Hydrogen town Demo project

2014.6

Korea Hydrogen Industry Association

Junbom Kim

Selected Target Area (Ulsan)

•Uljugun Onsanmyun districts

• Uljugun Cheongryangmyeon Sangnam districts

•Ulsan Seonamdong

Target area	Uljugun Onsanmyun Deoksinri	▪ Moorim P&P company housing : 34 households ▪ LS company housing : 16 buildings 298 households, Two-story building ▪ Korean Paper company housing : 200 households ▪ A lot of shopping center and within 2 km of Onsan national industrial Complexes
	Uljugun Cheongryang myeon Sangnamri	▪ Many schools and Single-family Housing in this area ▪ Petrochemical complex within 2 km
	Namgu Seonamdong	▪ Large city within 1 km of Taekwang industry

Fukuoka Hydrogen Town

Summary of Hydrogen town Demo project

Project name

- 2012 Hydrogen town Demo project

Project goal

- New growth industry development and green city, Implementation of fuel cell field by using pure hydrogen from industry

Project details

- Installed area : Deokksin town, Onsan-eup, Ulsan
  (LS Nikko copper housing and PR building, Onsan-eup town hall)
- Installed capacity : 195kW (1kW 140ea, 5kW 9ea, 10kW 1ea)
- Project period : 2012.8 ~2018.4 (69 months)
  - Installed period : 2012 8.10 ~ 2013.5.31 (9 months 20 days)
  - Operation period : 2013.4.10~2018.4.9 (60 months)
- Budget: 8.7 million$ (government: 5.2, municipalities: 1.8, private:1.7)
- Consortium : Techno Park, Ulsan
  - Project operation and PR building : Techno park, Ulsan
  - Manufacturers of fuel cell : Hyundai Hysco, Fuelcell Power, GS Caltex, Hyosung
  - Safety management : SDG

Target facilities

- **Location : Onsan industrial complex within 3km**
- **Spot : LS Nikko Copper housing** (company housing : 140/296 of household, Gymnasium, Public relation building, etc.) **Onsan town hall**
- **Address : Duksin-ri, Onsan-eup, Ulju-gun, Ulsan**

View of LS Nikko Copper housing

Installed spot of fuel cell

View of Onsan town hall

Application of fuel cell system

- **Supply and installation to hydrogen town 195 kW scale, participating in 4 manufacturers that are producing fuel cell**

1 kW

Fuelcell Power

1 kW

Hyundai Hysco

1 kW

Hyosung

5 kW

GS Caltax

10 kW

Project location of hydrogen town

Construction of Hydrogen infra

- **Plumbing hydrogen within LS Nikko Copper housing**
  - **Plumbing hydrogen for supplying hydrogen fuel at town**
  - **Connection from SPG piping to installed area of fuel cell in front of Onsan hall**

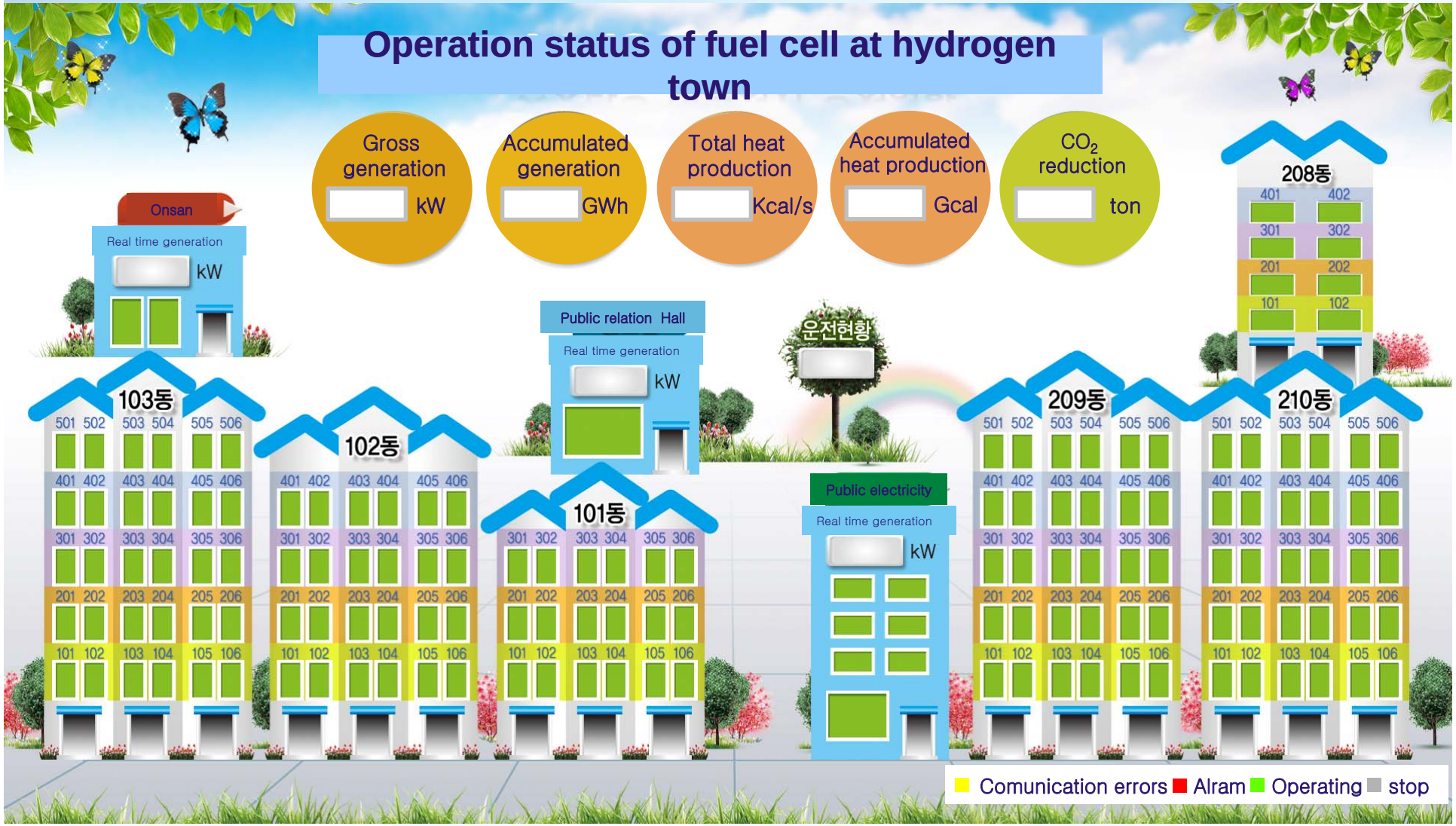
Hydrogen piping at household

Underground plumbing in housing

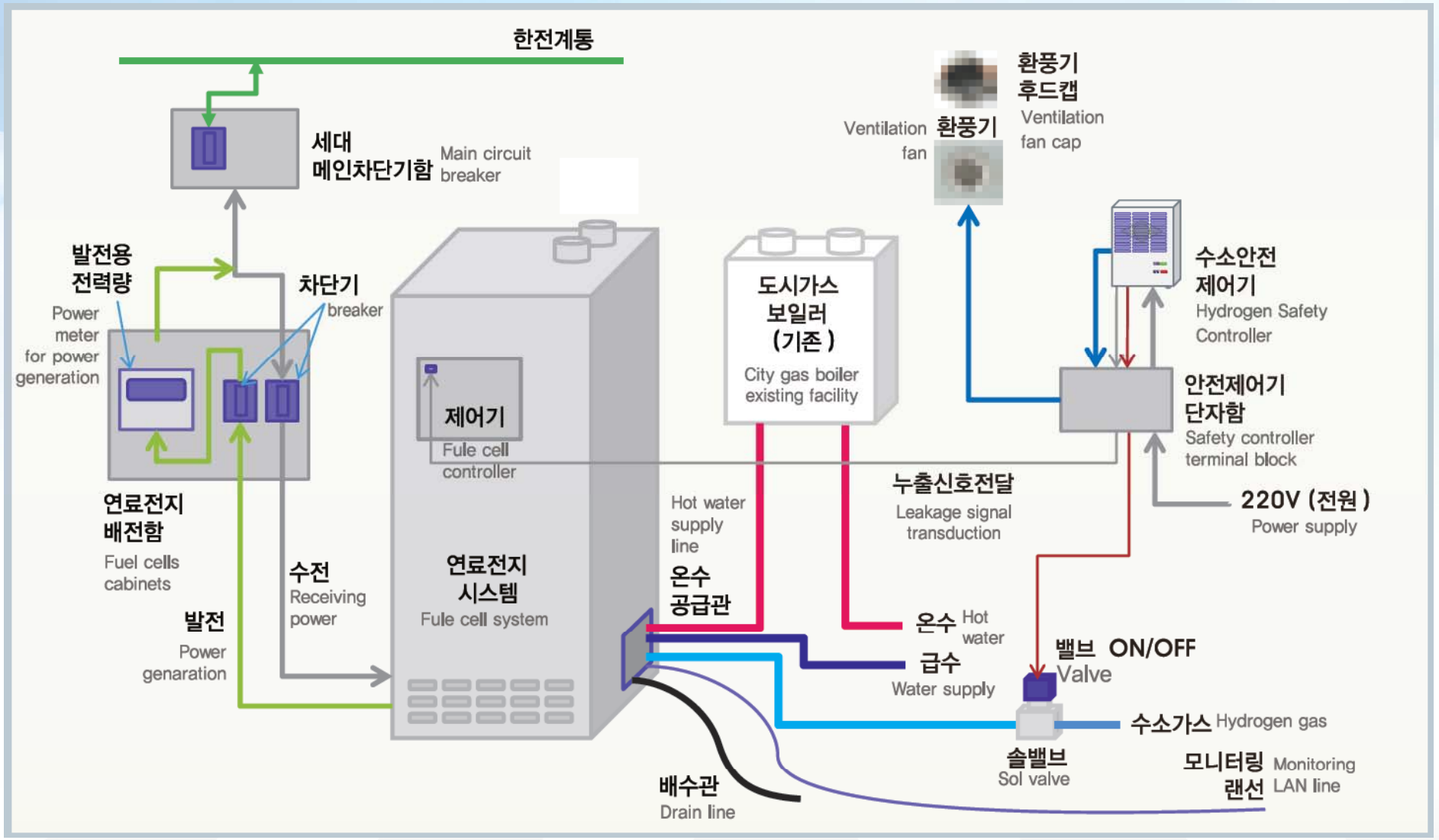
Regulators

Installed status in LS Nikko Copper

Power generation monitoring system



Installation of Fuel cell (System scheme)



Installation of Fuel cell (5kW 6ea & 10kW 1ea)

Installation site in LS-Nikko Copper company house

Panel and fuel cell installation

Pipe connections at basement

Externalhydrogen pipe connections

Installation of Fuel cell (Exhibition hall 5kW 1ea)

Stability

- Hydrogen gas
  : Classified as flammable gases with Methane (city gas)_Article 2 of the Enforcement regulations by high pressure gas safety law
  According to construction of Korea Gas Safety Corporation
  KGS FP211.2.5.1.3_low pressure gas piping material

Test Report for Fuel Cell Certification

: Test report of Korea Gas Safety Corporation's product certification standards
(Ccertification standards for renewable energy equipment)

Installation of various valves and sensors for guaranteed Safety

- Gallery installation for ventilation
- Installation of stack internal/external gas shut-off valves and sensors
- Installation gas pressure alarm devices, internal temperature of the unit and fuel cell stack temperature alarm
- Built-in alarm and auto Shutdown in case of abnormal operation
- Monitoring of remote control systems

Safety Check Inspection

- Gas leakage check (Quarterly)
- Leakage detection of supply manifold : Hydrogen gas meter (every 6 months)
- Check the operating status of gas leakage detector (every 6 months)
- Flowmeter check : Flow calibrator (every 3 years)

*** Safety inspection management for 5 years by SDG**

Hydrogen Town Opening

- July 09, 2013 : Opening ceremony of hydrogen town
- Attendants : About 200
- Major events : Awards, Public relation building admission & cutting ceremony

Hydrogen safety management

<Check Hydrogen at fuel cell room>

에스디지

Hydrogen distribution management company

<Hydrogen check at metering>

Continued Cooperative

<Check Hydrogen in house>

수소타운 안전점검 보고서

제 목	LS니꼬동제련 사택 안전점검보고서		
점검일자	2014년 02월 18일 ~ 03월 18일	작성일자	2014년 03월 19일
장 소	LS니꼬동제련사택, 온산읍사무소	작성자	최 경 환

▶ 점검전선과의 이격거리 부적합 세대
(122가구 / 140가구 부적합, 부적합세대 2/4분기 재확인)

209	101, 103, 201, 302, 404, 503
210	202, 304, 501, 502, 506, 405

▶ 기타 점검내용
- 온산읍사무소 수소 전지실 : 전기콘센트 및 점검전선과의 이격거리 부적합
- 점검 방문시 연료전지에 대한 점검요청이 발생함.
(소음, 부품교체, 연료전지에 대한 신뢰성, 통신에러)

Safety inspection report for every 3 months

Fuel cell system checking Piping management in house

Professional safety manager

<Safety training in house>

Project achievements

- **Major visitors**
  - Hydrogen fuel cell manufacturers, Companies related to hydrogen production, supply and distribution
  - Related organizations of Seoul, Pohang, Gyeongbuk & others
  - College students and the general public
  - Environmental NGOs
  - The Press

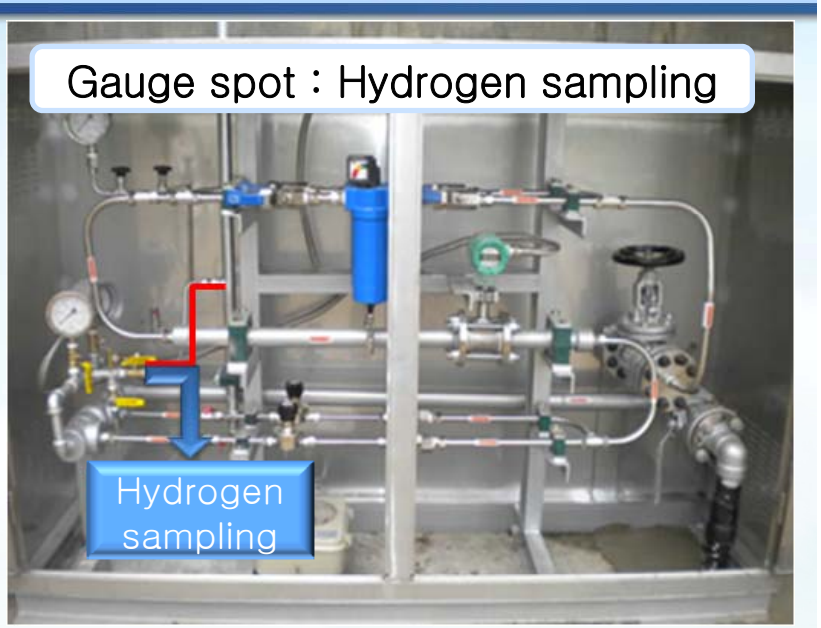
[Environmental NGOs]

Project 2014 (Facility)

Installation of Hydrogen analysis equipment

- Installing valve for final quality analysis of Hydrogen supplied to hydrogen town
- Installation site of sampling valves : Total 3 points, 2 gauge spots (Onsanmyun office, LS-Nikko Copper), Fuel cell Exhibition hall

Gauge spot : Hydrogen sampling

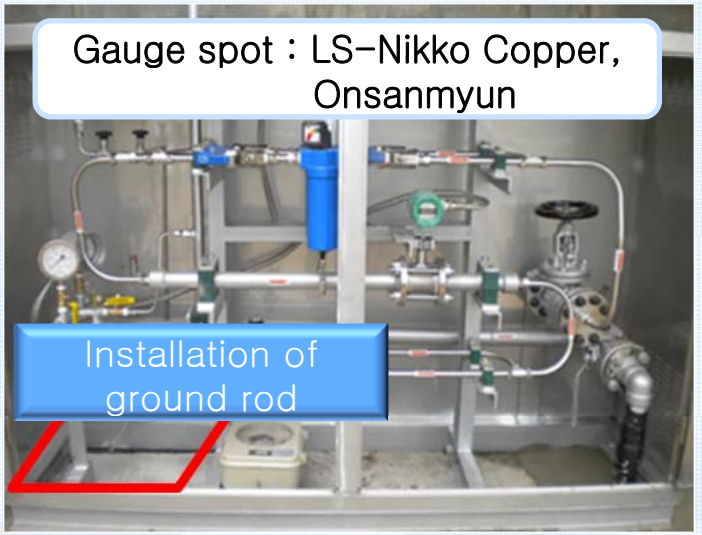


Exhibition hall: Hydrogen sampling

Antistatic device

- Installation antistatic device in LS-Nikko Copper, Onsanmyun

Gauge spot : LS-Nikko Copper, Onsanmyun



Expected Benefits

Economic effects

- Annual fee savings of LS-Nikko Copper company for 140 housing residents : about 40 thousands $
- Annual energy production 2,637 MWh (1,623 MWh/yr. + 1,014 MWh/yr.)
- Energy cost savings of about 41% less than using fossil fuel
- Cost reduction of 24% compared to fuel cell using LNG

Environmental improvement effects

- When installing 195kW of pure hydrogen fuel cell, annual replacement of fossil energy 331.4 TOE (1.789toe/kW × Fuel cell operating ratio(95%) × 195kW = 331.4toe)
- Annual greenhouse gas (carbon dioxide) emissions reductions 991.9 TCO2
- The effects of planting young pine trees 3,816,000

Other effects

- Industrial development and foundation for industrialization related in new market of hydrogen fuel cell
- Operational experience gained by various data acquisition systems of hydrogen town
- Leading city image to green environment and enhancing technology
- Promotion and education effects related Hydrogen energy

Thank you for your attention !

Kim, Junbom
82-10-5444-2833
jbkim@ulsan.ac.kr

Hangsoo, Woo
82-52-19-8781
hswoo@utp.or.kr

울산테크노파크 Ulsan Technopark · HYUNDAI HYSCO · FCP 퓨얼셀파워 FuelCellPower · GS 칼텍스 · HYOSUNG · 에스디지