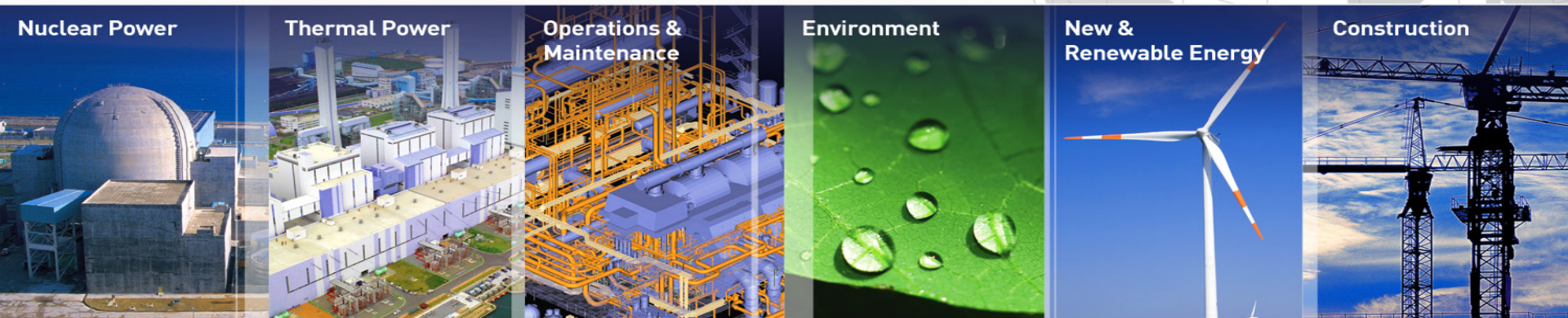


# KEPCO E&C

Global Power EPC Company



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3 \_ Our Performance



**KEPCO**  
E&C

KEPCO  
ENGINEERING & CONSTRUCTION  
COMPANY, INC.

# Company Overview



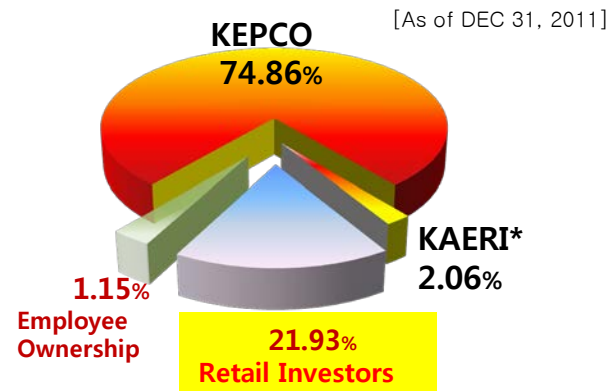
## Korea's Leading Power Plant Engineering Company

- Korea's leading provider of design and engineering for nuclear, thermal and hydro-electric plants with 35 years of experience
- Current 100% market share in nuclear power plant design in Korea
- The world's most competitive engineering company specialized in the two sectors: A/E and NSSS
- Expanding its business to Thermal EPC, energy-related business, environment-friendly business, etc.

### Corporate Information

CEO & President	An, Seung Kyoo (Former Vice Chairman, Hyundai Engineering)
Foundation Date	October 1, 1975
Employees	2,252 (As of FEB 1, 2012)
Business Area	Power plant design & engineering, etc.

### Ownership



### IPO Information

Shares Outstanding (Common shares 100%)	38,220,000
Listing Date	December 14, 2009
Offered Securities	7,644,000

Year	2009	2010	2011
Propensity to Dividend	50%	50%	70%

\* KAERI - Korea Atomic Energy Research Institute



## Business Areas

### • Design & Engineering

- Nuclear Power Plant
- Thermal Power Plant
- Combined Cycle Power Plant
- Cogeneration Power Plant

### • O&M (Operations & Maintenance)

- Technology & Engineering Support for Operating Power Plants

### • Environmentally-friendly Biz.

- FGD System / DeNOx System
- ESCO, Renewable Energy
- Water Pollution Control
- Wastewater Treatment Facilities



### • PM/CM

- SOC
- Private SOC
- Power Plants
- International Plants

# Business Area – Design & Engineering

All of the local nuclear power plants have been independently designed by KEPCO E&C since 1993, Ulchin Unit 3.

## Nuclear Power Plant

### Services performed

- Site selection and feasibility survey
- Engineering and design
- Construction/Project management, licensing support, quality assurance and inspection
- Support for purchasing, owner support, education/training

## Major Project Experience

### • Projects in Progress

Reactor	Project	Project Period	Client
<b>APR 1400</b>	UAE #1,2,3,4	Jan '10 ~ May '20	KEPCO
	Shin-Ulchin #1,2	Dec '07 ~ Dec '16	KHNP
	Shin-Kori #3,4	Aug '06 ~ Sep '14	KHNP
<b>OPR 1000+</b>	Shin-Wolsung #2	Aug '02 ~ Jan '13	KHNP
	APR1400 US NRC DC design/licensing support	Mar '11 ~ Dec '12	KEPCO
	APR+ design Development – stage 2	Aug '10 ~ Dec '12	KHNP

### • Projects Completed

Reactor	Project	First Power	Design
<b>OPR 1000+</b>	Shin-Wolsung #1	2012	KEPCOE&C
	Shin-Kori #1,2	2011 / 2012	KEPCOE&C
<b>OPR 1000</b>	Ulchin #5,6	2004 / 2005	KEPCOE&C
	Yonggwang #5,6	2002 / 2002	KEPCOE&C
	Ulchin #3,4	1998 / 1999	KEPCOE&C
	Yonggwang #3,4	1995 / 1996	KEPCOE&C-WEC
	Wolsung #3,4	1998 / 1999	AECL-KEPCOE&C
<b>CANDU PHWR</b>	Wolsung #2	1997	AECL-KEPCOE&C
	Wolsung #1	1983	AECL-CANATOM

\*KHNP – Korea Hydro & Nuclear Power co. LTD. (The sole nuclear plant operator in Korea)

\*WEC – WestingHouse Electric.

\*AECL – Atomic Energy of Canada Limited

\*CANDU PHWR – CANada Deuterium Uranium Pressurised Heavy Water Reactor



# Technology – Nuclear Power Plant



## Korean Nuclear Power Plant Design Development

### OPR 1000 Optimized Power Reactor

- Improved Safety
- Improved Operability, Maintainability and Accessibility
- Yonggwang Units 5,6  
Ulchin Units 3~6

### OPR+ Improved OPR

- Optimization of plant arrangement
- Optimization of system design and Equipment capacity
- Shin-Wolsong Units 1,2  
Shin-Kori Units 1,2

### APR 1400 Advanced Power Reactor

- 1,400MW Class large capacity
- A Korean nuclear power reactor improved economic factor
- Shin-Kori Units 3,4  
Shin-Ulchin Units 1,2  
BNPP(UAE) Units 1~4

### • Under Development

#### APR 1400 (For Europe)

#### APR+ Improved APR

- 1,500MW
- New light water nuclear reactor

#### APR 1400 (US NRC DC\*)

#### SMART System-integrated Modular Advanced Reactor

- 90MW
- Reactor, steam generator, pressurizer & coolant pumps integrated in one vessel

**VHTR**  
Very High  
Temperature Reactor

**SFR**  
Sodium Cooled  
Fast Reactor

2020s - GEN. IV

2010s - GEN. III+

### • The Competing Reactors

France  
AREVA  
EPR1600

USA  
WH-Toshiba  
AP1000

Japan  
Mitsubishi  
APWR+

Russia  
ASE  
VVER-1500

※ All of the reactors in this box are PWR.

\* US NRC DC: United States Nuclear Regulatory Commission Design Certification

# Strength of Korean Nuclear Power Plants

## APR1400 - The best reliability, economic efficiency and operability



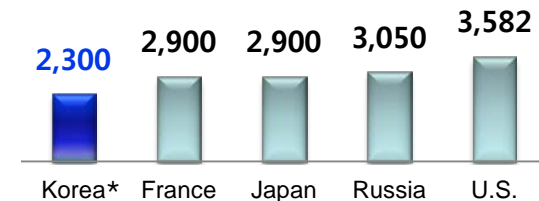
### APR 1400 in Detail

<Source : [www.apr1400.co.kr](http://www.apr1400.co.kr) ; Comparison with other reactors>

	OPR 1000	APR 1400	EPR 1600
Capacity (MWe)	1000	1,400	1,600~1700
Design Life Time	40	60	60
Seismic Design Basis	0.2g	0.3g	0.25g
Refueling Interval (month)	12~18	18	18
Construction Period (month)	Over 60	54	57
Construction cost (\$/Kw)	-	2,300	2,900

### • The World's Most Economical and the Safest Reactor

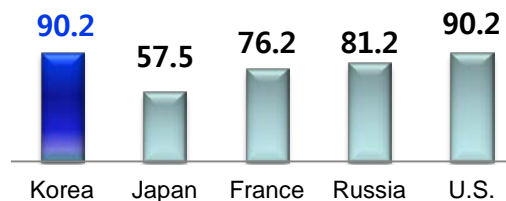
#### Cost of Building Nuclear Power Plant (\$/Kw)



\*APR1400

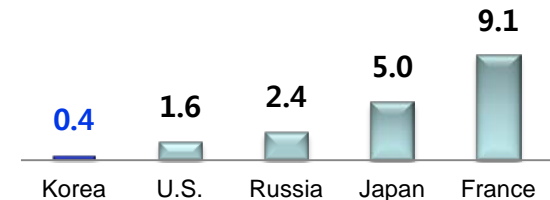
※ World Nuclear News  
(World Nuclear Association, 2008)

#### Energy Availability(%)



※ IAEA PRIS (Power Reactor Information System), A three-year average (2009~2011)

#### Unplanned Capacity Loss Factor (%)



### • Exporting technology to the world ( Below is recent overseas projects)

- Consulting services for site selection & evaluation for new NPP in Malaysia (Client : TNB)
- ITER Electrical Installation Support (Client : ITER)
- AP1000 COL Demonstration & Design Finalization (Client : WEC)
- Technical Support for Bechtel (Client : Bechtel)

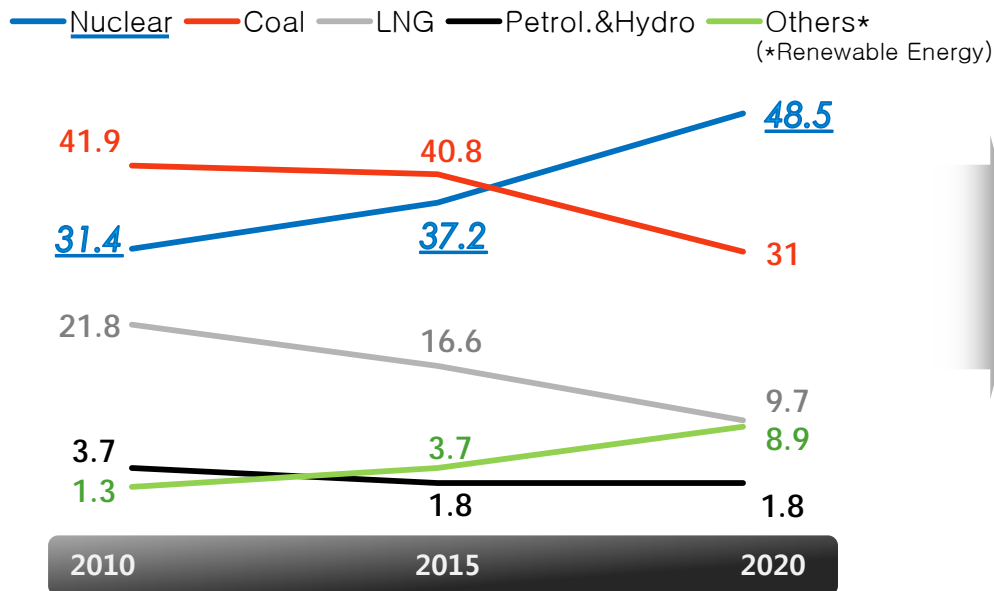
# Domestic Market Opportunities

## Korean Government's Focus on Nuclear Energy

### Long-term Electricity Supply in Korea

#### • Outlook of Generated Output

(Unit : % of total electricity supply in Korea )



#### • Timeline for Completion of nuclear power plant construction ('13 ~'24)

Year	Project [capacity (MW)]
2013	Shin-Kori #3 [1400]
2014	Shin-Kori #4 [1400]
2016	Shin-Ulchin #1 [1400]
2017	Shin-Ulchin #2 [1400]
2018	Shin-Kori #5 [1400]
2019	Shin-Kori #6 [1400]
2020	Shin-Ulchin #3 [1400]
2021	Shin-Ulchin #4 [1400]
2022	Shin-Kori #7 [1500]
2023	Shin-Kori #8 [1500]

# Business Area – Design & Engineering

## Experiences of Coal fired/ CFBC Coal fired/ Combined Cycle/ Cogeneration Design

### Thermal Power Plant

#### Services performed

- Feasibility studies, environmental impact assessments, site survey
- Design standardization, basic and detail design of construction work
- Support for the purchase of equipment and materials
- Project management, supervision, test operation
- Quality assurance and control support
- Preparation, review and approval of documentation

### Major Project Experience

#### • Projects in Progress

Capacity (MW)	Project	Project Period	Client
340	Ghana Takoradi T2 EPC	Dec '11 ~ Oct '14	Takoradi Int'l Company
1000x2	Taeon #9,10	Jun '11 ~ Mar '17	Korea Western Power
150 x3	Turkey Turfanbeyli (Including Procurement)	Apr '11 ~ Feb '15	SK E&C
1000x2	Shin-Boryeong #1,2	Jan '11 ~ Sep '17	Korea Midland Power
350 x2	Morocco Jorf Lasfar	Jun '10 ~ Apr '14	Daewoo E&C
1000x2	Dangjin #9,10	Oct '07 ~ Sep '16	Korea East-West Power
1000x2	Samchok #1,2	Sep '09 ~ Mar '16	Korea Southern Power
300	Taeon *IGCC Pilot Plant	Apr '11 ~ Jul '16	Korea Western Power

#### • Projects Completed

##### ■ Coal Fired Power Plant

- 500MW 34 Units    ▪ 800MW 4 Units

##### ■ Large Scale \*CFB Coal Fired Power Plant

- 200MW 2 Units    ▪ 340MW 1 Unit

##### ■ Combined Cycle /Cogeneration

- 38 Units

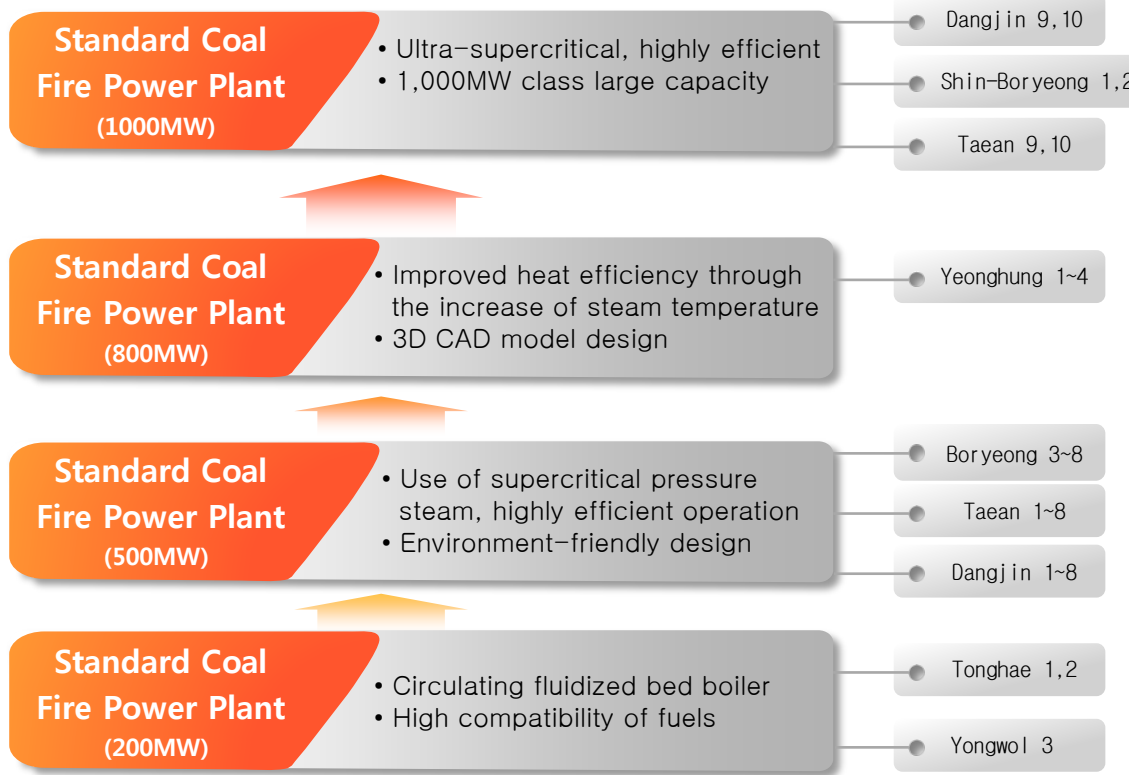
\* IGCC - Integrated Gasification Combined Cycle  
(Producing electricity by burning coal gas regarded as clean as natural gas)

\* CFB - Circulating Fluidized Bed Combustion Boiler



# Technology – Thermal Power Plant

## Coal-Fired Power Plant Design Development



- **Dangjin #1~4- World Best Project Awarded**  
<US, Power Engineering, 2001>

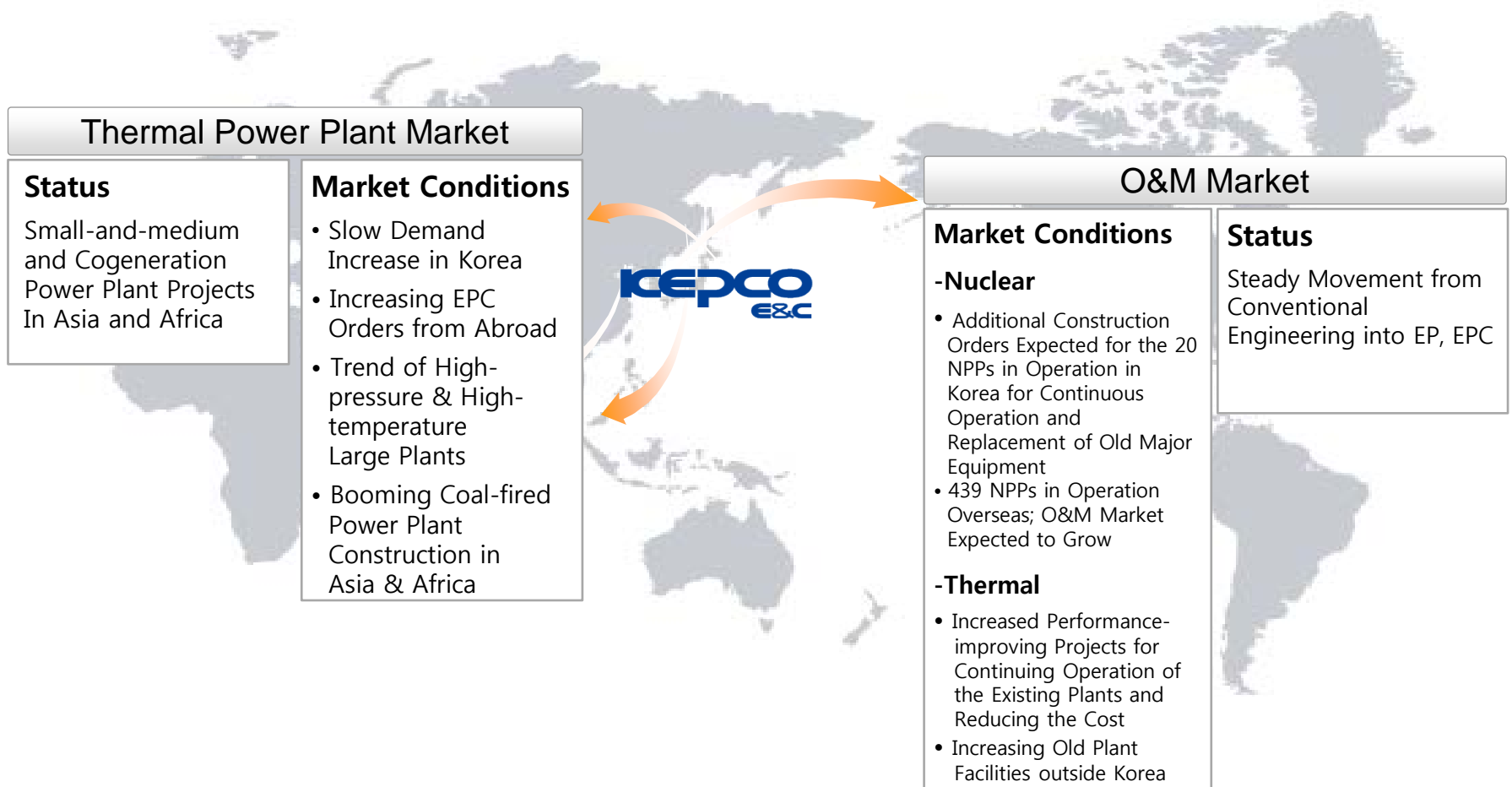


- **Boryeong #3,4 – World Best Project Awarded**  
<US, Electric Power International, 1996>

# EPC Business Expansion

## Developing Overseas EPC Projects toward Global Top 5 Power EPC Leader

### EPC Strategy



## Business Area – O&M

### Contribution to the Improvement of the Operating Power Plants' Operability, Efficiency and Safety

#### O&M (Operation & Maintenance)

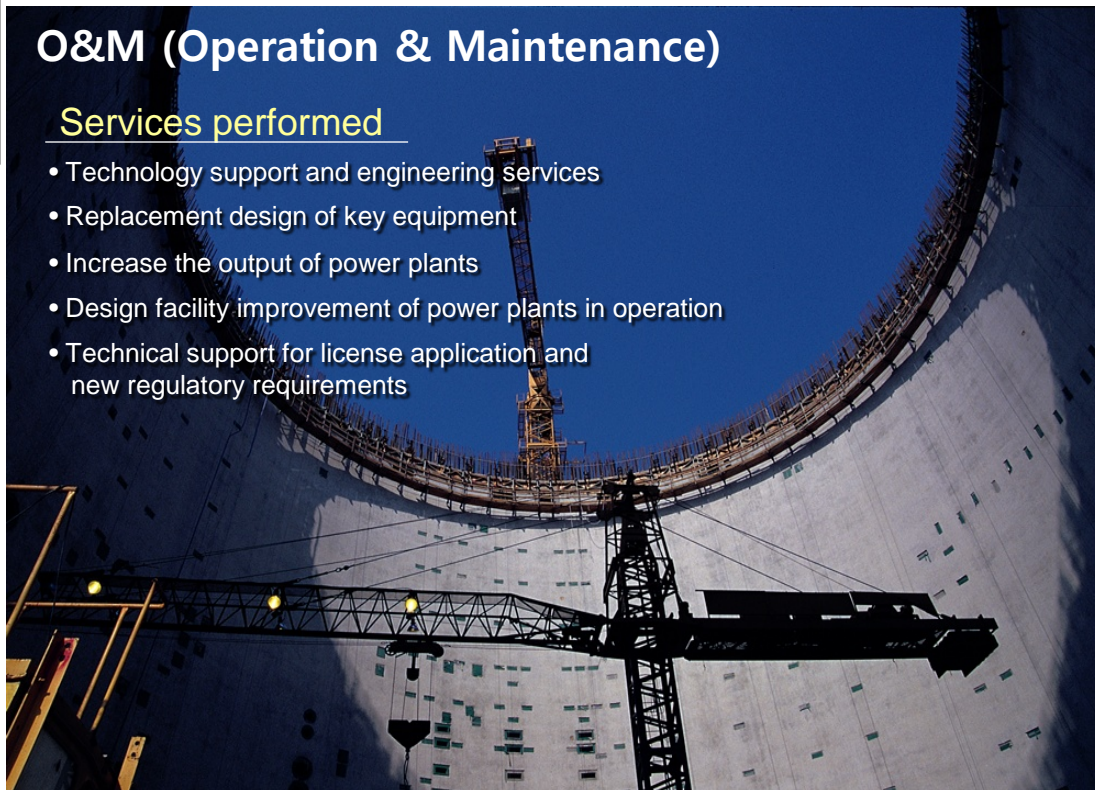
##### Services performed

- Technology support and engineering services
- Replacement design of key equipment
- Increase the output of power plants
- Design facility improvement of power plants in operation
- Technical support for license application and new regulatory requirements

#### Major Project Experience

##### • Recent Projects

- Technical support for license application to replace the steam generator for Unchin #1,2
- Technical consulting for license application to increase the output for Ulchin #1,2
- Improvement of facilities at Yeosu #2
- the other 118 small projects are in progress



# Business Area – O&M

The O&M market is growing  
due to the old operating nuclear power plants.

• Domestic Operating Nuclear Power Plants (23 units)

Plant		Capacity (MW)	Commercial Date	NSSS Supplier	Plant A/E	Model
Kori	#1	587	78.04.29	WEC	Gilbert	
	#2	650	83.07.25	WEC	Gilbert	
	#3	950	85.09.30	WEC	Bechtel/KEPCO E&C	
	#4	950	85.04.29	WEC	Bechtel/KEPCO E&C	
Wolsung	#1	679	83.04.22	AECL	AECL	
	#2	700	98.07.01	AECL/DOOSAN	AECL/KEPCO E&C	
	#3	700	98.07.01	AECL/DOOSAN	AECL/KEPCO E&C	
	#4	700	99.10.01	AECL/DOOSAN	AECL/KEPCO E&C	
Yonggwang	#1	950	86.08.25	WEC	Bechtel/KEPCO E&C	
	#2	950	87.06.10	WEC	Bechtel/KEPCO E&C	
	#3	1,000	95.03.31	DOOSAN	KEPCO E&C	OPR1000
	#4	1,000	96.01.01	DOOSAN	KEPCO E&C	OPR1000
	#5	1,000	02.05.21	DOOSAN	KEPCO E&C	OPR1000
	#6	1,000	02.12.24	DOOSAN	KEPCO E&C	OPR1000
Ulchin	#1	950	89.09.10	Framatome	Framatome	
	#2	950	88.09.30	Framatome	Framatome	
	#3	1,000	98.08.11	DOOSAN	KEPCO E&C	OPR1000
	#4	1,000	99.12.31	DOOSAN	KEPCO E&C	OPR1000
	#5	1,000	04.07.29	DOOSAN	KEPCO E&C	OPR1000
	#6	1,000	05.04.22	DOOSAN	KEPCO E&C	OPR1000
Shin-Kori	#1	1,000	11.02.28	DOOSAN	KEPCO E&C	OPR1000+
	#2	1,000	12.07.20	DOOSAN	KEPCO E&C	OPR1000+
Shin-Wolsung	#1	1,000	12.07.31	DOOSAN	KEPCO E&C	OPR1000+



## Business Area – Environmentally-friendly Biz.

### • Environmental Business

#### Advanced air pollution prevention facilities

- Flue gas desulfurization system
- Flue gas denitrification(DeNOx) system



#### Site selection and environmental assessment



#### Water quality pollution prevention facilities

- Wastewater treatment facilities
- Sewage, manure, and livestock wastewater treatment facilities



#### Greenhouse gas reduction systems

- Development of technologies for capturing carbon dioxide
- CDM(Clean Development Mechanism) projects



### • New and Renewable Energy

#### ESCO(Energy Service Company)

- ◆ Improvement of output of power plants
- ◆ Installation of energy-saving facilities
- ◆ Improvement of productivity of manufacturing industries

11 Projects

ESCO projects performed by KEPCO E&C

117,369

TOE Annual energy saving by ESCO projects

321,899

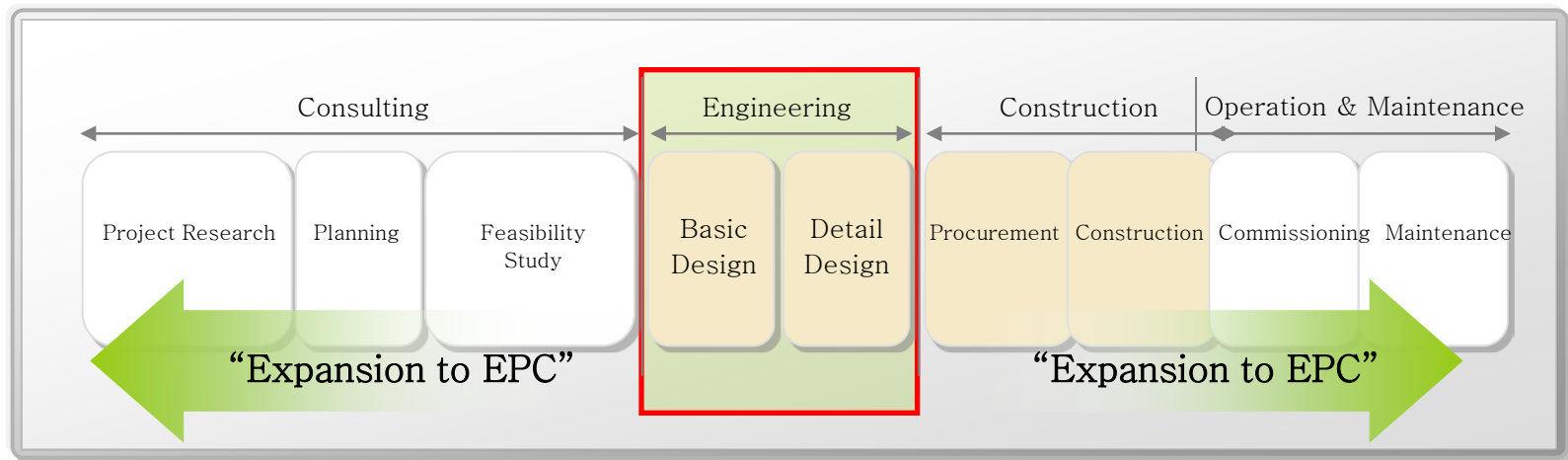
t Annual CO<sub>2</sub> reduction by ESCO projects

63,165,560

US\$ Annual energy saving value  
by ESCO projects

## Business Area – PM/CM

Management of the Entire or Parts of a Construction Project  
(Consulting, Engineering, Construction, O&M , etc. )



### • Involved Projects



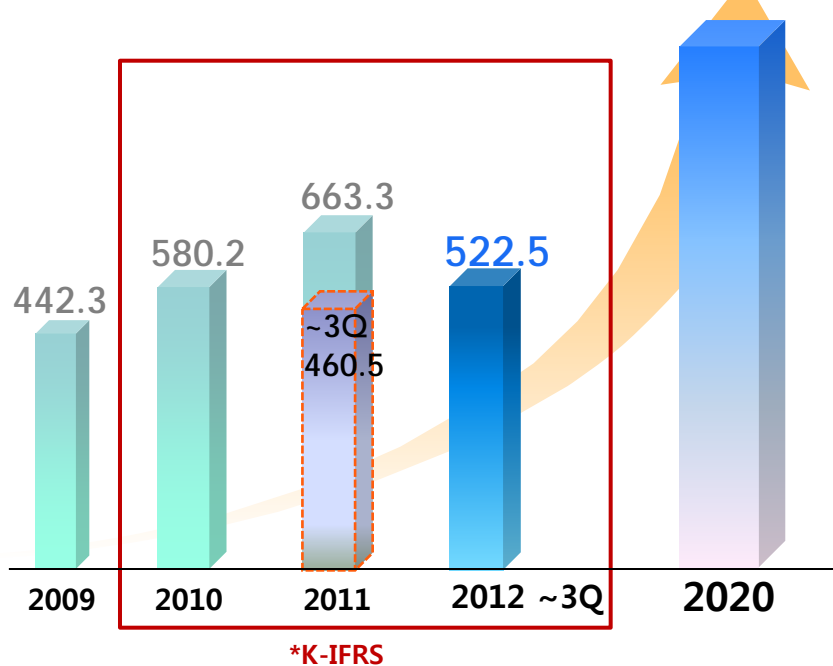
## 2012 3Q Revenue

## • Revenue

[Unit: KRW bn.]

Global Top 5 Power EPC Leader

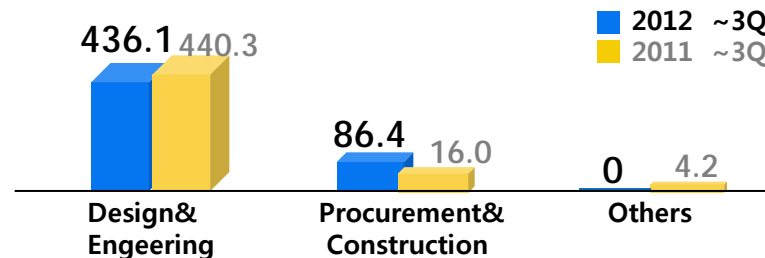
5000 KRW bn.



## • Revenue Breakdown

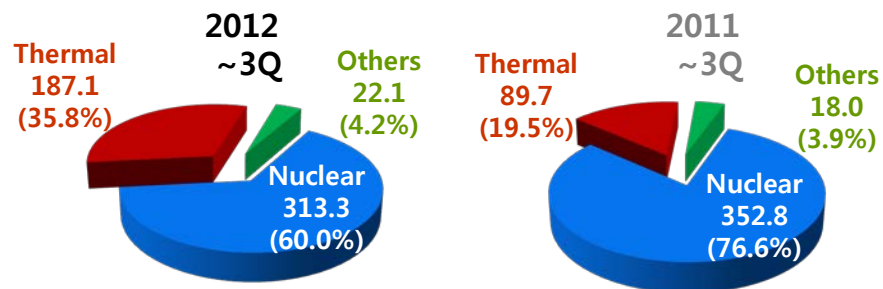
## ■ By Business Area

[Unit: KRW bn.]



## ■ By Division

[Unit: KRW bn.]



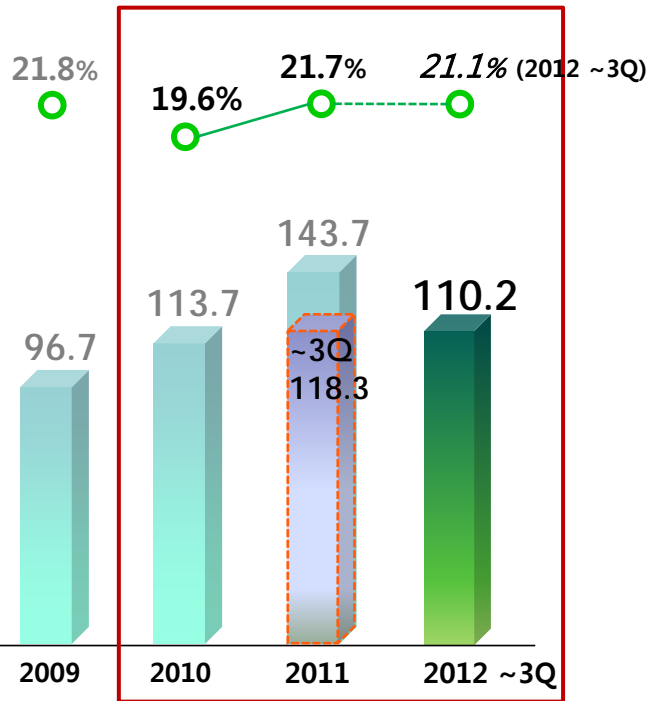
## ■ By Region



## 2012 3Q Financial Highlights

## • Operating Income /Margin

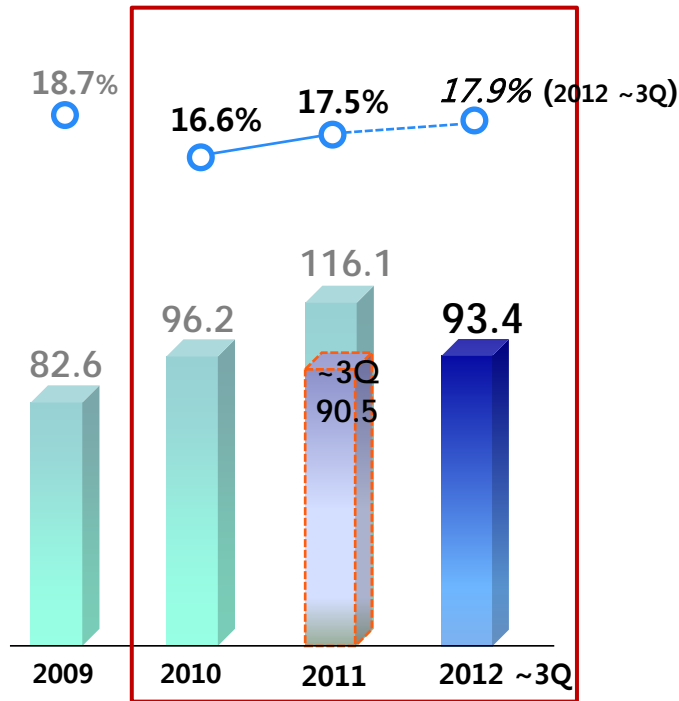
[Unit : KRW bn.]



K-IFRS

## • Net Income /Margin

[Unit : KRW bn.]



K-IFRS

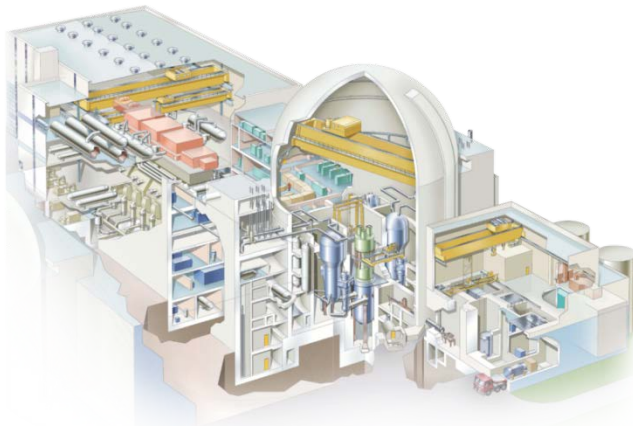
## • 2012 3Q Overview

[Unit : KRW bn.]

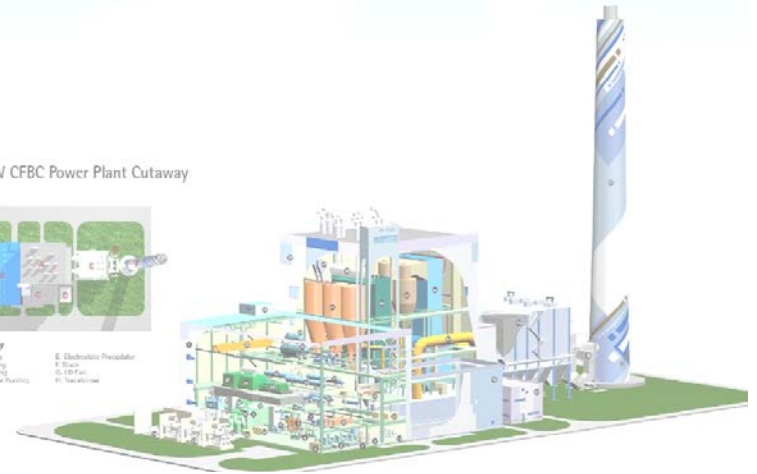
	2012 3Q	2012 2Q	2011 3Q
Revenue	185.9	172.1	177.9
Operating Income	33.2	30.2	52.5
Net Income	28.8	21.9	36.8



# Vision 2020 – Global TOP 5 Power EPC Leader



200MW CFBC Power Plant Cutaway



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