoing laws are applicable to radioactive waste and nuclear power accidents, respectively, so they are not likely to be directly applicable to the CCS project. However, they may be used as models for CCS regulation in Korea.

8.2 General policy and legislation

8.2.1 Approval processes for sequestration facility closure

CLOSURE APPROVAL PROCESS

The Radioactive Waste Management Law requires that a business plan be submitted in advance for approval by the Ministry of Knowledge Economy for the treatment and disposition (permanent sequestration) of radioactive waste.

The Radioactive Waste Management Law and the Nuclear Damage Compensation Law are applicable to radioactive waste and nuclear power accidents, respectively, so they are not likely to be directly applicable to the CCS project. However, the various laws mentioned above may be used as models for CCS regulation in Korea.

8.2.2 Leakage liability

STANDING TO ENFORCE STORAGE OBLIGATIONS

As explained above, the Nuclear Damage Compensation Law governs the compensation for, inter alia, damage caused by the radiation leakage. The Nuclear Damage Compensation Law tends to hold the nuclear power providers strictly liable for any damage caused by nuclear power accidents and prescribes the maximum amount of damages. The statute of limitation for such claims would be three years after the day on which the responsible party was identified or 10 years after the date of accident (30 years in the case of bodily injury, death and disease), whichever is earlier.

9. Post-closure and long-term storage of CO_2

9.1 Introduction

South Korea is currently developing and establishing policies on CCS. It appears that there are no specific policies, integrated or generally applicable laws governing post-closure and long term storage of CO_2.

Laws that may be relevant to the post closure and long term storage for purposes other than CCS would be the Radioactive Waste Management Law and the Nuclear Power Law, which govern the responsibilities for capture, storage and leakage of radioactive substances remaining after nuclear power generation. It is unclear, however, whether or not such laws would be applicable to CCS projects.

9.2 Evaluation

The legislation outlined above would provide a useful framework for the development of post-closure storage and liability frameworks in South Korea.

10. Summary

CCS policies and laws are at an early stage of development in South Korea. The New Energy Growth Engine policy promises to provide a useful policy framework for the development of CCS technologies in South Korea and the assessment of potential CCS storage sites in South Korea.

South Korea has already implemented environmental, waste management sustainability legislation which could provide a platform for regulation of the CCS project cycle in South Korea.

11. References

11.1 Legislation and Regulation

11.1.1 International

Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, as modified by the Protocol of 1996, opened for signature 29 December 1972, 1046 UNTS 138 (entered into force 30 August 1975).

Kyoto Protocol to the *United Nations Framework Convention on Climate Change*, opened for signature 11 September 1997 2303 UNTS 148 (entered into force 16 February 2005).

United Nations Framework Convention on Climate Change, opened for signature 9 May 1992, 1771 UNTS 107 (entered into force 21 March 1994).

11.1.2 Legislation and Regulation

Aggregate Extraction Law. (Enacted on December 14, 1991, last amended on March 28, 2009).

Atmospheric Environment Preservation Law. (Enacted on August 1, 1990, last amended on May 21, 2009).

Hazardous Substance Safety Management Law. (Enacted on May 29, 2003, last amended on June 5, 2008).

High-Pressure Gas Management Law. (Enacted on February 7, 1973, last amended on February 29, 2008).

Law for Promotion of Recycling of Construction Waste. (Enacted on December 31, 2003, last amended on February 29, 2008).

Law on Preservation of Water Quality and Ecosystem. (Enacted on August 1, 1990, last amended on May 21, 2009).

Law on Regulation of Noise and Vibration. (Enacted on August 1, 1990, last amended on March 21, 2008).

Maritime Scientific Investigation Law. (Enacted on January 5, 1995, last amended on February 29, 2008).

Mining Law. (Enacted on December 23, 1951, last amended on December 31, 2008).

Nuclear Damage Compensation Law. (Enacted on January 24, 1969, last amended on February 29, 2008).

Radioactive Waste Management Law. (Enacted on March 28, 2009, no amendment since the enactment).

Rules on Safety of Petroleum Mines. (Enacted on May 4, 1979 (Ministry of Energy and Resources Decree No. 0019), last amended by the Ministry of Knowledge Economy Decree No. 0001 on March 3, 2008).

Submarine Mineral Resource Development Law. (Enacted on January 1, 1970, last amended on February 29, 2008).

Urban Gas Management Law. (Enacted on December 5, 1978, last amended on December 26, 2008).

Waste Management Law. (Enacted on December 31, 2003, last amended on December 21, 2007).

11.2 Other sources

Ministry of Government Legislation, *Low-Carbon Green Growth Basic Law,* Ministry of Government draft Legislation relating to CCS policies (in Korean), February 27, 2009, available at: http://inglaw.moleg.go.kr/PS/lbicInfoR.do?topMn=02&lbicId=1000000001278&dataType=LMPLN#vmCncStp.

Presidential Committee on Green Growth, *Low-Carbon Green Growth Basic Law,* Draft legislation relating to CCS policies (in Korean), May 12, 2009, available at: http://www.greengrowth.go.kr/userBbs/bbsView.jsp.

Ministry of Knowledge and Economy, available at: http://www.mke.go.kr.

New Growth Engine, available at: http://nge.itfind.or.k (this is a temporary website and the official website will become available in mid-August 2009).

Korea Institute of Energy Research, available at: http://www.kier.re.kr.