

Green Energy Policy of Korea



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1 Overview of Korea Energy Agency



- **1980** Establishment of the Organization (Previous name was **KEMCO** until 2015)
- **1987** Foundation of Alternative Energy Center (renamed to **New and Renewable Energy Center**)
- **2005** Opening of **GHG Reduction Registry Office** and **UN CDM Verification Body**
- **2012** Opening of **Green Building Architecture Center**
- **2016** Opening of **Vehicle Energy Testing Laboratory**

Organizations 4 Executive Directors, 1 Renewable Center, 12 Regional Headquarters (Employees: 507)

Budgets (2016) 1,227 million USD (Operation budget \$62 million, Project subsidy and loans \$1,165 million)

Major Activities



Delivering Sectoral Energy Efficiency Services:
Industry, Buildings, Transport, Power and Appliances



Accelerating New and Renewable Energy Deployment:
Policy Support, Industrial Promotion, Dissemination



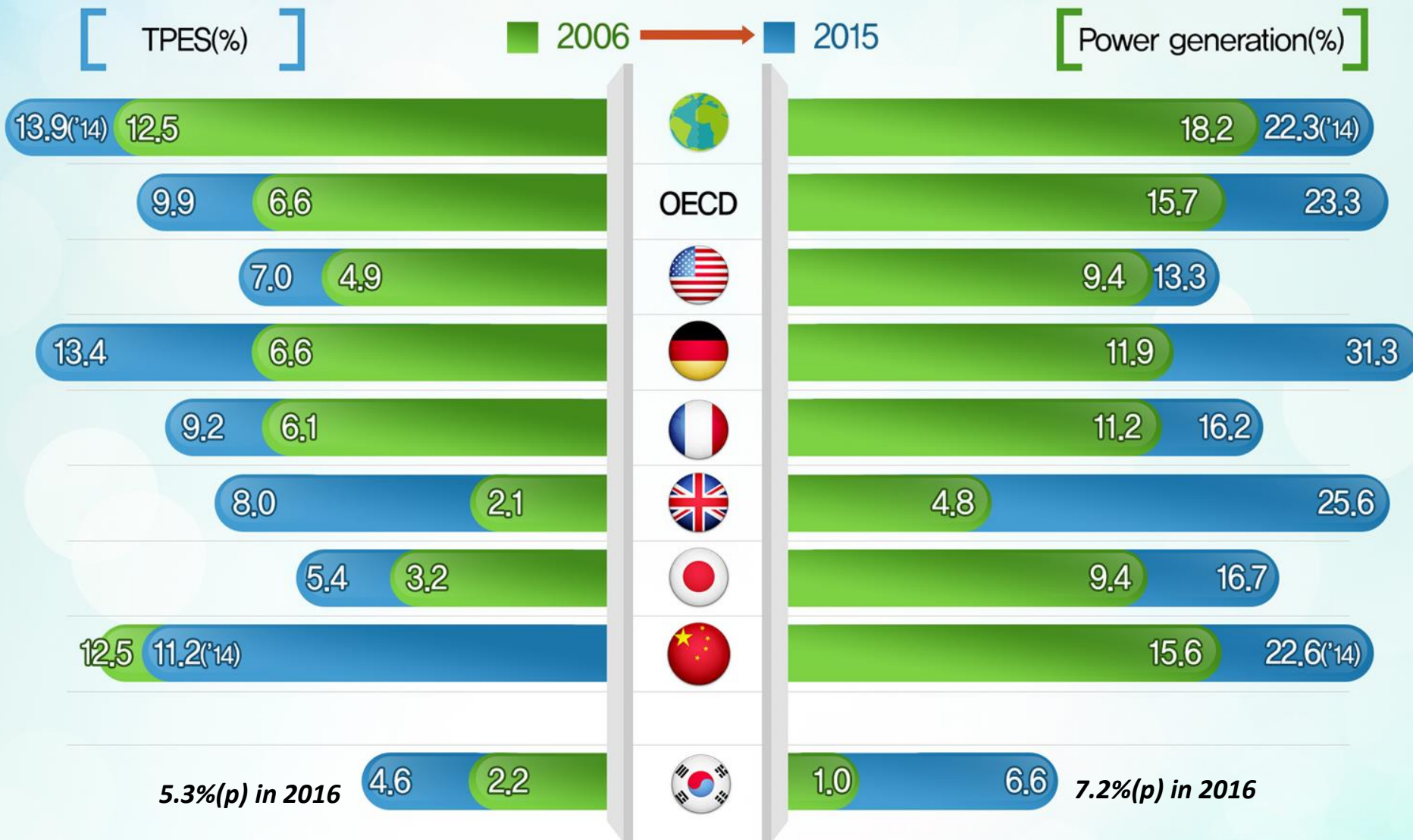
Establishing Greenhouse Gas Reduction Scheme:
Emission Trading and Target Management, Survey and Analysis



Communication and Cooperation:
*Energy Welfare, Training and Education,
Energy Saving Culture, International Cooperation*

2 Global Trend of Renewable Energy

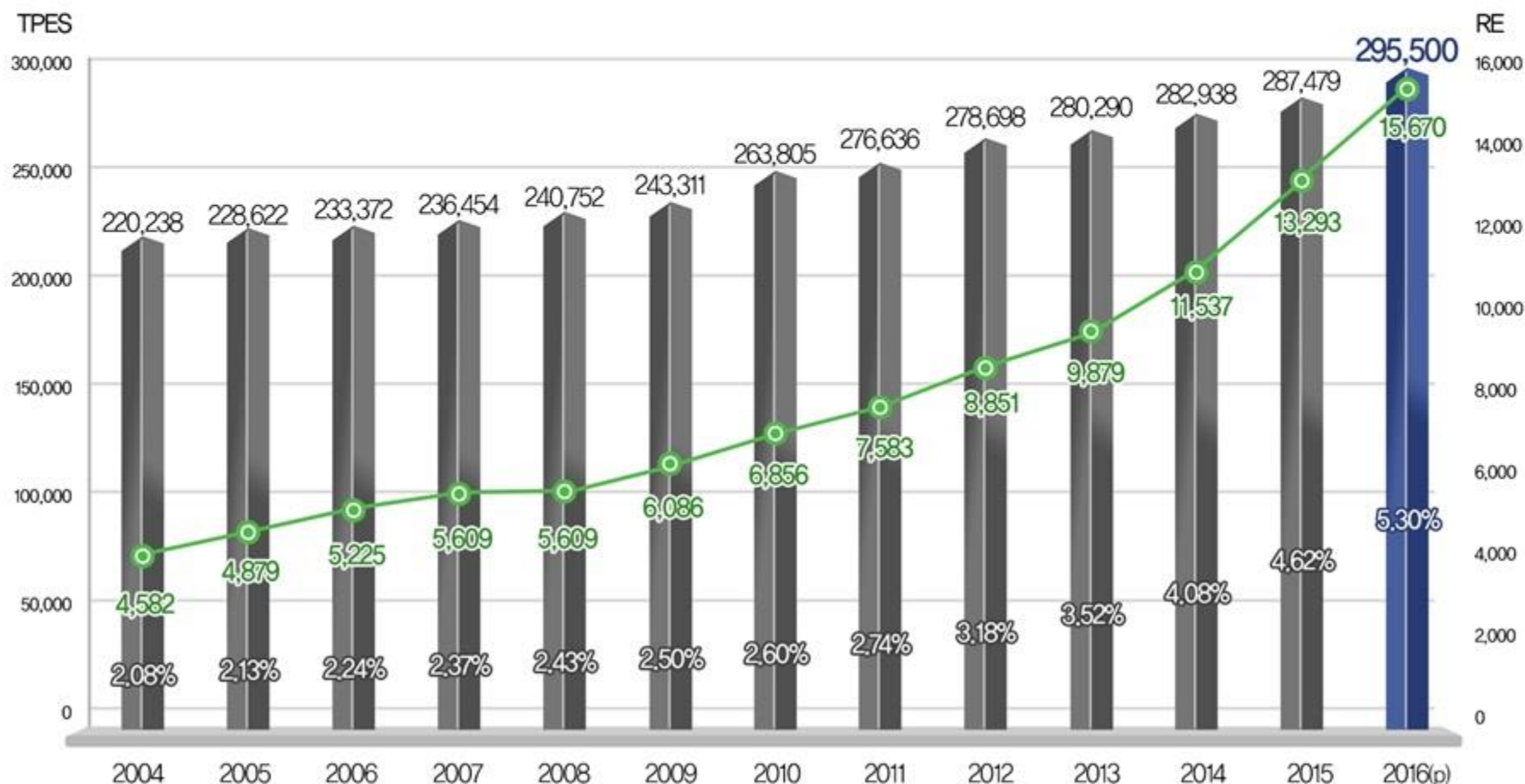
RE Deployment



* Source) World Energy Balances 2016(IEA), Korea Energy Agency

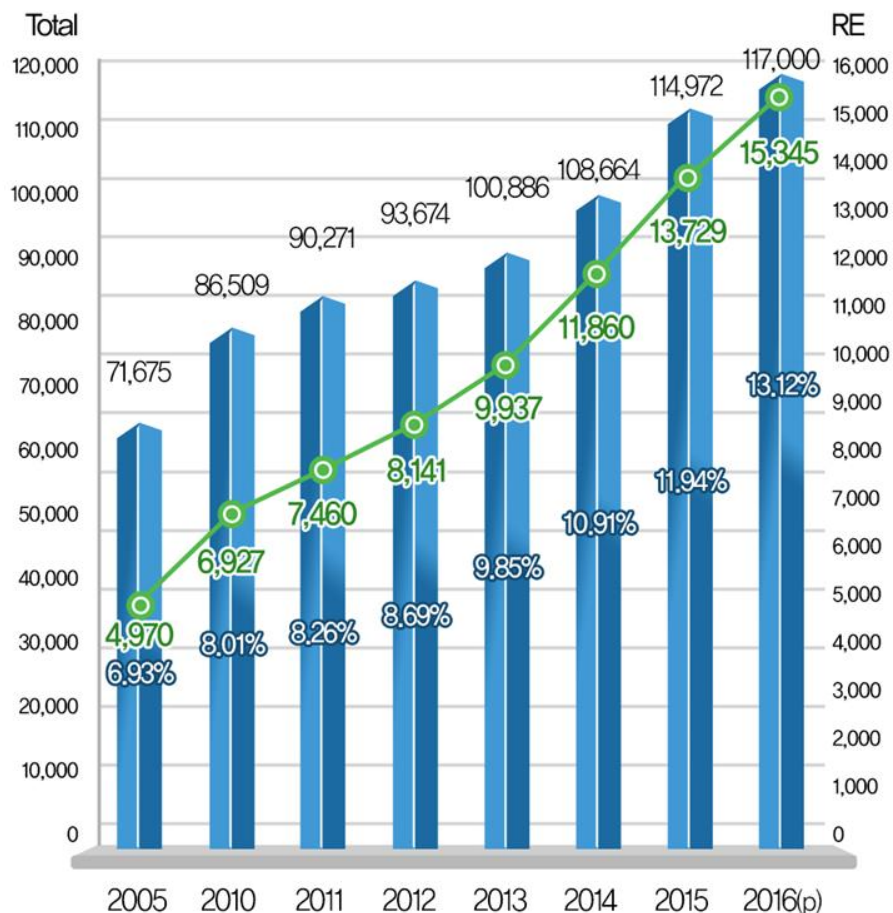
■ Renewable Energy Supply(TPES)

■ TPES(1,000toe) ■ Renewable Energy Supply(1,000toe)

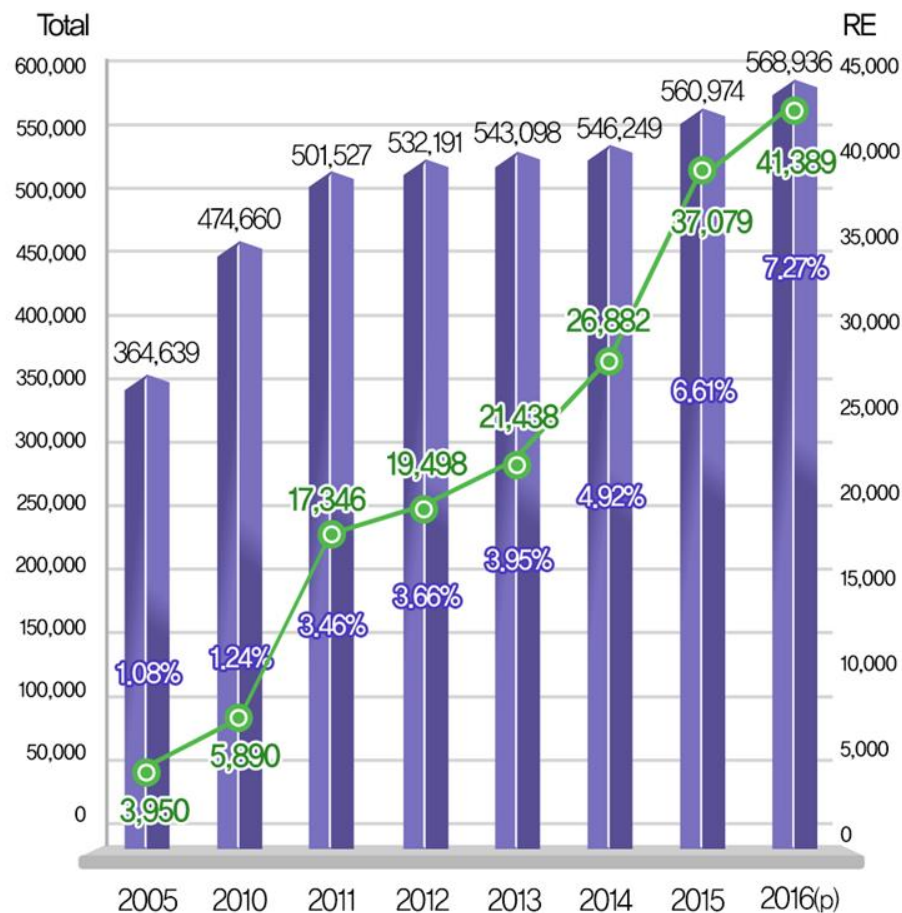


Renewable Energy Capacity & Power Generation

■ Total Power Generation Capacity(MW)
■ Renewable Energy Power Generation Capacity(MW)



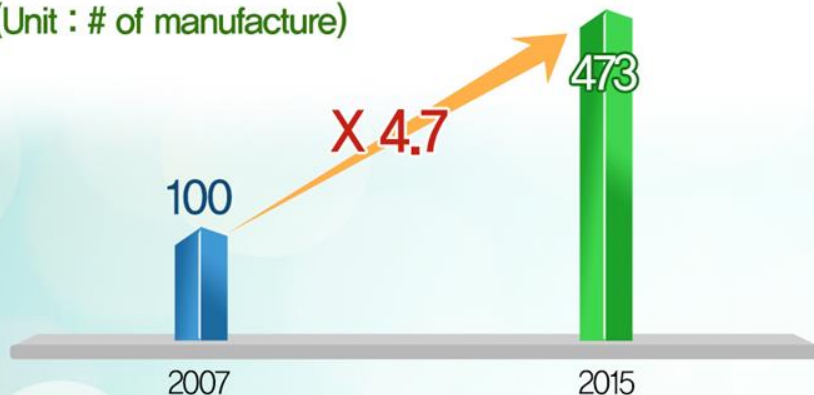
■ Total Power Generation(GWh)
■ Renewable Energy Power Generation(GWh)



■ Renewable Energy Industry(2007 → 2015)

Companies

(Unit : # of manufacture)



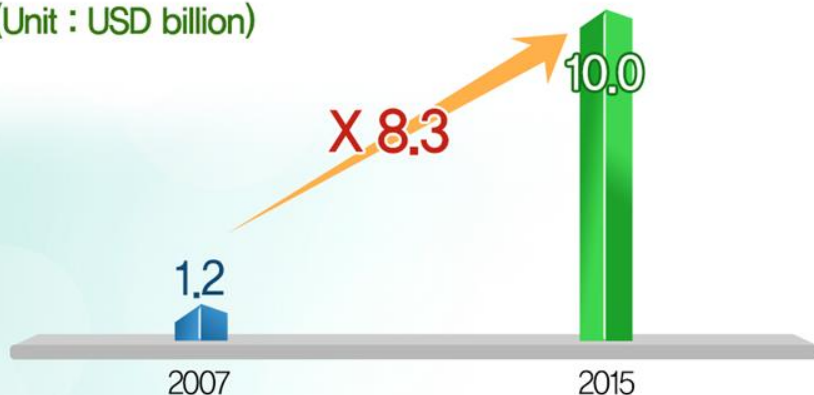
Employment

(Unit : # of employment)



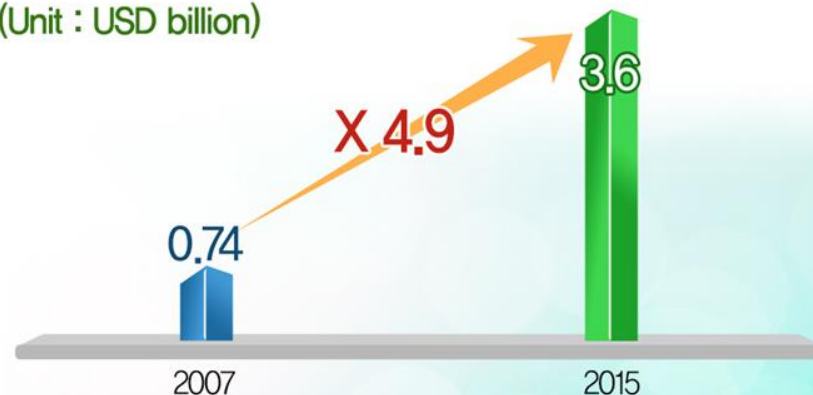
Sales

(Unit : USD billion)



Export

(Unit : USD billion)



4 Korea's Renewable Energy - PV

■ Status of PV industry in Korea

○ PV export(hundred Million Dollars)



○ Capacity of Korean PV enterprises

Cell

① Hanwha Q Cells(5,200MW/year, World 1st rank)

PERC(Passivated Emitter and Rear Cell)
Efficiency 19,5%, 1st commercialized for
Polycrystalline Cell

② LG Electronics(1,100MW/year)

22% efficiency for N-Type Monocrystalline
Bifacial Cell

③ Hyundai Heavy Industries(600MW/year)

④ Shinsung E&G(600MW/year)

21,7% efficiency of Monocrystalline PERC cell

Polysilicon

① OCI(52,000ton/year, World 3rd rank)

② Hanwha Chemical(15,000ton/year)

③ Hankook Silicon(15,000ton/year)

Module

○ Global production capacity 10GW

○ Domestic production capacity 6.4GW

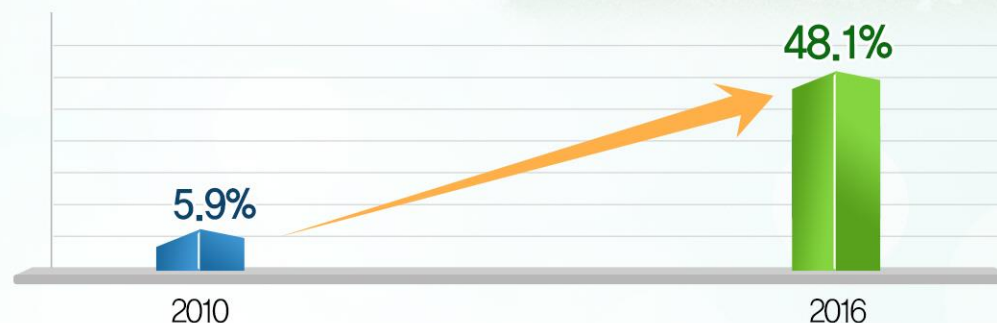
■ Status of Wind industry in Korea

○ 1,031MW installed by 2016

- Onshore wind : 77 sites, 519 turbines, 996,22MW
- Offshore wind : 3 sites, 12 turbines, 35MW



○ Domestic turbine market share



○ Capacity of Korean Wind enterprises

Turbine	Doosan Heavy Industries	<ul style="list-style-type: none"> 3MW on/offshore turbine, 5.5MW offshore turbine – world 5th rank Offshore turbine supplier in 2016(30MW, 1.5%)
	Hyosung	<ul style="list-style-type: none"> 5.5MW offshore wind turbine certified in Germany (July, 2015)
	Unison	<ul style="list-style-type: none"> 750KW, 2MW, 2.3MW wind turbine
	Hanjin	<ul style="list-style-type: none"> 1.5MW, 2MW wind turbine
Tower	CS Wind	<ul style="list-style-type: none"> Wind tower global market share 6.5% Manufacturing at Canada, China, Viet Nam and UK
Forging	Tae-woong	<ul style="list-style-type: none"> 400 customers including world turbine top 10 enterprises

5 Korea's Renewable Energy - Programs

■ RE Deployment Programs

1 Feed in Tariffs(FIT, 2001–2011) → Renewable Portfolio Standard(RPS, 2012~)

* RPS goal : ('12) 2.0% → ('16) 3.5% → ('17) 4.0% → ('18) 5.0% → ('20) 6.0% → ('23~) 10.0%

RPS('12~'16)

7,555MW (Solar PV 3,289MW)

FIT('02~'11)

1,030MW (Solar PV 497MW)

Rate of change

633.5%↑ (Solar PV 561.8% ↑)

2 RE mandatory programs : RE use for public buildings(30% by 2020), RFS

* RFS goal : ('15~'17) BD 2.5 → ('18~'20) BD 3.0

3 Subsidy programs : Home / building / regional / combined support

* 0.7 mil households by 2020(target)

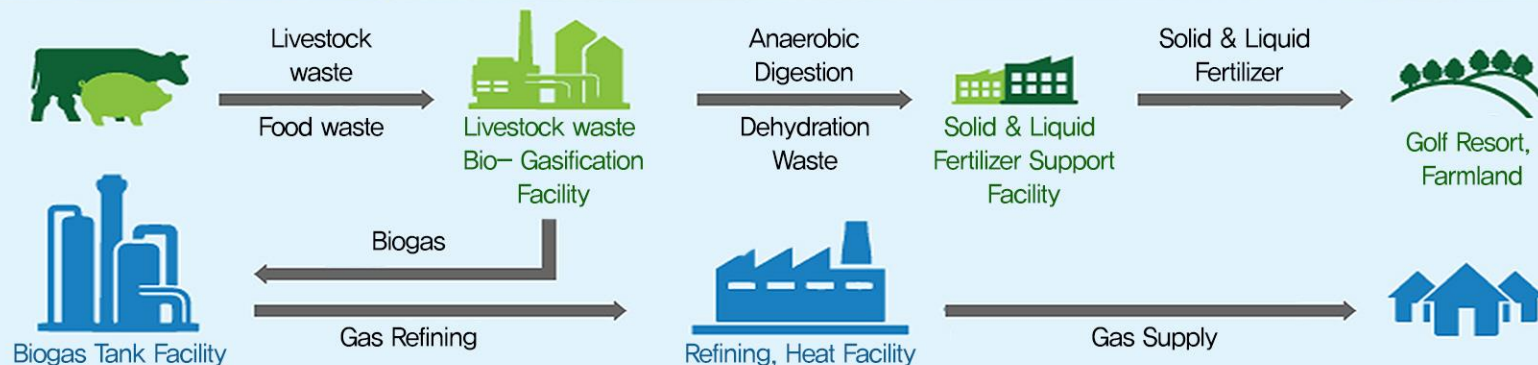
4 PV rental program / agricultural solar villages program

* PV rental goal : 0.4 mil households by 2030

■ Eco-friendly Energy Town : Clean Energy + Waste to Energy

	2014	2015	2016	2017	Total
Projects	3	10	6	5	24

Hong Chun



Biogas Plant



Fertilizer Production Facility



Green Village

Small hydropower
In Sewage treatment plantPV in Sewage
treatment plant

Water leisure sports Center



* Small hydro 25kW, PV 340kW etc

5 Korea's Renewable Energy - Programs

■ Energy Independent Island : Microgrid to replace high cost of diesel generators

	Govnt/ subsidy (50:50)	Private (100%)	Local Govnt (100%)	etc	total
Projects	14(6)	4	1	2(2)	21(8)

* 8 projects accomplished among 21 projects

Juk Do(island, 2016)

PV 201kW, Wind 10kW, ESS 900kWh, reducing electricity bill,
tourism and local economy development





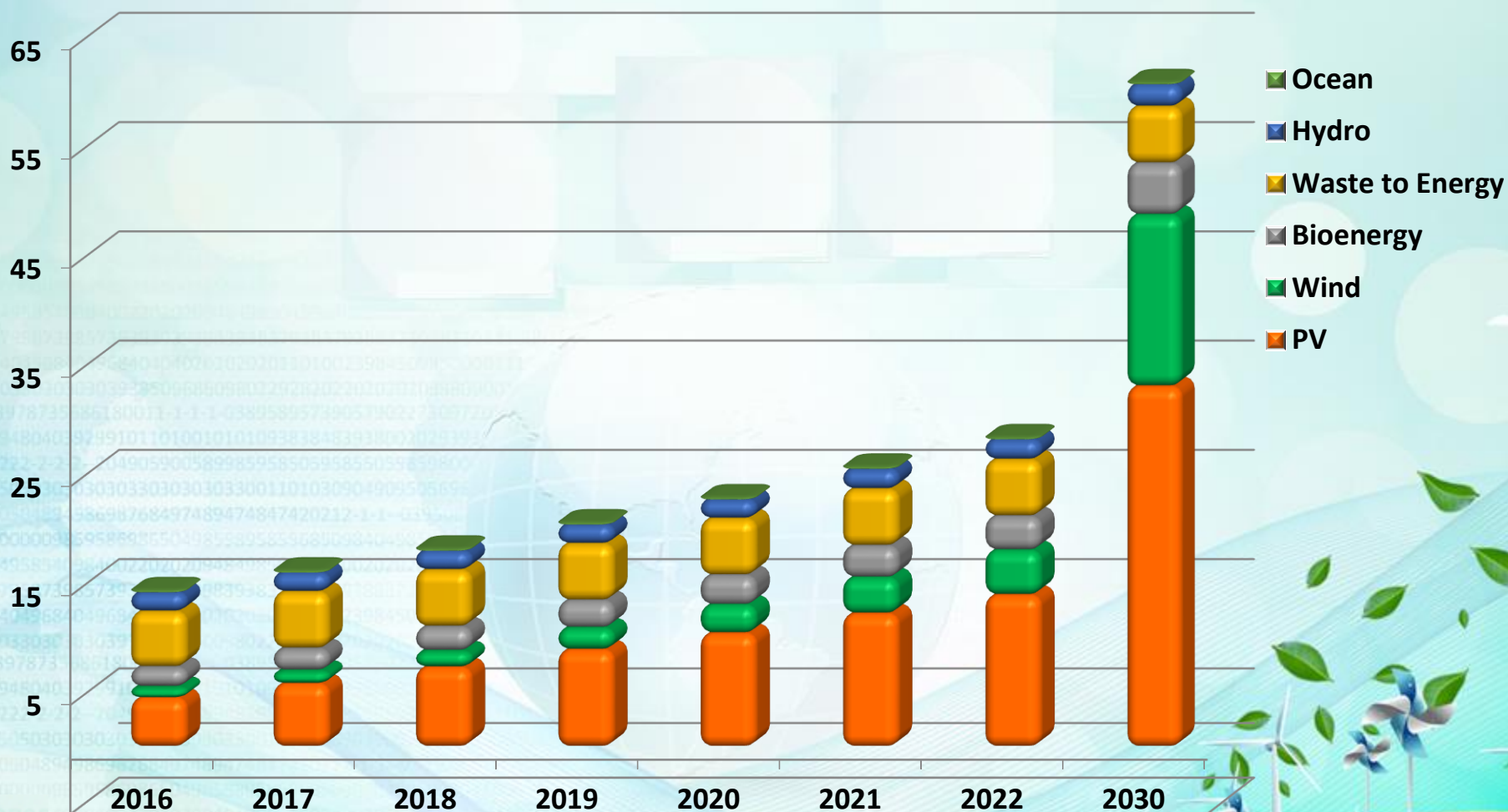
Sustainable KOREA!

- ▶ **Energy Transition** from new nuclear power & Fossil fuel power generation
- ▶ Increase **20% of renewable energy by 2030** and relevant job creation
- ▶ Deploy eco-environment and low-carbon energy **cultivating new businesses and markets**
- ▶ Govern energy system **adapting to the new climate regime**



■ New Government : Set target of RE power generation as 20% by 2030

- RE deployment 61GW by 2030(47GW new addition compared to 2016(14GW) ** under consideration*



6 Energy Transition – Way to Achieve

■ To achieve 20% target by 2030

- 1 Increasing RPS mandatory rate
 - 2 Promoting large scale RE projects : Offshore wind farm, etc
 - 3 Local community participation : Agricultural solar villages, etc
 - 4 Investment for grid stability : T&D improvement, securing backup power
 - 5 Efficient demand side management using smart grid infrastructure
 - 6 R&D investment \$1.4bil including RE(\$1.0bil) (2016–2020)
- 

KOREA,

the Dramatic Renewable Stories



IREC 2019 KOREA





90% Target Electrification by 2017

83% ELECTRIFICATION IN 2014

7,017 ISLANDS

15 MILLION WITHOUT ELECTRICITY




GENERATION LIMITED TO 4-8HRS PER DAY

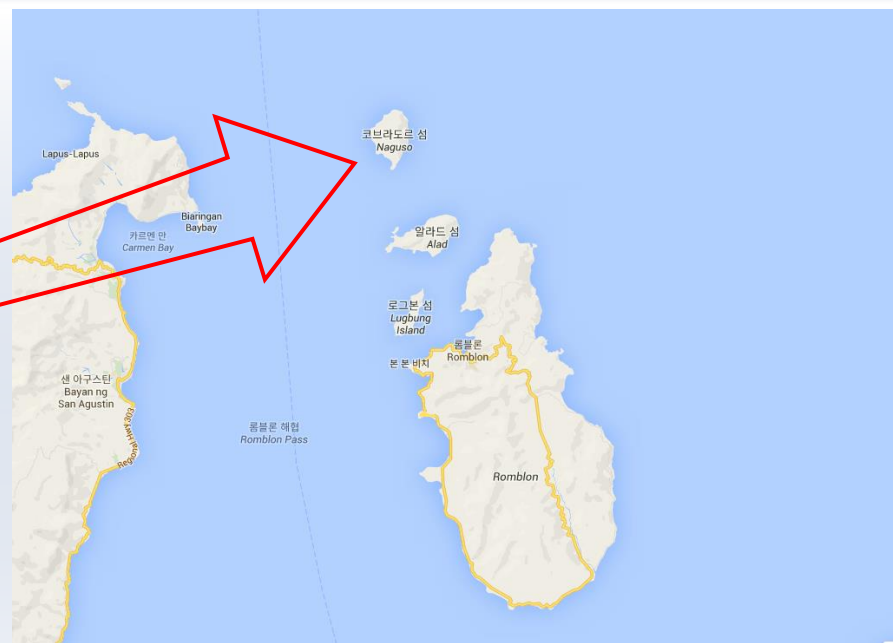
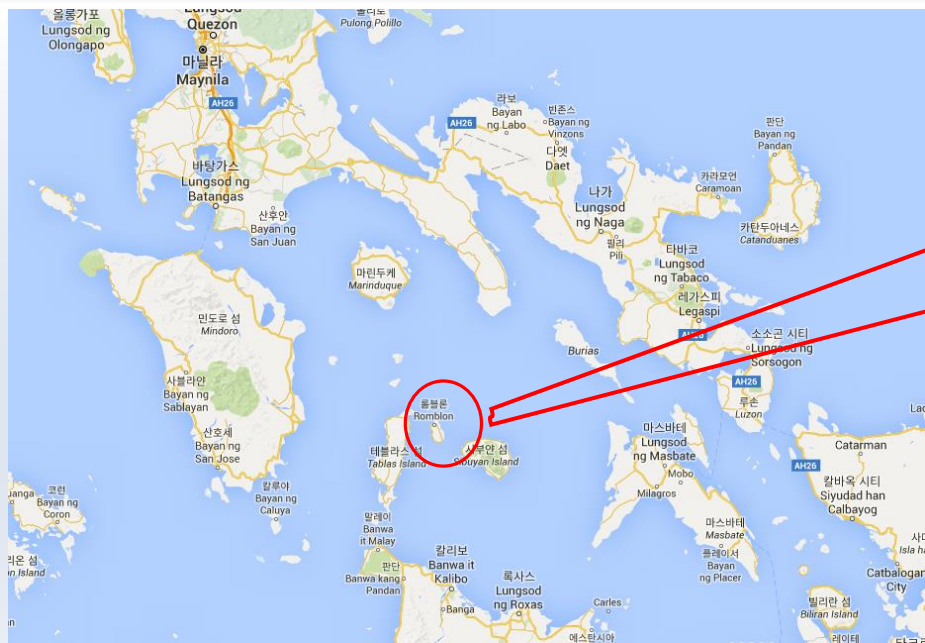
DIESEL GENERATION IN OFF-GRID AREAS



KOREA ENERGY AGENCY

Corbrador Island

-  Area/Population : 2.64km², 983 people (609 people above 18, 374 people under 18)
-  Total Households : 234 Households (Other Facilities: School, Hospital, Church, Commercial Facilities and etc)
-  Electricity Usage : 15kW Diesel Generation for 8 Hours



Overview

- Joint Project between KEA & ADB to develop Distributed Grids in off grid island in the Philippines
- PV(30kW)+ESS(175 kWh, Lithium Battery) + PCS(25 kW) + Diesel Generation(15kW) as hybrid system



Stakeholders & Role

Organisation	Role	Benefit	Invest(\$)
KEA	System Installation, EPC, Training, Output Analysis	Providing Korean products	300,000
ADB	Battery Purchasing, Installation	Energy 4 All Initiative, 1 st Lithium-ion Battery Project	100,000
ROMELCO	Construction, Logistics, Tax, O&M, data sharing	Business model	100,000
NEA	Custom Clearance, Licensing, Approval	Achieve government target for electrification	-

Project



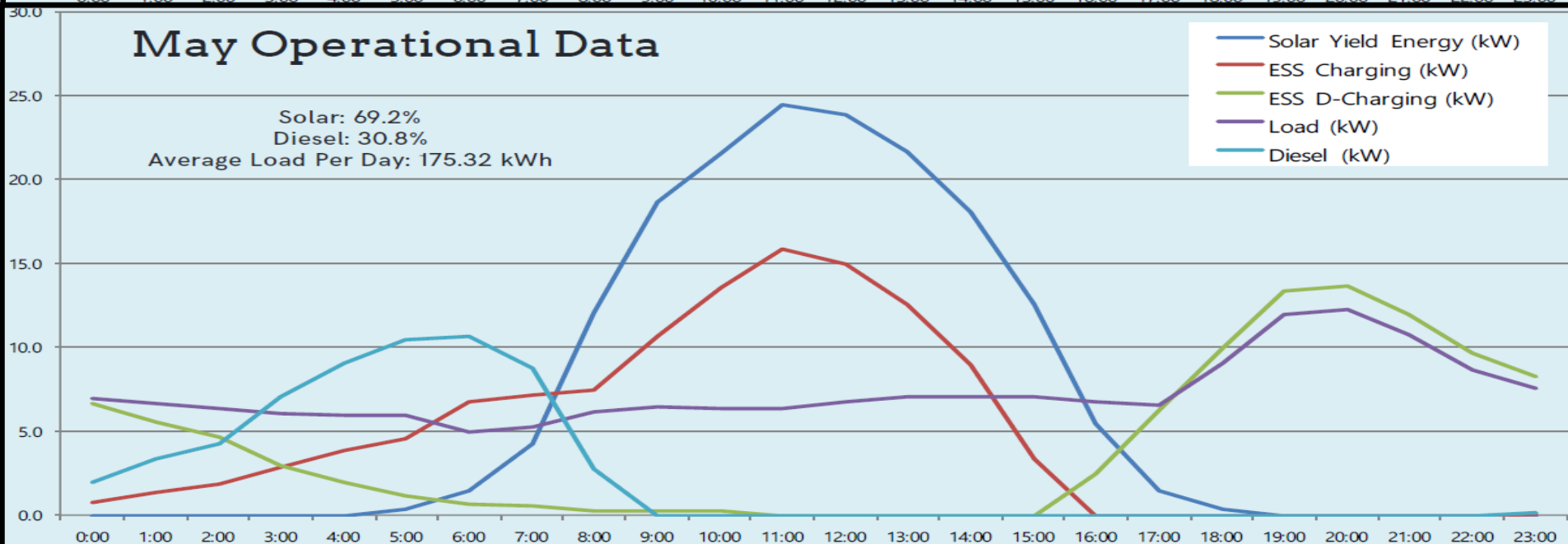
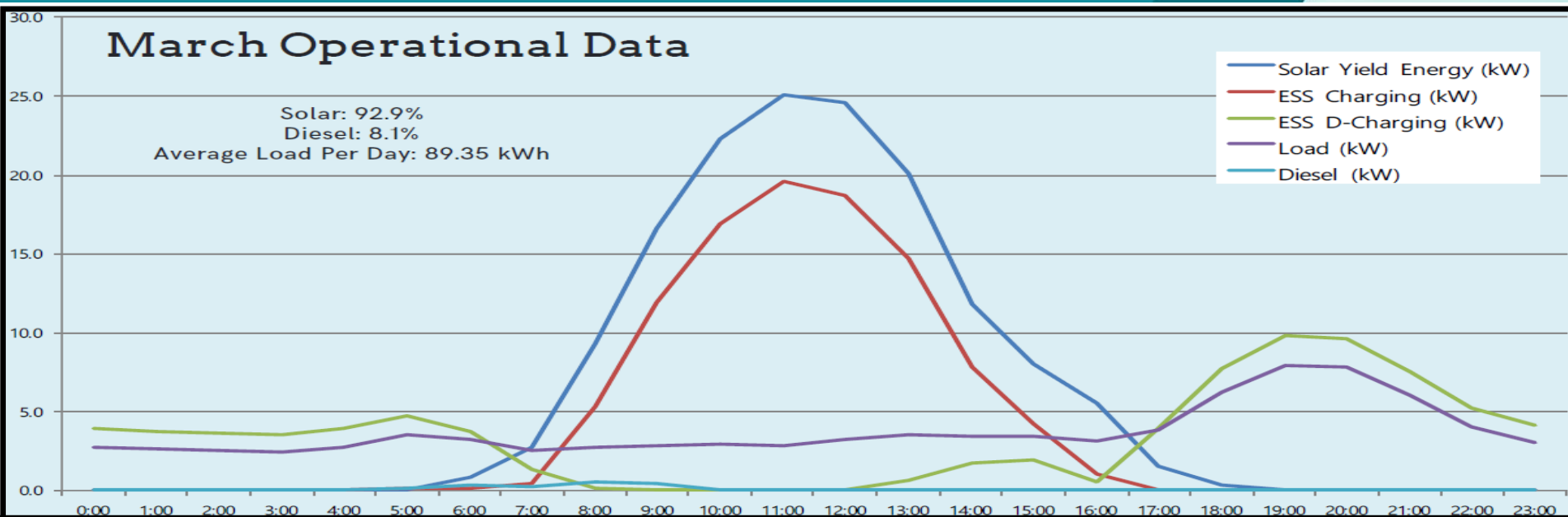
268%
REDUCTION
IN ENERGY
COST

US\$ 0.67/ kW to US\$ 0.25/ kW (ROMELCO)

Typhoon Ready at 55m/sec wind load

Distance monitoring & optimization





10
**307% LOAD
INCREASE**

58.05 kWh on March 1 to 178.6 kWh on May 15

Improved Livelihood: Trade, Technology,
Education, Medicine



