



<CSLF Technical Group Meeting 2014, Seoul>

Carbon Capture & Storage in Korea

March 25, 2014

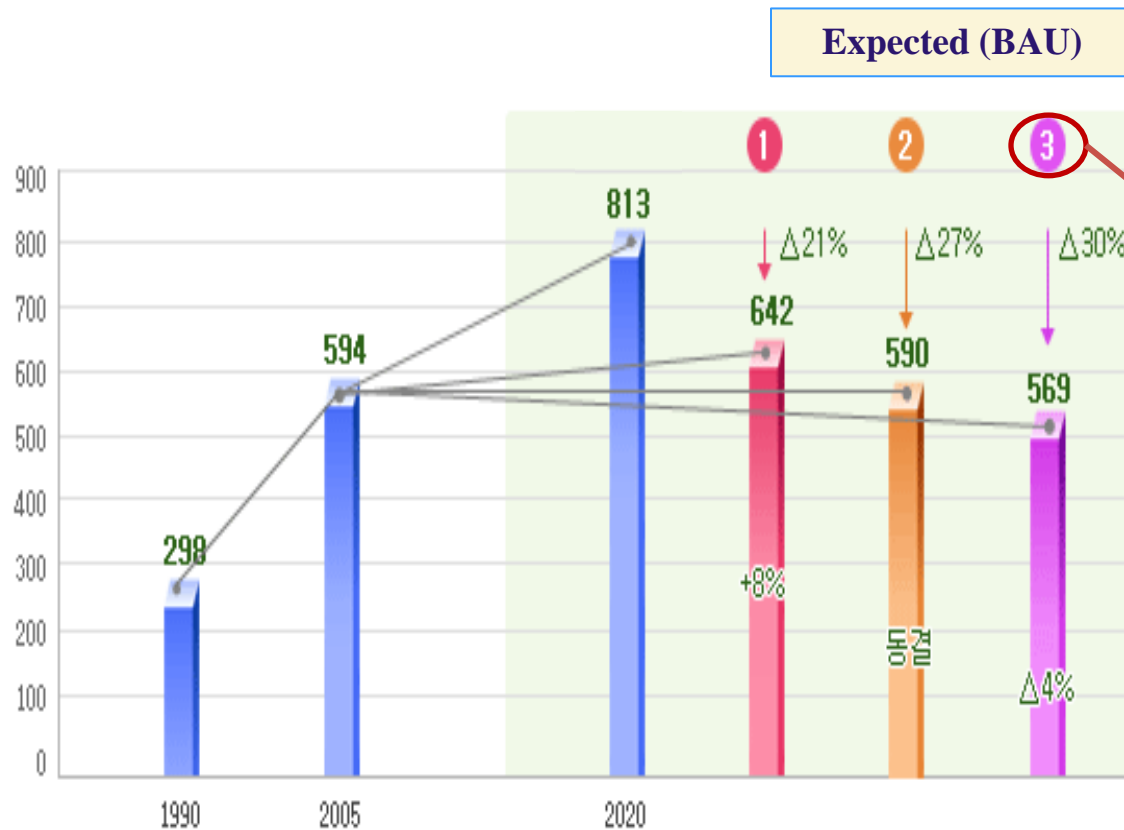
Prof. Chonghun Han

Seoul National University
Korea Carbon Capture and Storage
Association (KCCSA)



Korean National Plan for Reduction of CO2 Emission

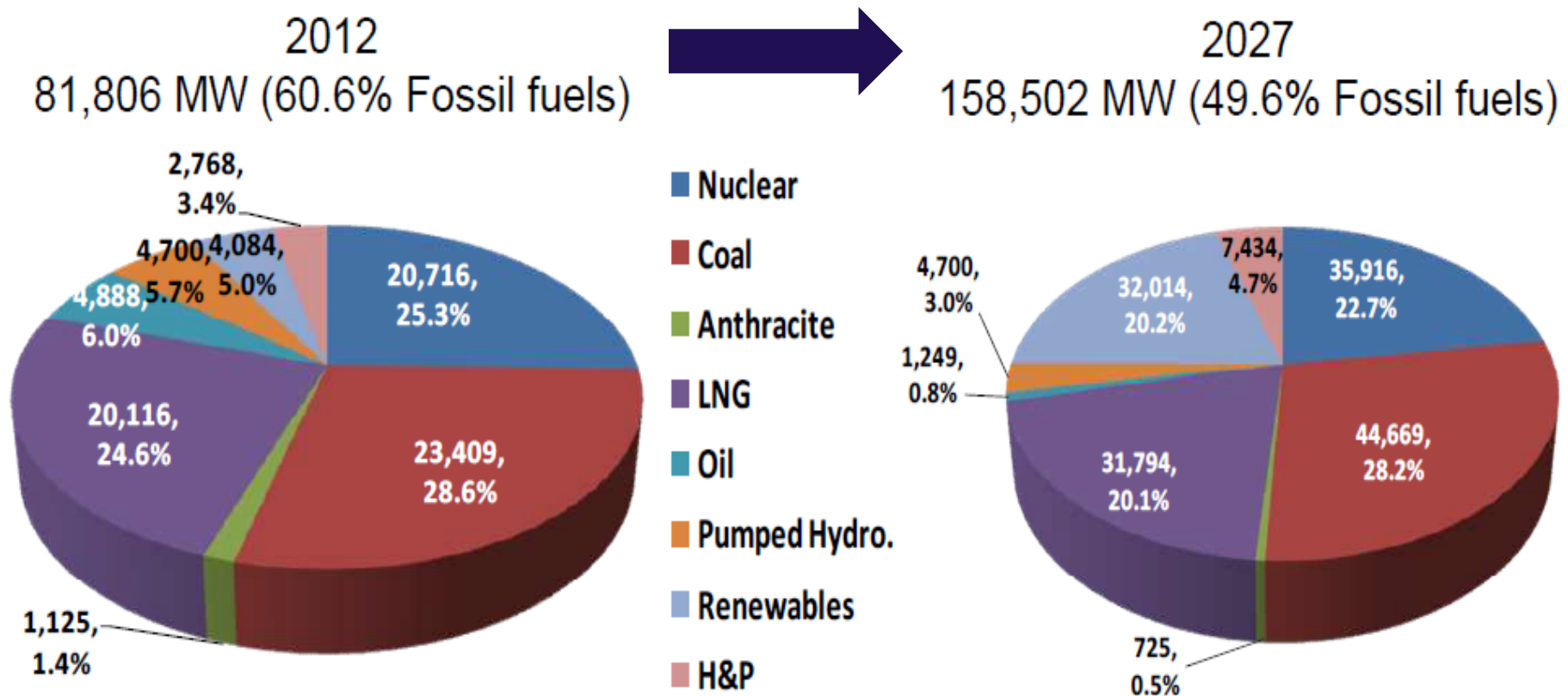
- South Korea : 8th Most GHG Emitting Country (2009)
- Emission Reduction Target :
BAU 30% Reduction of CO2 Emission by 2020 (Nov. 2009)



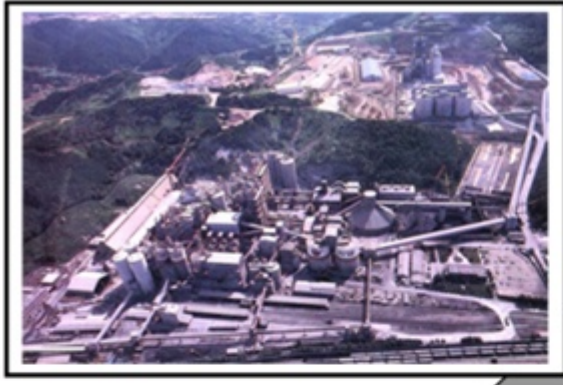
**2009.11 Cabinet Meeting:
(BAU 30% Reduction)**

Electrical Capacity in Korea (2013-2027)

● MOTIE's The 6th Electricity Supply and Demand Program (Feb. 2013)



Major Carbon Gas Emission Sources in Korea



Cement

40 million tons/yr



Iron & Steelmaking

**POSCO Kwangyang
3.2 million tons/yr**



Power Plants

KEPCO 158 million tons/yr

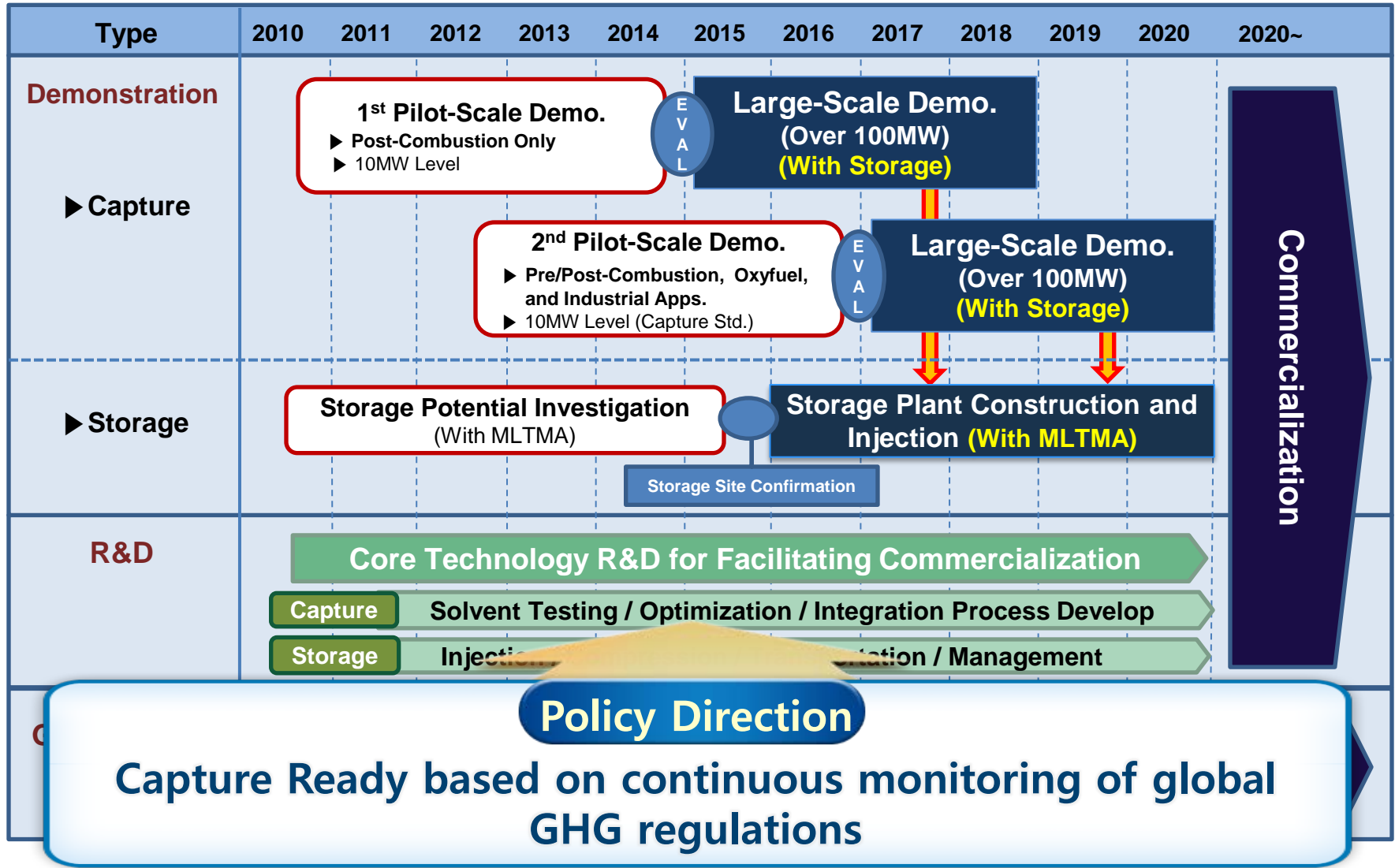


Petrochemical

40 million tons/yr

Korean National Roadmap for CCS

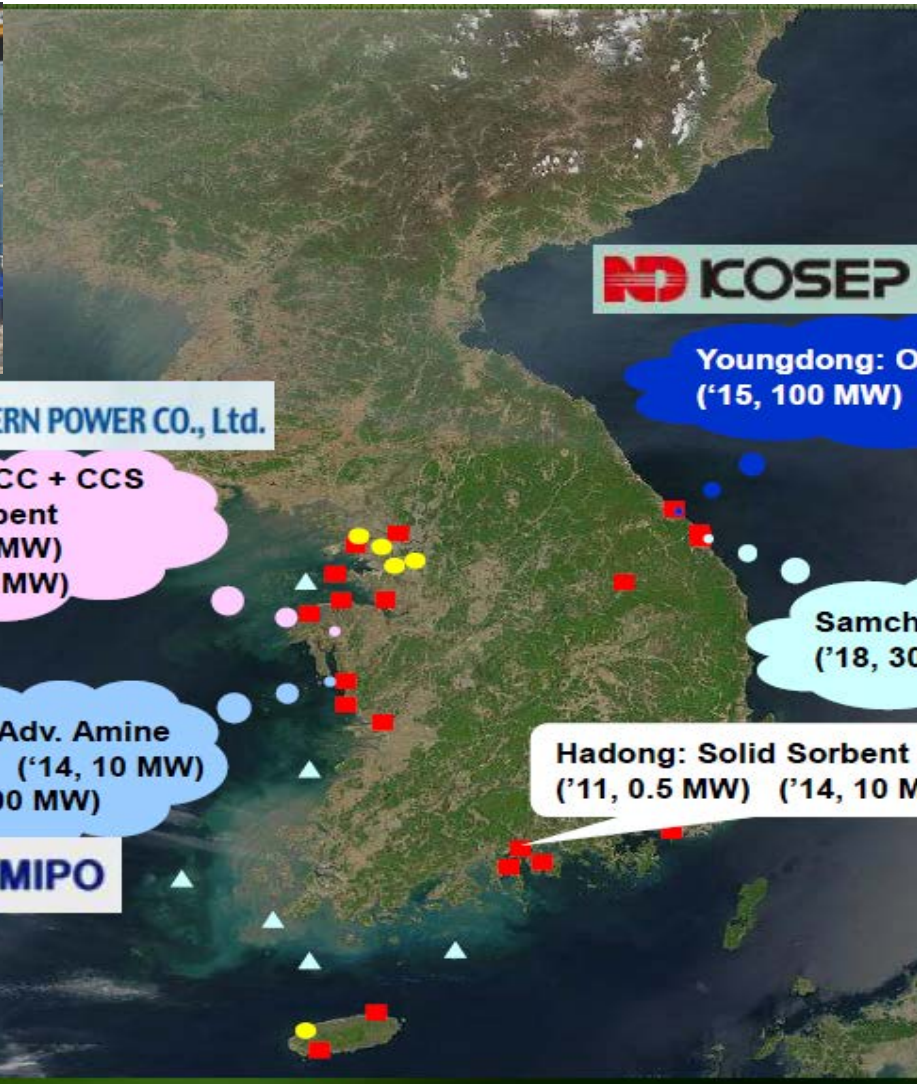
(2009)



Demo Sites of CO₂ Capture Plants



wp KOREA WESTERN POWER CO., Ltd.



KOSEP



Youngdong: Oxy-Fuel ('15, 100 MW)

Taeon: IGCC + CCS Solid Sorbent ('18, 1-10 MW) ('18~, 300 MW)

Samcheok: Solid Sorbent ('18, 300 MW)



Boryeong: Adv. Amine ('10, 0.1 MW) ('14, 10 MW) ('18, 500 MW)

Hadong: Solid Sorbent ('11, 0.5 MW) ('14, 10 MW)

KOSPO 한국남부발전주

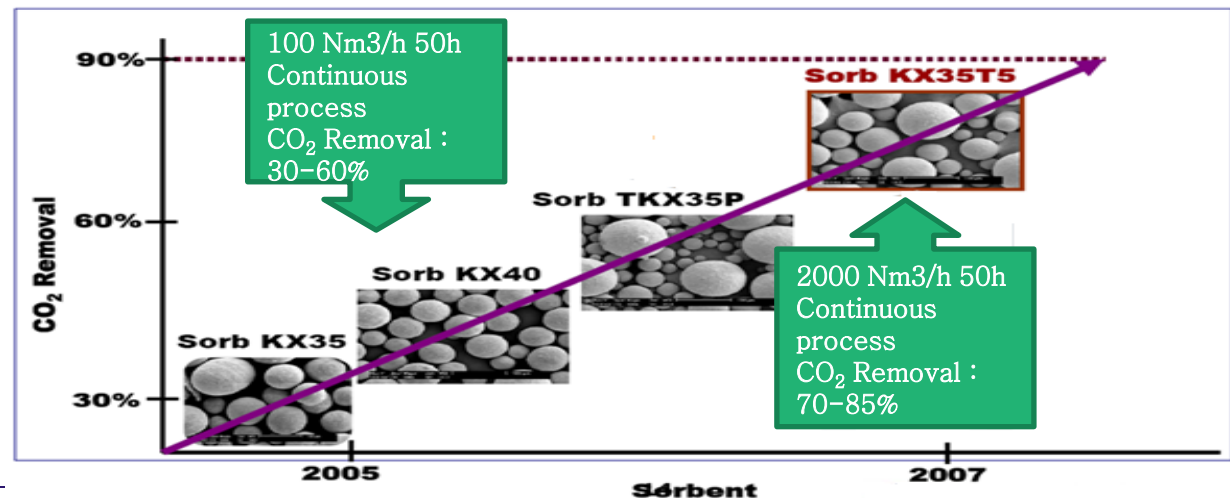
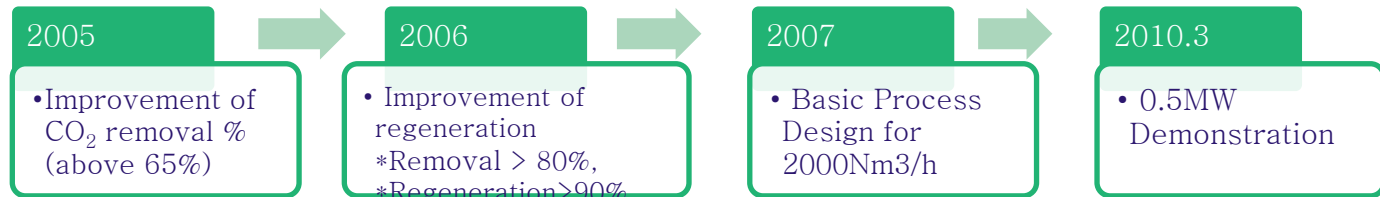
KOMIPO



Ongoing CCS Projects in Korea

● Dry Re-generable Solvent

- 0.5MW Test Bed Constructed (2010. 3)
 - 10MW Pilot Plant (2014)
 - 100~300MW Demonstration Plant (2018)



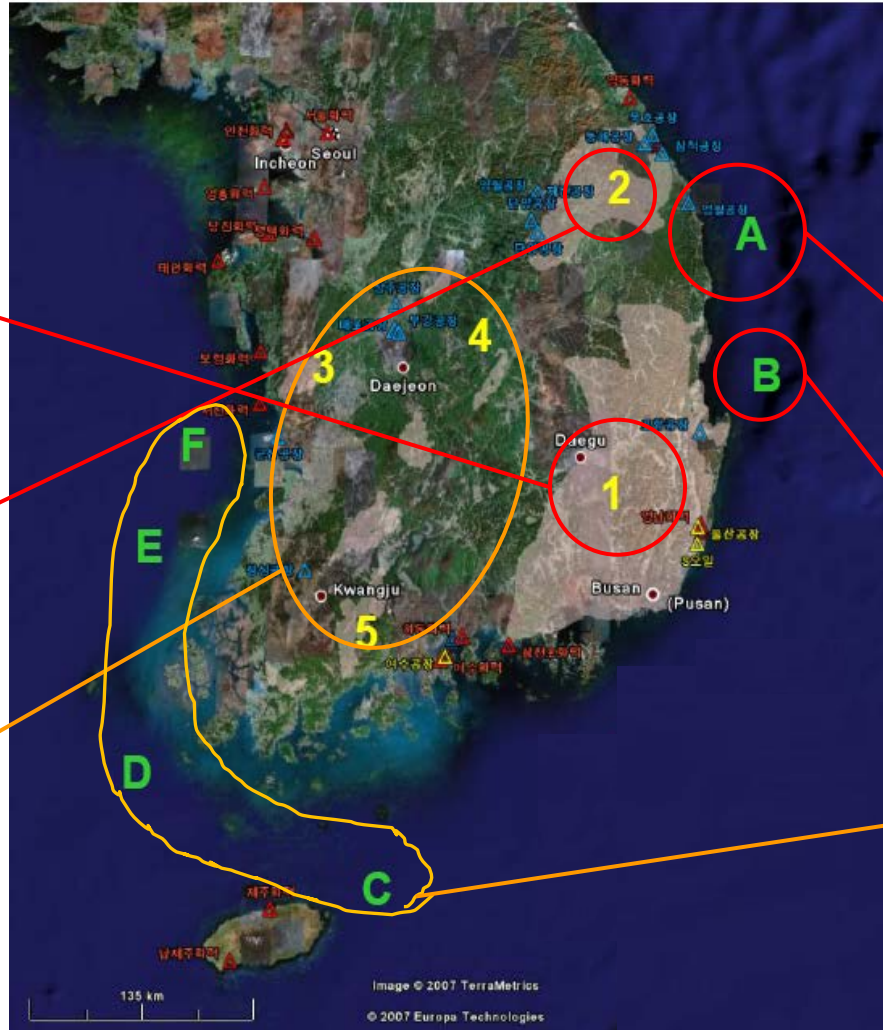
Potential CO₂ Storage Sites in Korea

Underground Storage
(1.8 billion ton estimated)

Kyongsang Basin
680 million ton
Priority Rank 1

Taebaek Basin
180 million ton
Priority Rank 2

3: Chungnam Basin
4: Moonkyung Basin
5: Honam Basin
Priority Rank 3



Undersea Storage
(Expected to have great storage potential)

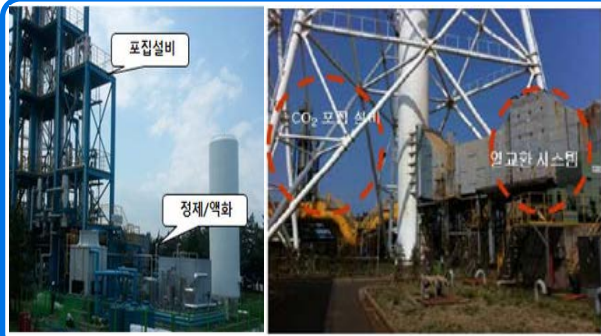
Ulleung Basin
(Dolgorae Gas field)
Priority Rank 1

Pohang Basin
Priority Rank 2

C: Chuju Basin
D: Haenam Basin
E: Kyukpo Basin
F: Koonsan Basin
Priority Rank 3

Industrial Applications of CCS in Korea

● As alternatives for storage,



CO2 capture in Steel industry (POSCO)

[27 million(USD), 2009~2014]

- Capture CO2 from blast furnace using ammonia liquid (10 ton/day, 0.5MW equiv)
- Purification/liquefaction process integrated with capture facility
- Production of liquid CO2 using the capture facility (3 ton/day)



CO2 conversion using microalgae (Korea District Heating Co.)

[11 million(USD), 2012~2017]

- CO2 fixation through microalgae photosynthesis
- Conversion of CO2 into high value-added products (astaxanthin)
- Developing photo-culture process (1 ton)



Green Polymer (SK)

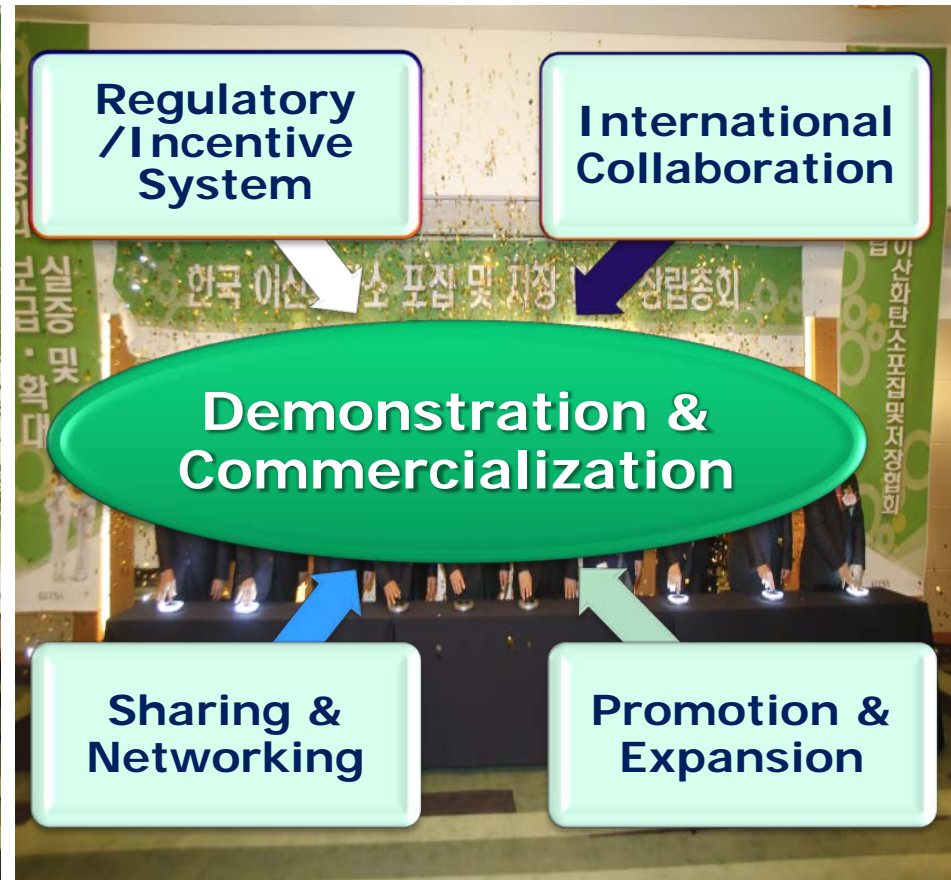
- Convert CO2 into polymerized compound and produce plastic
- Aims for commercialization in 2014

Korea CCS Association (KCCSA)

National CCS Master Plan (July 2010)



Goal and Roles (KCCSA)



Members of KCCSA: All Major Players in Korea



CO₂ EMISSION



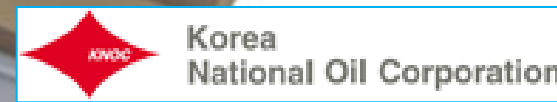
CO₂ CAPTURE



CO₂ TRANSFER



CO₂ STORAGE



* Newsletter recipients (bimonthly): 62,000

Active Participation in International CCS Networks



*IEA-GHG: International Energy Agency GreenHouse Gas R&D Program
 *CSLF: Carbon Sequestration Leadership Forum
 *CO2CRC: CO2 Cooperative Research Center
 *CCPP: Climate Change Policy Partnership, Duke University

*GCCSI: Global CCS Institute
 *CCSA: Carbon Capture Storage Association
 *NETL: National Energy Technology Laboratory
 *MIT CSI : MIT Carbon Sequestration Initiative

Summary

- **CCS will play an important role in CO₂ emission reduction.**
- **Large scale integration projects (LSIP) may be postponed until international regulation on CO₂ emission is to be effective.**
- **Capture-Ready may be required for new power plants in the future.**
- **Korea will keep investing in CCUS R&D.**
- **Korea needs international collaboration in CCS in general, and Storage in particular.**

Thank you

KCCSA

한국이산화탄소 포집 및 저장협회

Korea Carbon Capture and Storage Association

KCCSA

CCS 상용화와 산업화를 지원하는
한국 이산화탄소 포집 및 저장 협회

- Email : kccsa@kccsa.or.kr
chhan@snu.ac.kr
- Tel : +82-2-888-1022
- KCCSA Homepage
<http://www.kccsa.or.kr/>

