New and Renewable Energy in Korea

- Best Practices in Policy and Deployment -

May. 2015

Sang Keun YU(Gavin)

New & Renewable Energy Center(NREC)
Korea Energy Management Corporation(KEMCO)

Contents

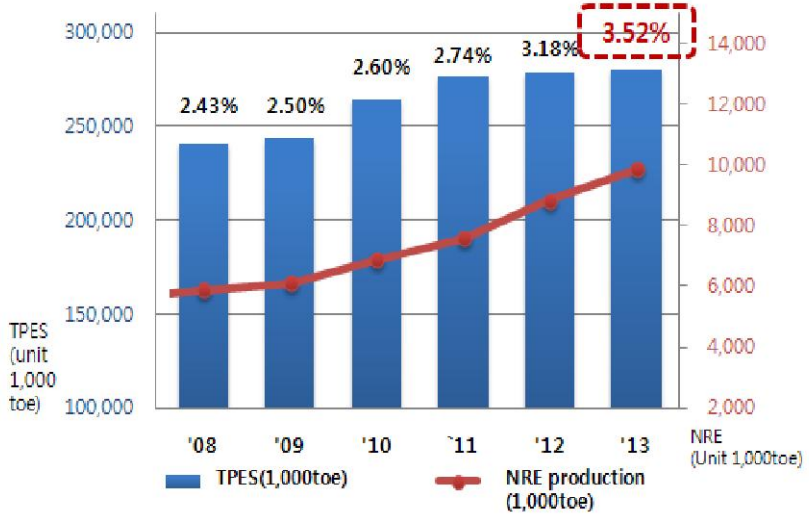
NRE: New and Renewable Energy

I The Status of New & Energy In Korea

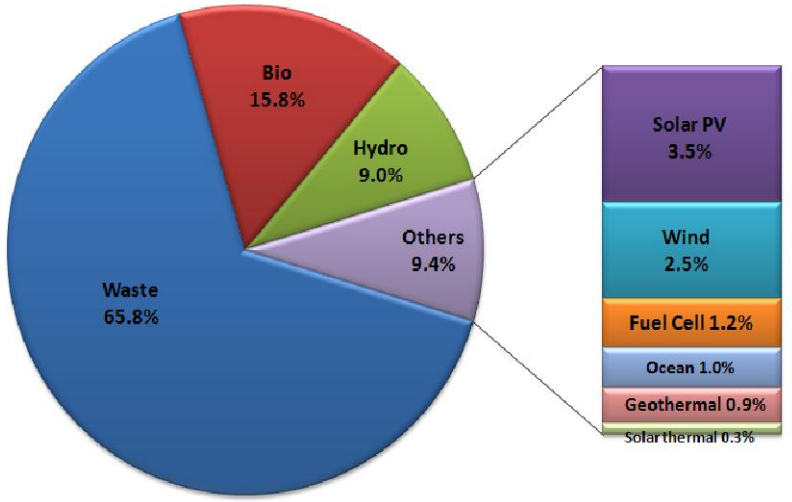
1. The Status of New and Renewable Energy

- NRE Share in TPES: 3.52% (2013)
  - TPES(280,290 Thousand TOE) vs. NRE Supply(9,879 Thousand TOE)
- **NRE** supply has been increased by annual average of 11.0% (2008-2013)
  (while annual average of TPES growth is 3.1%)

NRE Share in TPES



NRE Supply by Sources



RE : 8 Sources

- PV, Solar Thermal, Wind, Waste, Bio(LFG, Bio-Fuels), Hydro, Geothermal, Marine

New Energy : 3 Sources

- Fuel-cell, Hydrogen, Coal Liquefaction or Gasification

2. 2015 Hydrogen & Fuel cells R&D Budget

(Unit /million USD)

		2014 budget	2015 budget
Research project expenses		1728.9	1673.6(▼)
New & Renewable Energy supply business		444.42	418.949(▼)
R&D whole budget		527.5	508.0(▼)
Hydrogen Fuel cells R&D	Eco-friendly Demonstration Complex	1	5(▲)
	New & Renewable Core Technology R&D	31.766	29.551(▼)
	New & Renewable Convergence Technology R&D	-	1
	Global R&D	0.668	0.632(▼)

✓ **In the 2015, Electric power industrial foundation spend 3806.5** million USD

It increased 20.9% ▲ over than 2014 plans. (656.9 million USD)

✓ **Research project expenses was decreased to** million USD

It decreased 3.2%▼ lower than 2014 plans. (53.3 million USD)

✓ **508.0** million USD **(30% of whole budget) supports for R&D business** to solve the pending issues and strengthen competitiveness of electric power industry.

3. Deployment of Fuel Cells(2013)

Fuel Cells Supply(toe)

Total	**122,416**
Self-consumption	4,068
Commercial	118,348

** 1.2% of total NRE Supply*

Fuel Cells Power Generation(MWh)

Total	**578,578**
Self-consumption	17,688
Commercial	560,890

** 2.7% of total NRE Power Generation*

II Main Policies and Strategies in New and Renewable Energy

4. Main Policies and Strategies in NRE

▸ Budget for 2015 NRE Deployment and Infrastructure: 562.2 million USD
- (Deployment: 553.5 million USD ; Infrastructure : 8.7 million USD)

Function	Object	Method	Program	2015 Budget (Unit: 1 million USD)
NRE Deployment Program	Private Sector	Subsidy	Home Subsidy Program (1 Mil. Homes)	54.9
			Building Subsidy Program	22.5
			Feed-in-Tariffs (FIT)	336
			Overseas Business Support	4.5
		Loan	Financial Support Program	103.4
		Mandatory	Renewable Portfolio Standard (RPS)	0.2
	Public Sector	Subsidy	Regional Deployment Program	21.0
			Combined Support Program	10.0
			Establishment of NRE Test-bed	1.0
		Mandatory	NRE Mandatory Use for Public Buildings	-
Infrastructure-building Program	Private & Public Sector	-	Certification, Standardization, and International Cooperation	3.3
			R&D(Policy and Regulation)	5.4
Total				562.2

III

Best Practices –

Deployment & Infrastructure Programs

5. Home Subsidy Program (1 Mil. Green Homes)

Overview

- Home Subsidy Program (1 Mil. Green Homes) subsidizes a portion of installation cost of NRE Facility

※ *Applicable NRE : Solar PV, Solar Thermal, Geothermal, Small Wind, Fuel Cell, Etc.*

Goal and Current Status

- Goal : Expand dissemination of NRE supply for around 10% of total households by 2020
- The Status of Subsidy Program (Dec. 2014) *unit: # of whole types of buildings

2010	2011	2012	2013	2014	2015(Mar)	Total
957	292	245	234	210	2	1,940

- Fuel Cells Deployment(Mar. 2015) : 1,940 places, 1,192kW

Best Practice

- Bot-deul Villiage Apartment with Fuel Cells
  - (2011, Sung-nam City)
  - 27kW, 755 households

6. Building Subsidy Program

Overview

- Subsidize a portion of installation cost of NRE facilities in buildings
  - ※ *Applicable NRE : Solar PV, Solar Thermal, Geothermal, Fuel Cell, etc.*

Current Status

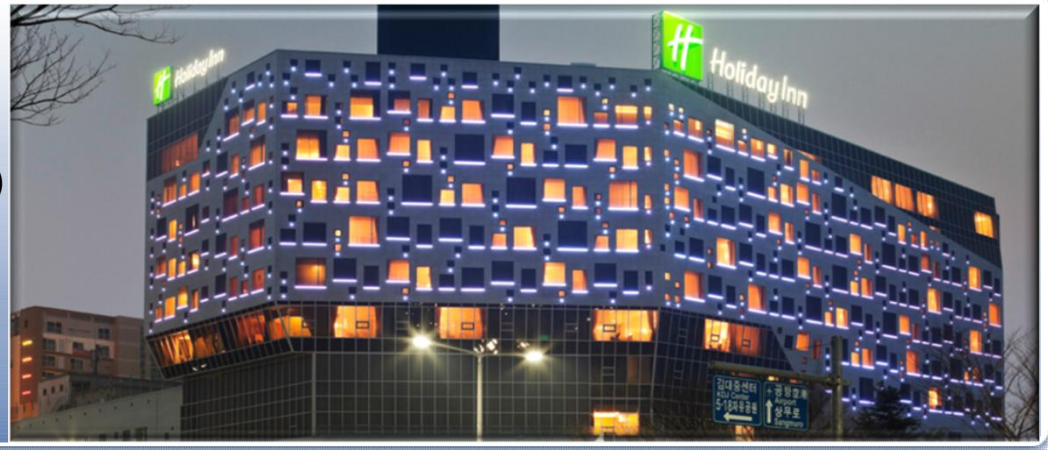
- The Status of Building Subsidy Program (Dec. 2014)

	~ 2009	2010	2011	2012	2013	2014	Total
# of Building	1	13	4	3	10	20	**51**
Capacity (kW)	1	21	16	53	160	391	**642**

- Fuel Cells Deployment(Dec. 2014) : 51 places, 642kW

Best Practice

- Holiday Inn Gwangju Hotel with Fuel Cells(30kW)(2013, Gwangju City)
  - PEMFC, 10kw ×3 Units



7. Feed-in-Tariffs (FIT)

Overview

- Provide the difference in between The standard electricity price And System Marginal Price(SMP) for 15-20yrs.
  *Government regulates the standard electricity price

Current Status

- FIT established early deployment foundation by deploying NRE facilities with the capacity of 1,030MW for 2,089 power plants for 10 years (2001-2011)

- Fuel Cells Power Generation in FIT (2001-2011, 20 Facilities, 50,500 kW capacity)

	~ 2009	2010	2011	Total
Generation (kWh)	77,050	204,672	278,248	559,970

Best Practice

- Meiya Power Company, Fuel Cells Power Plant (4.8MW) (2009, Gwang-yang City)
  - MCFC, 2.4MW × 2 Units

8. Renewable Portfolio Standard(RPS)

Overview

- Enforces 17 power producers to supply certain amount of the total Power generation by NRE (Implemented in 2012)
  - ※ Obligators: power producers with capacity of 500MW or above

Goal and Current Status

- Goal : ('12) 2.0% → ('13) 2.5% → ('14) 3.0% → ('17) 5.0% → ('20) 8.0% → ('22~) 10.0%
- Current Status : RPS achieved 1.7 times of total FIT installed capacity(proceeded for 10 years) in 2 years

RPS('12~'13)	FIT('02~'11)	Rate of change
1,751MW (Solar PV 589MW)	1,030MW (Solar PV 497MW)	170.0%↑(Solar PV 118.5% ↑)

- **[Fuel Cells Power plants in RPS]** 22 power plants (152.2MW capacity, Mar.'15)

Best Practice

- Gyeonggi Green Power Plant(Fuel Cells)
  - 58.8MW(2013, Hwasung City)
  - MCFC / 2.8MW × 21 Units

9. Combined Support Program

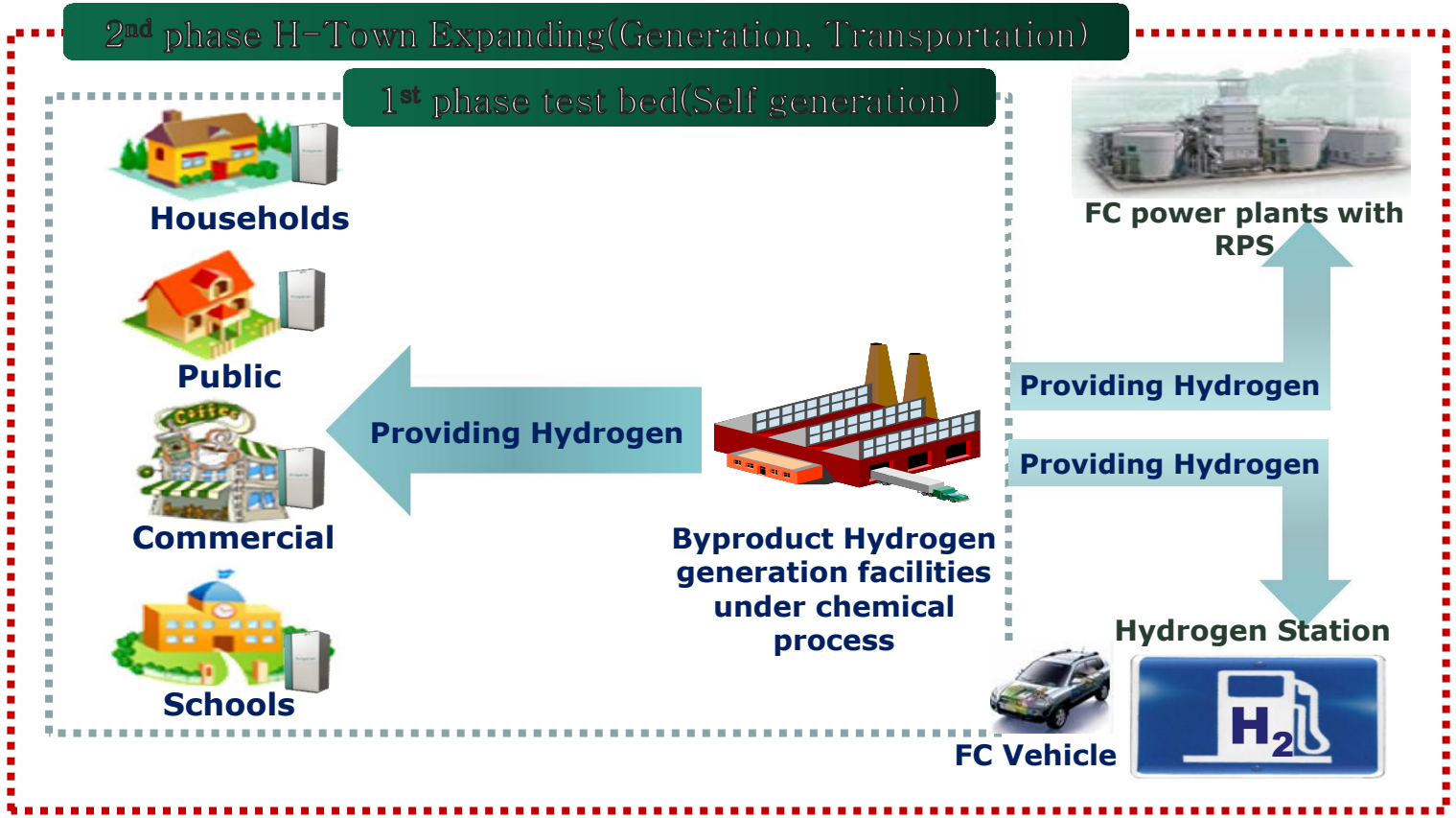
H-Town Pilot Project for Housing

Using byproduct hydrogen in fuel cells (no need for reformers)

- Need for diversification of energy sources and reinforcement of fuel cell's price competitiveness
  → Development of hydrogen fuel cell and expansion in the market
- Ulsan consortium (local government, a hydrogen supply company, 4 manufacturing companies, etc)

* Facilitate 1kw X 140 household, 5kW X 9 public & private buildings, infrastructures, and 10kw X 1 FC advertisement center

** For the households, installed capacity of 195kW in facilities and invested 8.8mil USD



Thank you