

# New and Renewable Energy in Korea

- Best Practices in Policy and Deployment -

Oct. 2016

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# Contents

I Overview of KEA

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II The Status of New & Renewable Energy in Korea

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III 4<sup>th</sup> Renewable Energy Basic Scheme

---

IV Main Policies & Strategies in NRE

---

V RPS, RFS, Eco-Friendly Energy Town

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***\*NRE: New and Renewable Energy***





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I

# Overview of Korea Energy Agency(KEA)



# 1. Overview of Korea Energy Agency

## History

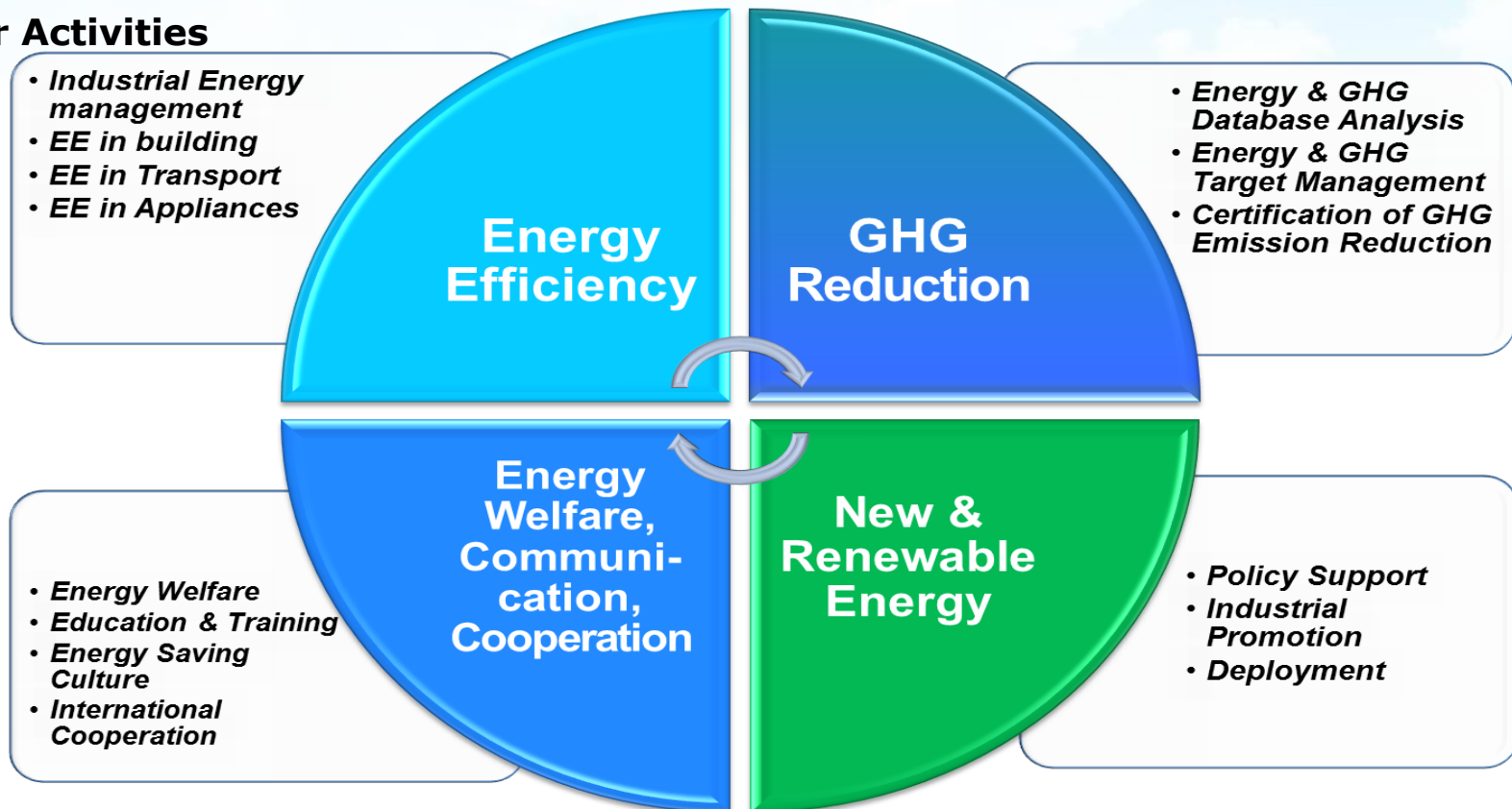


- **1980** Establishment of **KEMCO(Korea Energy Management Corporation)**
- **Since 27<sup>th</sup> July 2015** KEMCO changes organization's name as **KEA(Korea Energy Agency)**

**Organizations** 4 Headquarters, 1 New & Renewable Center, 12 Regional Offices

**Employment** : 498 Staffs

## Major Activities







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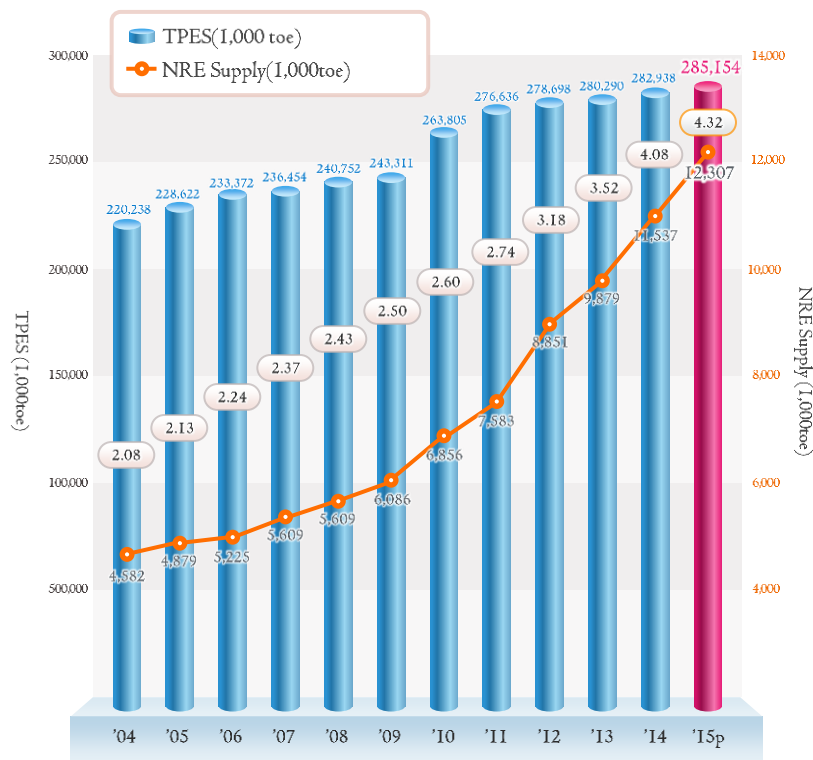
# **The Status of New & Renewable Energy in Korea**



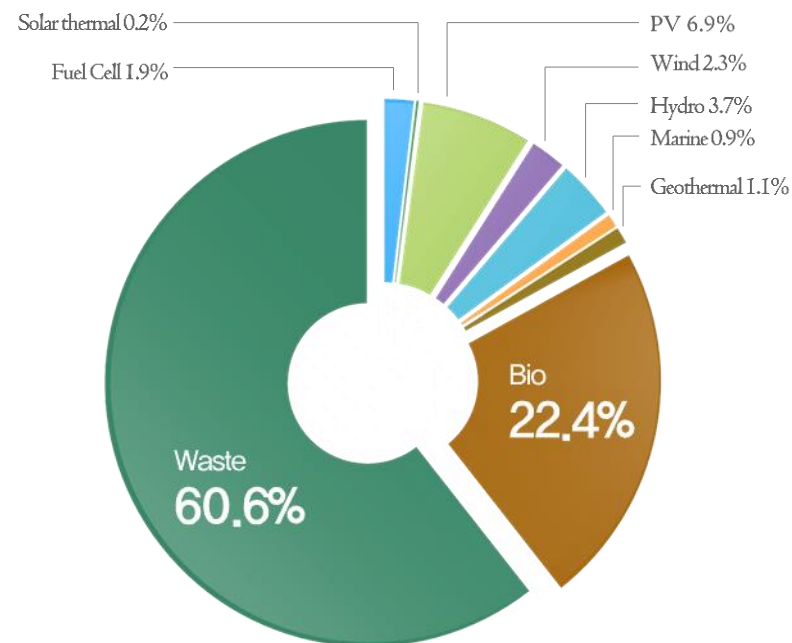
## 2. The Status of New and Renewable Energy

- Domestic Deployment of NRE has increased annually 12.3% for 5 years
- NRE Share in TPES: 4.32%, Waste and Bio Energy Supply in NRE (2015): 83%

### NRE Supply & Ratio



### NRE Supply by Sources



### RE : 9 Sources

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

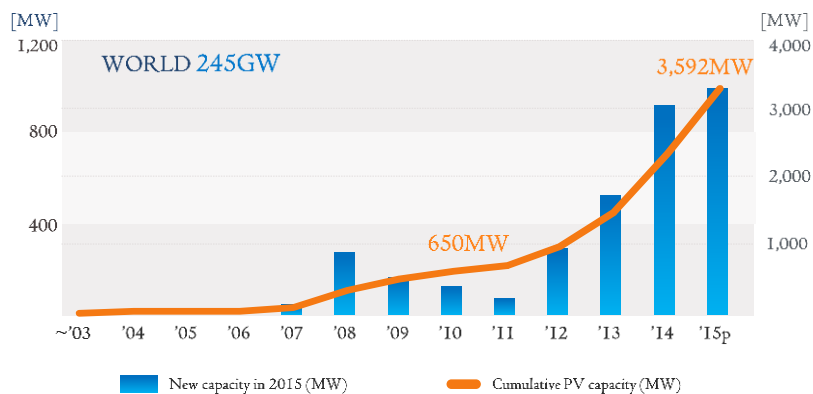
### New Energy : 3 Sources

- Fuel-cell, Hydrogen, Coal Liquefaction or Gasification

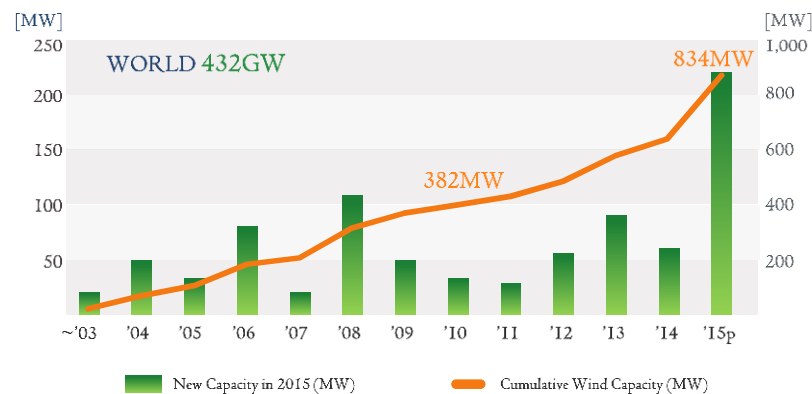
# 3. The Status of New and Renewable Energy



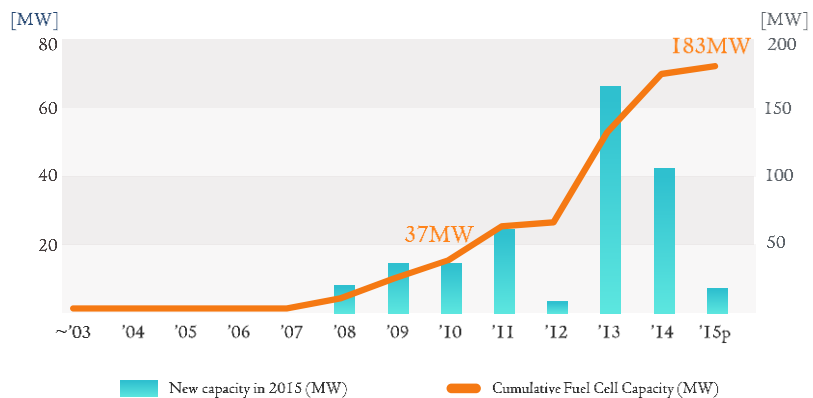
## PV



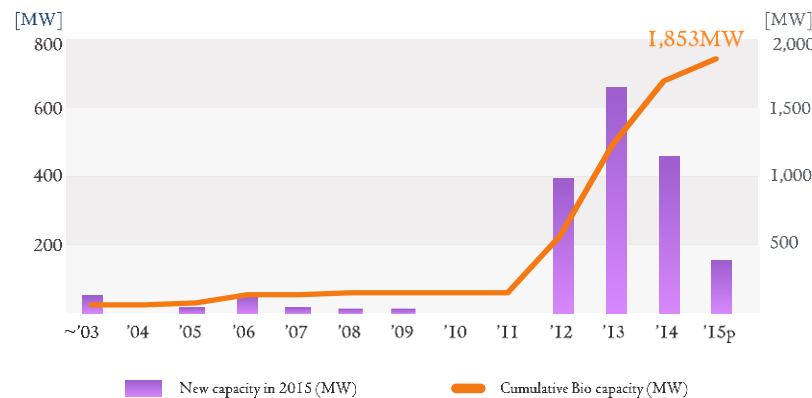
## Wind



## Fuel Cell

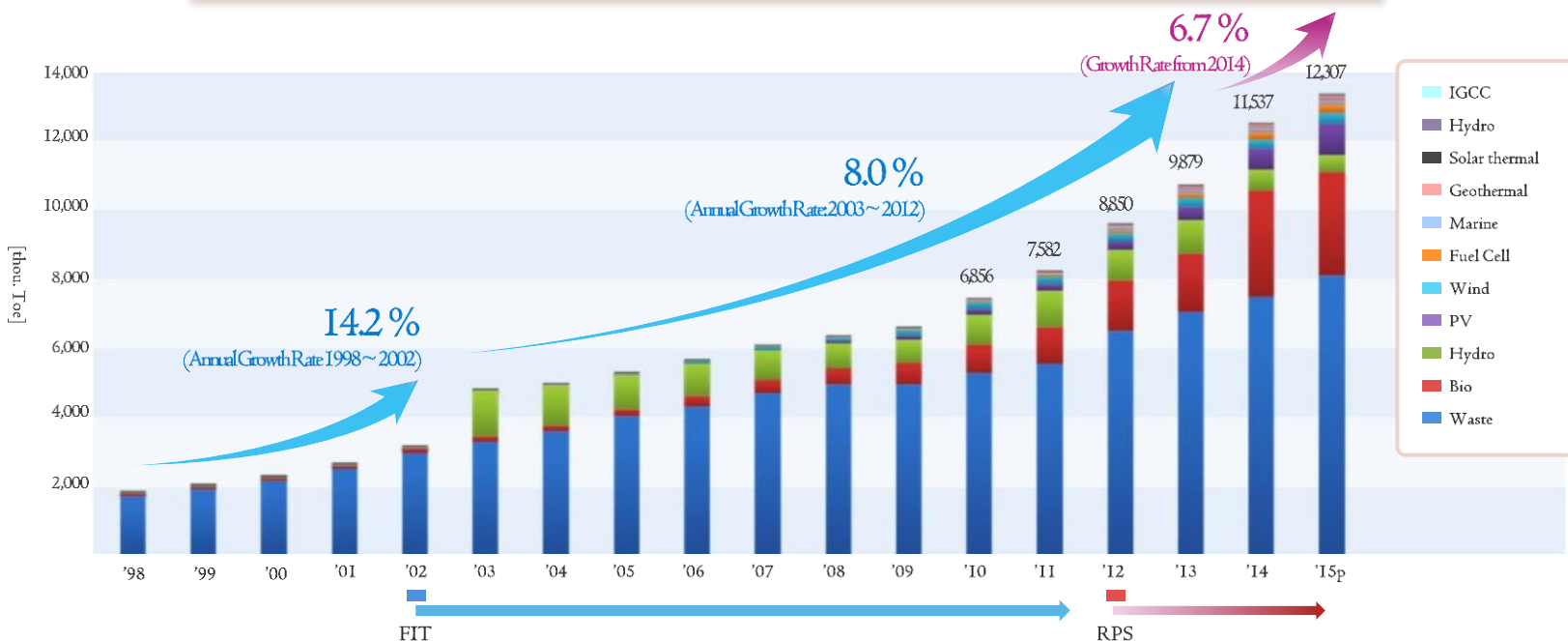


## Bio (Power Generation)



# 4. The Status of NRE Industry

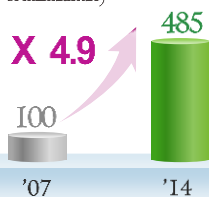
## Trend of Supply



## Status of NRE Industry

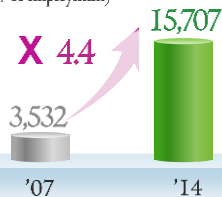
### Companies

(unit: # of manufacture)



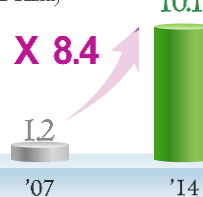
### Employment

(Unit: # of employment)



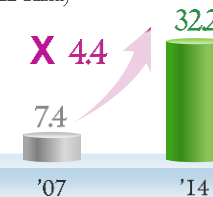
### Sales

(Unit: USD Billion)



### Export

(Unit: USD Billion)







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# The 4<sup>th</sup> Renewable Energy Basic Scheme



# 5. Target

Target ( ~ 2035)

NRE Shares in TPES by 11% (4.3% in 2015)

\* 4th New & Renewable Energy Basic Plan (Sep. 2014)



- ▶ R&D Project
- ▶ Pilot Project
- ▶ International-Cooperation R&D



- ▶ Certification
- ▶ Standardization
- ▶ Capacity Building



- ▶ Subsidy Programs
  - Home & Building
  - Regional
- ▶ Renewable-Portfolio-Standards
- ▶ Mandatory for Public Building
- ▶ Renewable Fuel Standard
- ▶ Loan/Tax Incentive
- ▶ PV Rental Program





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IV

# Main Policies and Strategies in New and Renewable Energy





# 6. Main Policies and Strategies in NRE

Function	Object	Method	Program
NRE Deployment Program	Private Sector	Subsidy	Home Subsidy Program (1 Mil. Homes)
			Building Subsidy Program
			Feed-in-Tariffs (FIT)
			Overseas Business Support
		Loan	Financial Support Program
		Mandatory	Renewable Portfolio Standard (RPS)
			Renewable Fuel Standard(RFS)
		Business	Solar PV Rental Program
	Public Sector	Subsidy	Regional Deployment Program
			Combined Support Program
			Establishment of NRE Test-bed
		Mandatory	NRE Mandatory Use for Public Buildings
Infrastructure- building Program	Private & Public Sector	-	Certification, Standardization, and International Cooperation
			R&D(Policy and Regulation)



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# RPS, RFS, Eco-Friendly Energy Town



# 7. Renewable Portfolio Standard(RPS)

## Overview

- Enforces 18 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) 4.0% → ('20) 6.0% → ('24~) 10.0%
- Current Status : RPS achieved 6.8 times of total FIT installed capacity (proceeded for 10 years) in 6 years

RPS('12~Aug.'16)	FIT('02~'11)	Rate of change
6,663MW (Solar PV 2.941MW)	980MW (Solar PV 497MW)	679.9%↑(Solar PV 591.8% ↑)

## Best Practice

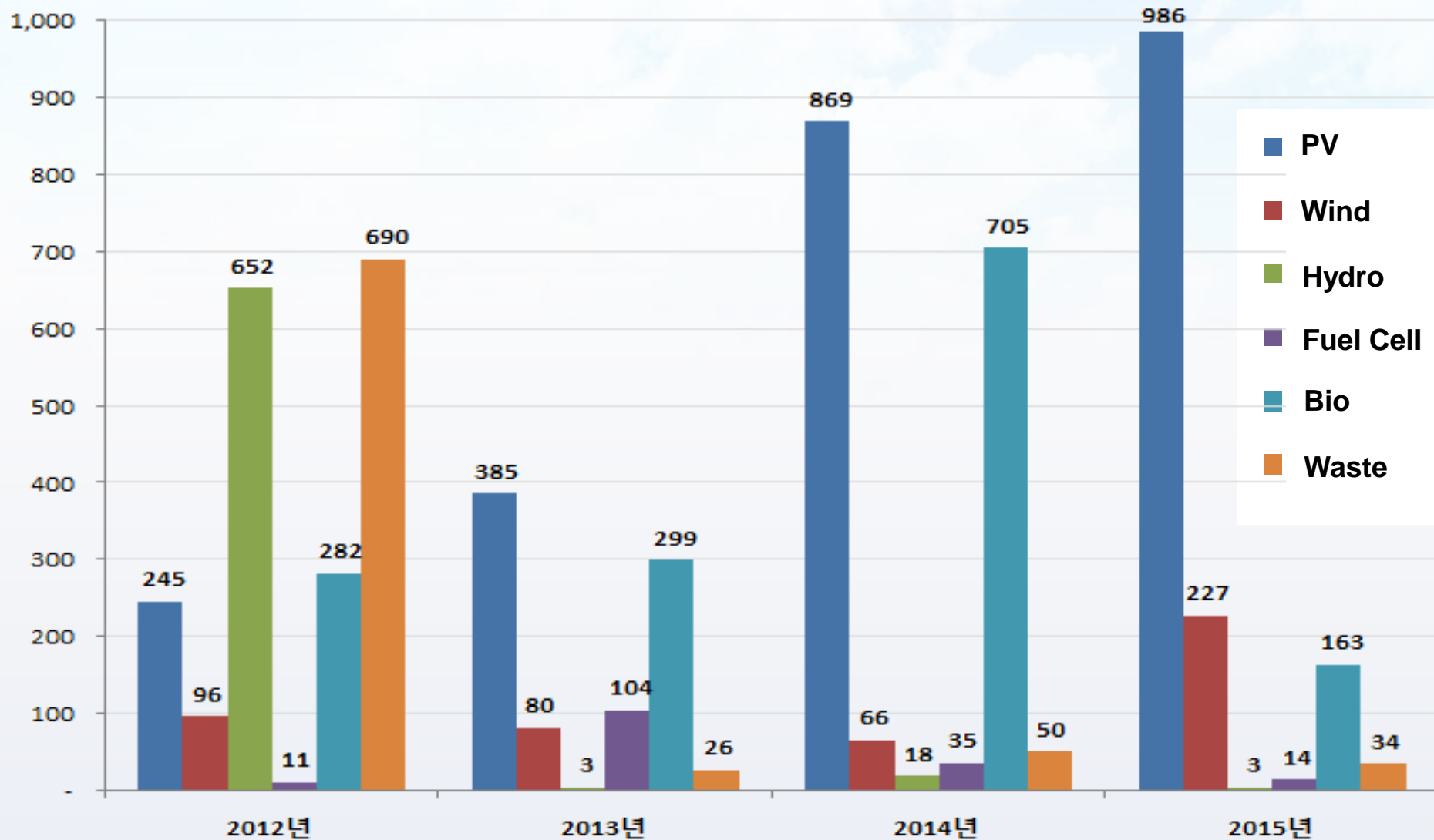
- Converting rooftop of the factory and parking lot into Solar PV Power Plant (Busan) (2013)
  - The largest Solar PV Plant for the single factory utilized existing facilities in the world (20MW, Renault Samsung Motors)
  - Generated electricity(26GWh/yr.) provides 7,300 households
    - \* Ave. usage rate 15%, 1 household uses 300kWh/month





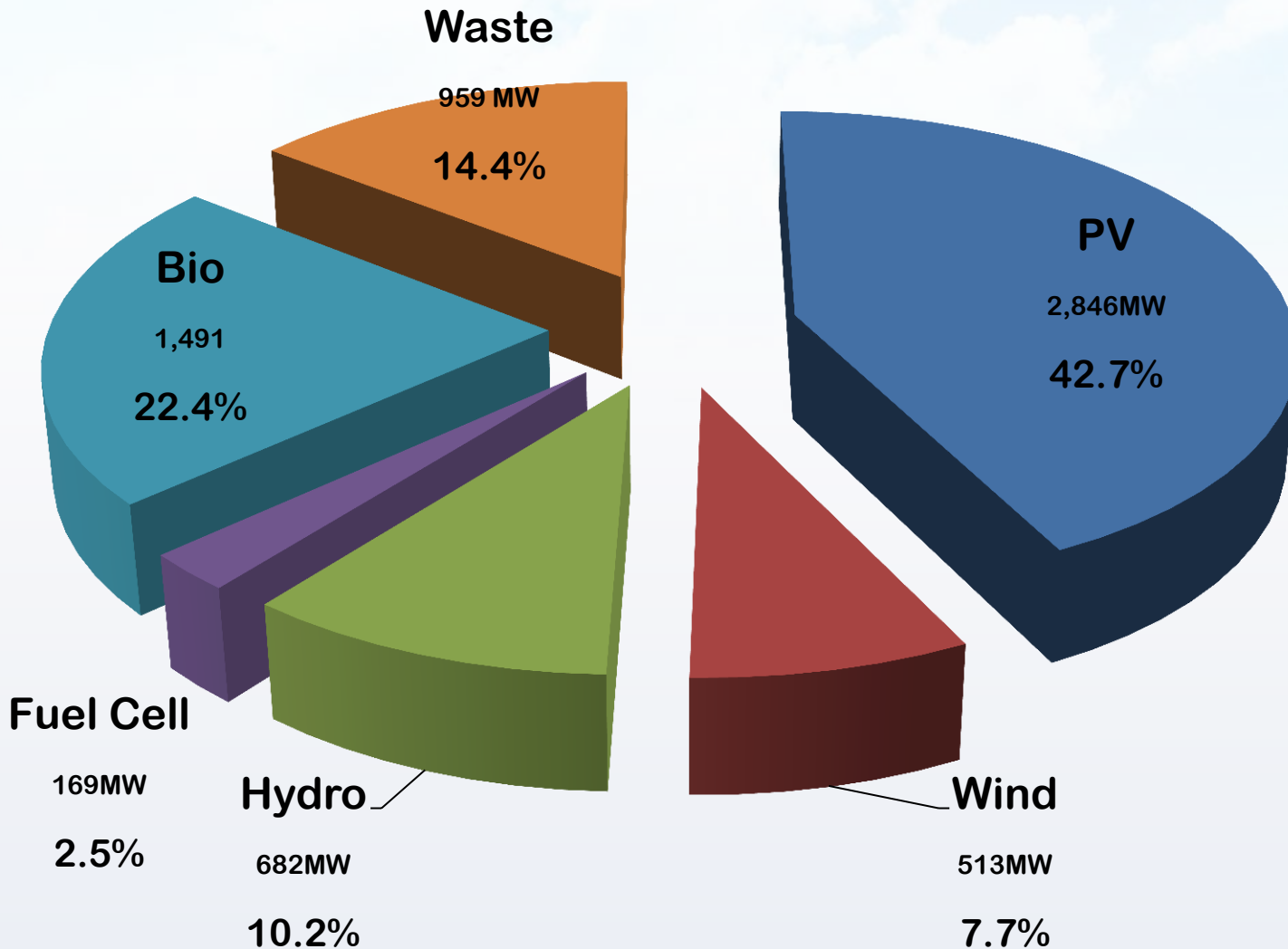
# 8. Renewable Portfolio Standard(RPS)

## New Capacity Addition



# 9. Renewable Portfolio Standard(RPS)

## Total Capacity



# 10. Renewable Portfolio Standard(RPS)

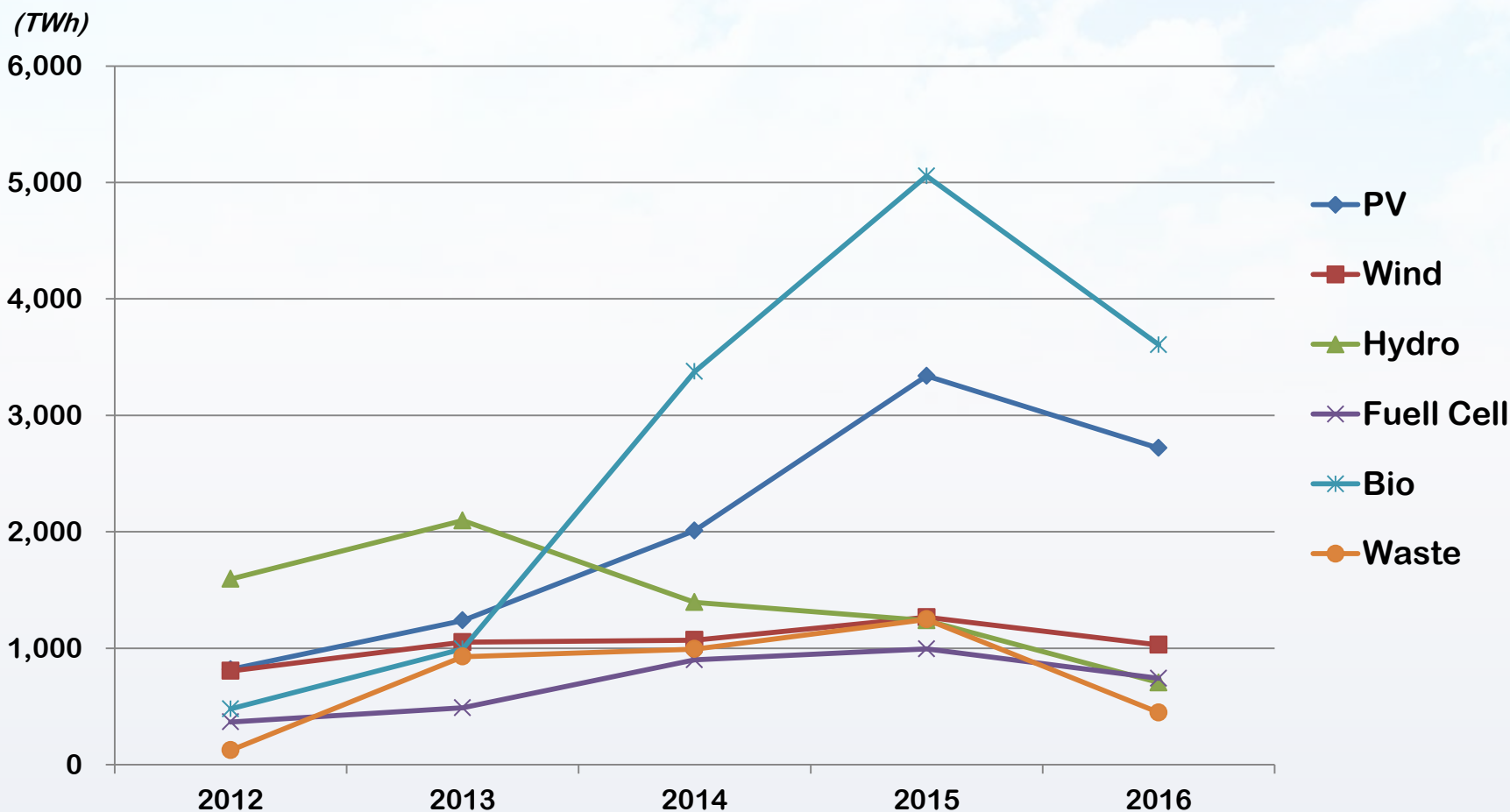
## Obligators Achievement – Group 1

		2013	2014	2015
Achievement Rate		67.0%	78.3%	90.8%
Rank	KOSPO	3	3	1
	KOEN	2	1	1
	EWP	4	6	2
	KOMIPO	5	2	3
	KHNP	1	4	4
	WP	6	5	5
Energy Sources		<ul style="list-style-type: none"> <li>• Hydro (21.0%)</li> <li>• Bio (17.5%)</li> <li>• Wind (15.4%)</li> </ul>	<ul style="list-style-type: none"> <li>• Bio (44.9%)</li> <li>• PV (15.1%)</li> <li>• Fuel Cell (14.7%)</li> </ul>	<ul style="list-style-type: none"> <li>• Bio (42.4%)</li> <li>• PV (28.0%)</li> <li>• Fuel Cell (11.8%)</li> </ul>



# 11. Renewable Portfolio Standard(RPS)

## Power Generation by sources



● Introduced Voluntary Implementation Plan – MOTIE Notification 2016-31, RPS and RFS Management, Operation Guideline(Feb. 2016)

# 12. RPS – REC & Multipliers

## Evaluation Criterion

- ① Economic feasibility
- ② Environmental effect
- ③ Potential
- ④ Industrial promotion effect
- ⑤ Policy priority

Energy Source	Multiplier	Eligible Energy Sources	
		Installation Type	Detail
Solar PV	1.2	On Land	Less than 100kW
	1.0		More than 100kW
	0.7		Exceed 3,000kW
	1.5	On Building & Existing Facilities	Under 3,000kW
	1.0		Exceed 3,000kW
	1.5	Floating on the Water Surface	
Other REs	0.25	IGCC, Byproduct Gas	
	0.5	Waste, LFG	
	1.0	Hydro, Onshore Wind, Bioenergy, RDF Combustion (全焼) Power Generation, Waste Gasification Power Generation, Tidal(潮力) (with Embankment, 防潮堤)	
	1.5	Lignocellulosic Biomass Combustion (全焼) Power, Off shore wind(less than 5km connecting distance)	
	2.0	Fuel Cell, Current Power(潮流)	
	2.0	Offshore Wind(more than 5km connection distance), Geothermal, Tidal(潮力)(without Embankment, 防潮堤)	-
	1.0 ~ 2.5		
	5.5	ESS(with Wind Facility)	2015
	5.0		2016
	4.5		2017

# 13. Renewable Fuel Standard(RFS)

## Overview

Enforces Obligators to supply certain amount of Renewable Fuel for transportation sector (Implemented in Aug. 2015)

※ Obligators: Transportation Fuel Producers and Importers



## Goal

Obligator(Fuel supplier) provides mixed Fuel with Bioenergy(Bio Diesel) as mandatory

Year	2015.Aug	2016	2017	2018	2018	2020
Mix rate(%)	BD 2.5	BD 2.5	BD 2.5	BD 3.0	BD 3.0	BD 3.0

## Achievement

11 Obligators, Mix Rate 2.58% (Aug. ~ Dec. 2015)

Total Domestic Sales 86.93 mil kl with BD 2.24 mil kl

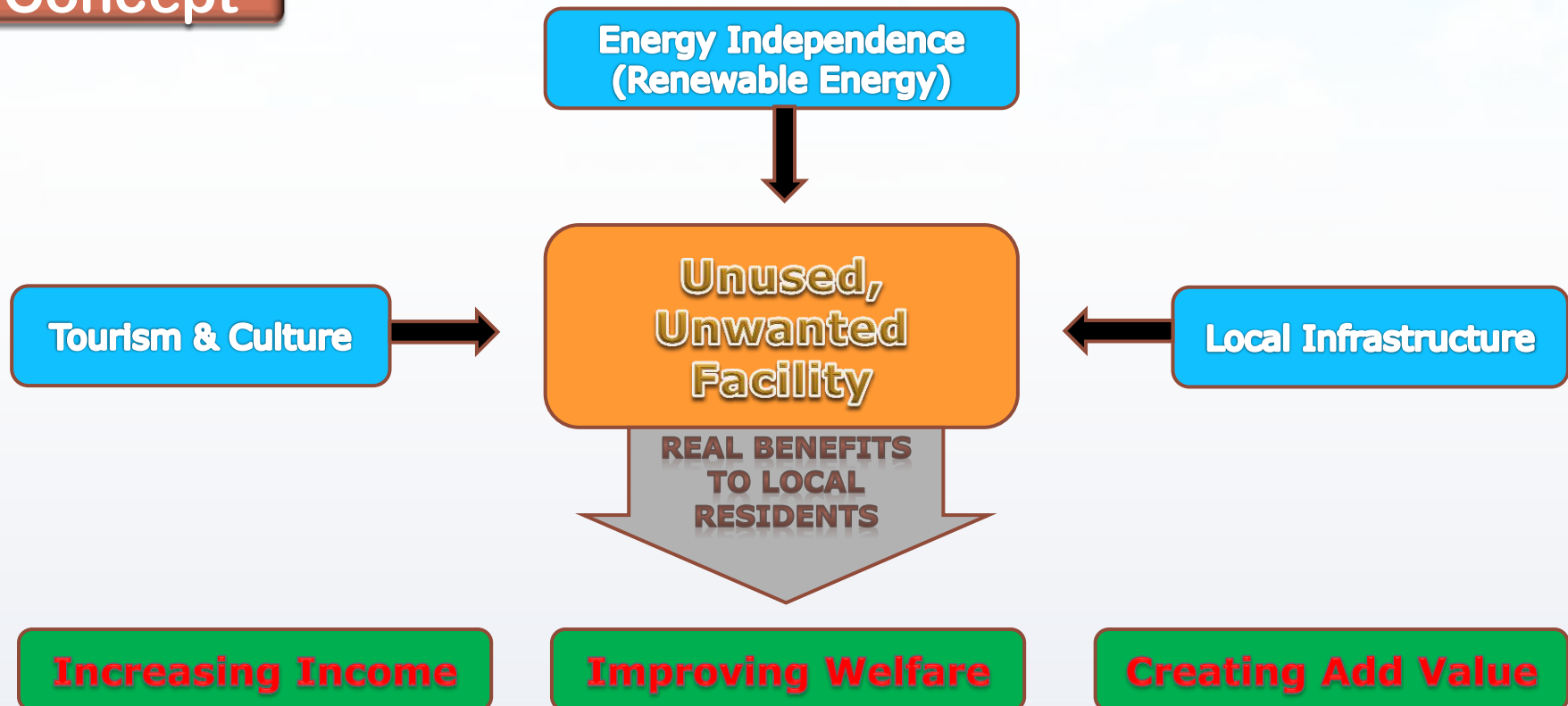


# 14. Eco-Friendly Energy Town

## Overview

- To provide real benefits to local residents as increasing income, elevating welfare by installing Renewable energy system on unused & unwanted facilities.

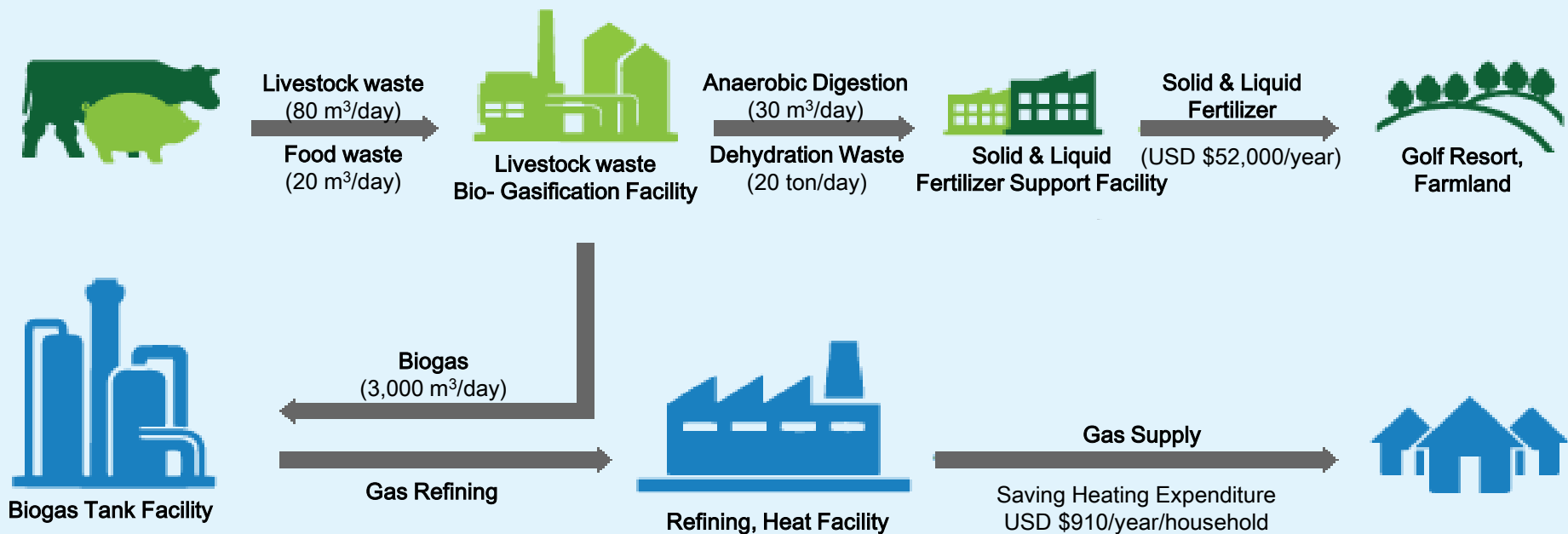
## Concept



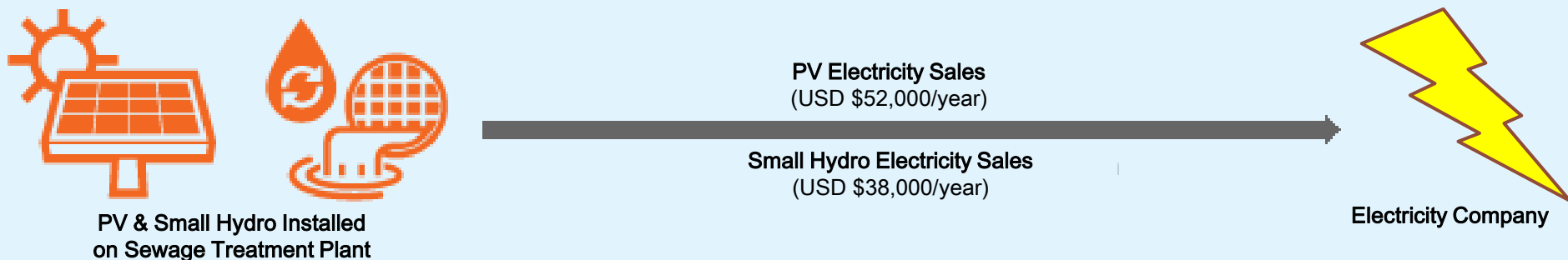
# 15. Eco-Friendly Energy Town(Korea)

## Best Practice – Hong Chun

### Utilising Livestock & Food Waste to Fertilizer & Citygas



### Improving Income of Residents by selling RE Electricity installed on Sewage Treatment Plant





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# Thank You



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