

# Efforts to convert environment-friendly energy from de-coal in Chungcheongnam-do



# Presentation Order

---

1

---

Energy Issued areas in  
Chungnam

2

---

Current Status and  
problems of coal  
thermal power  
generation in  
Chungnam

3

---

Efforts to transform  
de-coal energy in  
Chungnam

4

---

Vision Establishment  
to convert Energy in  
Chungnam

5

---

Local Government  
Tasks for Conversion  
of De-coal Energy



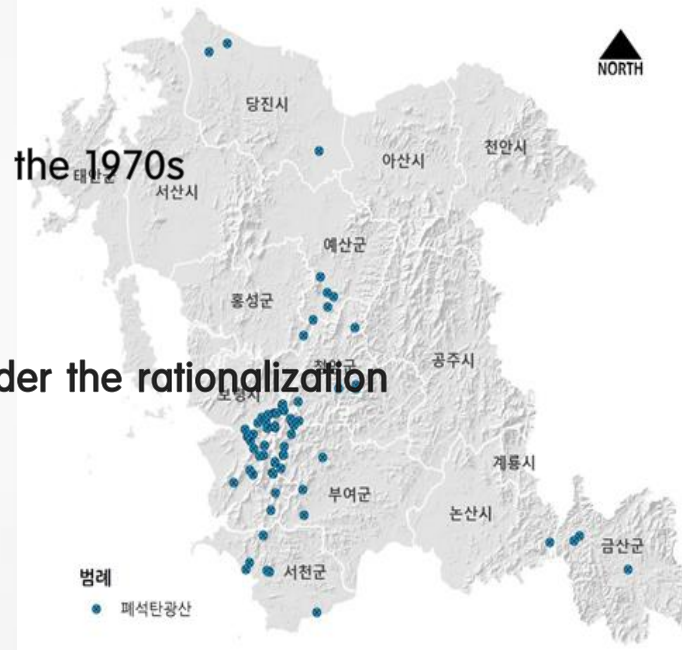
1

# Energy Issued areas in Chungnam

---

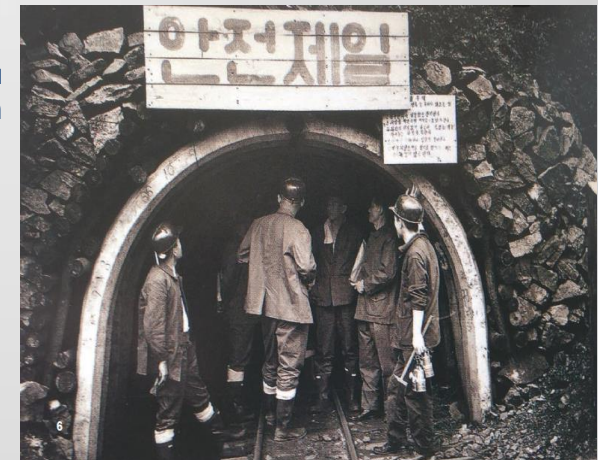
# 1-1. Chungnam - the key development area of coal mining in the 1980s

- South Korea accelerated development of coal mining in the 1970s
  - Strategy to Respond to Oil Crisis
- However, in 1989, coal mining was gradually closed under the rationalization policy of the coal industry
- A total of 90 coal mining mines exist in Chungnam.
  - 54 places in Boryeong, 12 places in Buyeo
- Results of basic environmental survey in 2013 exceeded pollution standards such as arsenic, nickel and zinc in 12 abandoned coal mines



Distribution of abandoned coal mines in Chungnam

Image of Sungju mining tunnel in Boryeong(in 1967)



Source : Korea Mine damage management authority

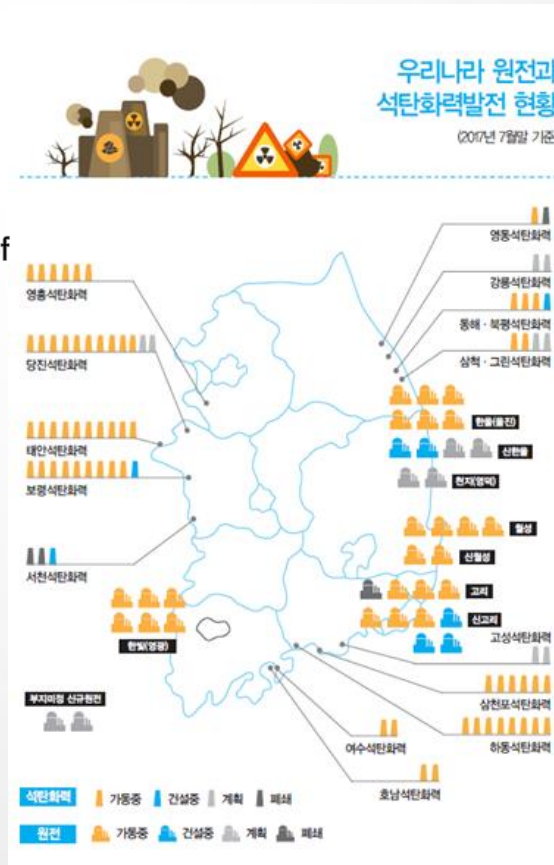
# 1-1. Chungnam – The cluster of a coal thermal power generation

29 of coal thermal power generation exist in Chungnam and it is 51.9% of coal thermal power capacity

▶ Power generation capacity is 20% of national power generation capacity

Electricity production is 114,084GWh in Chungnam in 2015

▶ Electricity production is 21.6% of national Electricity production (528,091GWh)



As of March 2917(Excluding renewable energy)

Section	National		Chungnam		Ration of nation wide
	Quantity	Capacity (MW)	Quantity	Capacity (MW)	
Total	569	94,161	74	18,846	20.0%
Nuclear	24	21,716	-	-	-
Coal	57	29,524	29	15,310	51.9%
Oil LNG	12	3,200	-	-	-
Combined Power generation	180	28,512	22	3,231	11.3%
Hydroelectricity	16	4,700	-	-	-
Collective Energy	73	6,179	3	102	1.7%
Internal combustion	201	330	20	3	0.9%

Electricity production by region (2005 vs 2015)

### 1-3. Chungnam – Enterprises that consume a lot of energy such as petrochemicals, steelworks, etc.

- In Chungcheongnam-do, 331 enterprises use energy more than 2,000toe annually, corresponding to 7.6% of the whole country.
- The energy consumption of the enterprises is 40,310toe, corresponding to 25.8% of the whole country 25.8%.

No. of types of Enterprises that consume a lot of energy

Unit: No. of Enterprises

Section	Buildings	Power Generation	Industrial Purpose	Industrial Types						
				Food	Fiber	Paper, wood	Chemical	Ceramics	Metal	Others
National	1,138	38	2,841	274	189	113	588	179	1,159	339
Chungnam	24	5	302	34	4	12	75	28	131	18

Energy consumption types of Enterprises that consume a lot of energy

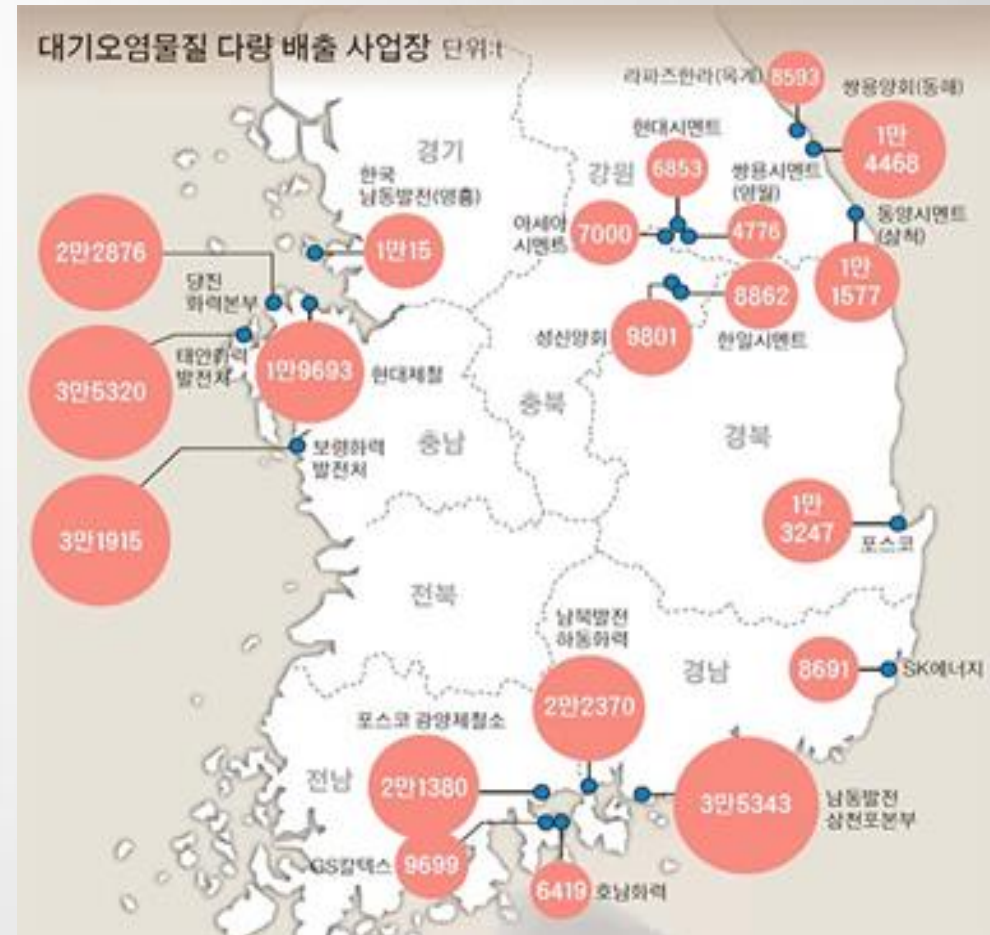
Unit: 1000toe

Section	Buildings	Power Generation	Industrial Purpose	Industrial Types						
				Food	Fiber	Paper, wood	Chemical	Ceramics	Metal	Others
National	2,492	60,344	89,990	1,168	901	1,293	23,259	5,558	37,988	19,824
Chungnam	47	24,137	16,126	98	11	93	5,242	377	8,126	2,149

※ Private Power Generation companies Included In others

## 1-4. Chungnam – Area where air pollutant emissions are concentrated

- Number of enterprises with automatic measuring device attached to chimney
  - ▶ 573 in the nation, 57 in Chungnam (9.9% in the whole country)
- Air Pollution Emissions Measured by Chimney Automatic Apparatus Attachment
  - ▶ 401,677ton/year in the nation, 108,708ton/year in Chungnam(27.1% in the whole country)
- Coal power generation, steel industry, petrochemical company are concentrated in Chungnam
  - ▶ Boryeong Thermal Power Plant, Taean Thermal Power Plant, Hyundai Steel, Dangjin Thermal Power are the Top 10 largest emitters

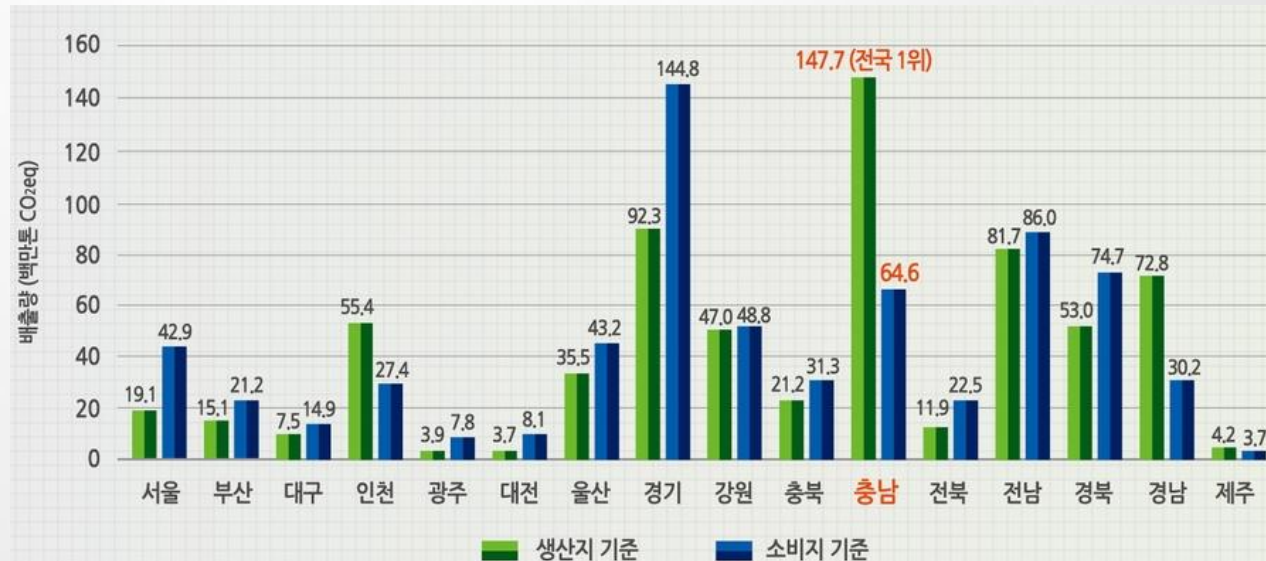


Source: Jungang Newspaper on Jul. 6. 2017

## 1-5. Chungnam - High emission area of greenhouse gas

- More than 20% of the nation's greenhouse gas emissions are emitted from power plants and manufacturing factories in Chungnam.
- Among the domestic greenhouse gas emissions, the portion of the power generation sector accounts for 36%, coal power generation is 75% of the power generation sector. (Korea Energy Economics Institute. 2016)

Greenhouse gas emission by region(As of 2011)



- 생산지 기준 최다 배출지역은 충남으로 우리나라 전체 배출량의 22.0% 배출
- 소비지 기준 최다 배출지역은 경기도로 우리나라 전체 배출량의 21.5% 배출
- 특히, 충남은 생산지와 소비지 기준 배출량 격차가 가장 큼 (83.1백만 톤)
  - ▶ 생산지 기준 : 에너지나 상품이 생산되는 곳에서 나오는 온실가스 배출량
  - ▶ 소비지 기준 : 생산된 에너지나 상품이 소비되는 곳에서 나오는 온실가스 배출량

## 1-6. Chungnam - The main indexes of energy

- Chungnam is a region where both primary energy supply and final energy consumption increase due to coal-fired power plants and energy-consuming companies.
- The final energy consumption per capita in Chungnam (16.29toe / person) is 3.8 times the national average (4.29toe / person).
- The final energy consumption (0.319toe / million won) per GRDP of Chungnam is 2.1 times of the nationwide (0.149toe / million won)
- The final energy consumption in Chungnam is petroleum (56.8%), coal (22.7%) and electric power (11.9%). Industrial sector consumes 82% of petroleum, 81% of coal and 78% of electric power.

Indicators	Primary energy supply (Thousand toe)	Electricity self-sufficiency (%)	Final energy consumption (Thousand toe)	Final energy consumption per person (toe / person)	Final energy consumption per GRDP (toe / million won)
2005	31,110	347.57	14,939	7.61	0.370
2010	45,445	304.75	21,468	10.96	0.288
2015	54,650	241.27	34,045	16.29	0.319

Indicators	Composition ratio by final energy source (%)					
	Coal	Petroleum products	Gas	Electrical Energy	Thermal Energy	New Regeneration
2005	0.4	82.0	4.3	12.9	0.0	-
2010	0.2	78.0	5.9	15.5	0.0	0.4
2015	22.7	56.8	3.8	11.9	0.0	4.7

# 2

## Current Status and problems of coal thermal power generation in Chungnam

---

## 2-1. Construction of coal-fired power plant in Chungnam currently underway

- Since 1983, Seocheon Thermal Power Plant, Boryeong Thermal Power Plant, Taean Thermal Power Plant, and Dangjin Thermal Power Plant were constructed.
- Seocheon Thermal Power Units 1 and 2, which are more than 30 years old, are closed in 2017.
  - Boryeong Thermal Power Units 1 and 2 will be closed within several years
- Six new coal-fired power plants (total 6,000 MW) completed and will be completed after 2016
  - In addition, the construction of the 1,000MW of new Unit 1 at Seocheon Thermal Power

Yr Built	Seocheon Power	Boryeong Power	Taean Power	Dangjin Power	New Facility Capacity(MW)	Acc. Facility Capacity(MW)
1983	Unit1,2	Unit 1			900	900
1984		Unit 2			500	1,400
1993		Unit 3,4,5	Unit 1,2		2,500	3,900
1994		Unit 6			500	4,400
1997			Unit 3,4		1,000	5,400
1999				Unit 1,2	1,000	6,400
2000				Unit 3	500	6,900
2001			Unit 5	Unit 4	1,000	7,900
2002			Unit 6		500	8,400
2005				Unit 5	500	8,900
2006				Unit 6	500	9,400
2007			Unit 7,8	Unit 7,8	2,000	11,400
2008		Unit 7,8			1,000	12,400
2016			Unit 9	Unit 9,10	3,090	15,490
2017		Unit (new)1,2	Unit 10		3,050	18,540

※ These approximate figures may vary in some facility capacities and built years

## 2-2. Chungnam where power consumption is increased in industrial sector as a power generation base

- In Chungnam, both electric power production and power consumption trends are on the rise.
- Electricity self-reliance is decreasing due to the increase in power consumption in industrial sector in Chungnam.
  - ▶ 348% in 2005, 305% in 2010, 241% in 2015
- Electricity independence gap due to difference in operation ratio of power source
  - ▶ Operation ratio of coal-fired power plant is more than 87%
  - ▶ Operation ratio of LNG power plant is less than 50%

### Power Production and Power Consumption in Chungnam

Unit: No. of Enterprises

Classification	2005	2010	2015
Power Usage in Chungnam	78,028	118,272	114,084
Power Consumption in Chungnam	22,449	38,809	47,286
Power self-sufficiency in Chungnam	348%	305%	241%

### Power generation capacity and power consumption by region (as of 2015)

Unit : MW, GWh

Source Type	Gyeongin	Gangwon	Chungcheo ng	Honam	Youngnam	Total
Power generation capacity	28,276	3,460	18,327	13,182	33,384	97,648
Composition Ratio(%)	29.0	3.5	18.8	13.5	34.2	100.0
Power consumption	173,640	16,206	82,058	63,056	144,067	483,654
Composition Ratio(%)	35.9	3.4	17.0	13.0	29.8	100.0

Source: Power Generation Facilities in 2015 by Power Exchange (2016)  
Power statistics in 2015 by Korea Electric Power Corporation (2016)

## 2-3. Increase trend in power plant related conflict

- Conflicts over property damage such as air pollution, damage caused by warm drainage, electromagnetic waves, landscapes and noise, falling land prices
- Conflicts related to coal-fired power plants and ultra-high-voltage transmission line-related conflicts as well as the location of coal-fired power plants and solar power plants are on the rise.



Source : "Getting the disease, fighting the residents ... Stop the coal-fired power generation now" from OhmyNews. May 25, 2017.



Source: "Controversy over Nuclear Power Plant Co-generation Power Plant in Naepo New Town" Hongju Focus, March 15, 2017.



Source: OhmMyNews on September.21.2017



Source : Energy newspaper on September. 19. 2017

## 2-4. The social cost of a coal-fired power plant

- Estimation of social costs due to the emission of air pollutants from power plants in Chungnam: KRW 5,243 billion (2013)
- Estimation of social costs due to greenhouse gas emissions from power plants in Chungnam: KRW 2.237 trillion (2012)
- Changes in marine ecosystem and fish species due to the discharge of power plant hot water

### Power plants and power generation in Chungnam



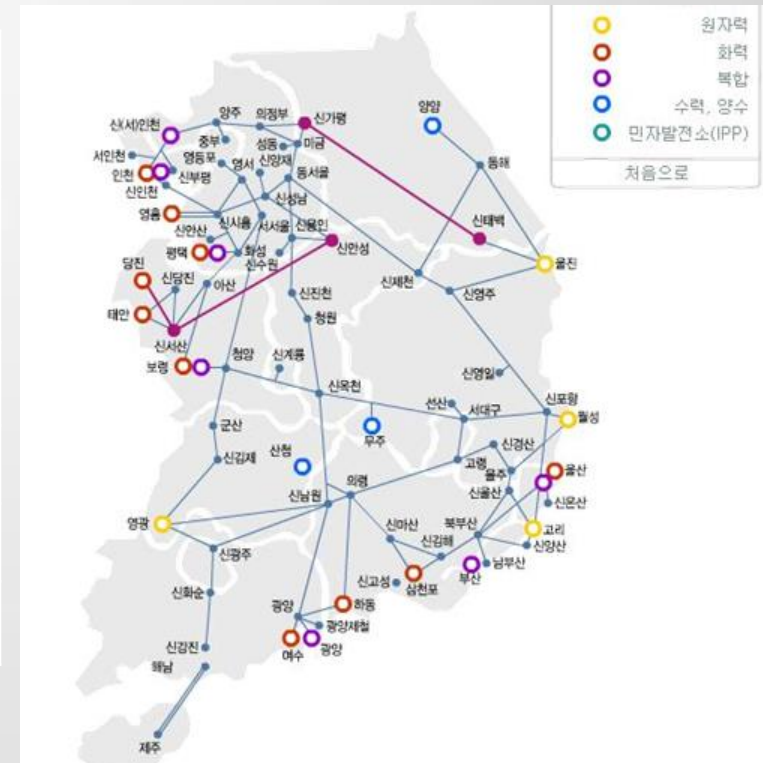
CO<sub>2</sub> in the power generation sector by region (2012),  
Estimated cost of air pollutant emission (2013)

Region	CO <sub>2</sub> Emission (tCO <sub>2</sub> )	CO <sub>2</sub> Damage Cost (million won)	Ratio (%)	Air pollution damage cost (million won)	Ratio (%)
Seoul	359,726	14,575	0.2	23,989	0.2
Busan	16,841,198	682,338	7.2	134,873	1.0
Daegu	2,287,082	92,663	1.0	146,735	1.1
Incheon	33,041,372	1,338,704	14.1	1,132,780	8.5
Gwangju	179,882	7,288	0.1	17,316	0.1
Ulsan	4,482,783	181,624	1.9	867,370	6.5
Geonggi	12,949,896	524,678	5.5	713,453	5.3
Gangwon	4,505,056	182,527	1.9	532,374	4.0
Chungnam	55,212,716	2,236,998	23.5	5,242,827	39.2
Jeonbuk	3,428,483	138,908	1.5	246,941	1.8
Jeonnam	32,815,934	1,329,570	14.0	779,526	5.8
Gyeongbuk	32,906,521	1,333,570	14.0	242,370	1.8
Geongnam	34,058,052	1,379,896	14.5	3,067,460	22.9
Jeju	1,386,306	56,168	0.6	238,799	1.8
Total	234,886,905	9,499,178	100.0	13,386,814	100.0

## 2-5. The social cost of ultra-high voltage transmission lines

- 60% of the electricity produced in the Chungnam is transmitted to other regions, including the capital region.
  - Current transmission line and transmission tower in Chungnam (As of 2013)
    - Transmission line : 756kV 230km, 345kV 994km, 154kV 1,840km
    - Transmission tower : 236 units of 756kV, 1,379 units of 345kV, 2,517 units of 154kV
- Damage to property, environment, and health in the vicinity of ultra-high voltage transmission line

Property Damage	Property value decline
	Restrictions of property for sale(lease)
	Inconvenience of using real estate
	Growth failure of biological organism, poor sales
	Costs for lightning accident prevention facilities, installation of facilities to eliminate radio interference
Environmental damage	Noise, disturbance of view, radio interference, etc.
Physical damage	Health accidents caused by accidents and electromagnetic fields
Mental damage	Mental stress due to property and environmental damage and accident risk



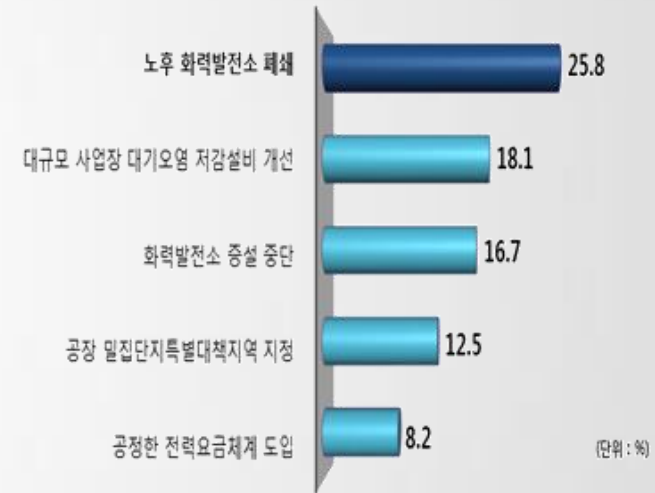
## 2-6. Concentration of heat and drought caused by climate change

- Demand for power generation and industrial water increased in western Chungnam where available quantity is not sufficient.
- Increased drought frequency and intensity by reduced rainfall due to climate change
- Increased infectious diseases due to climate change, such as hyperthermia, Tsutsugamushi disease

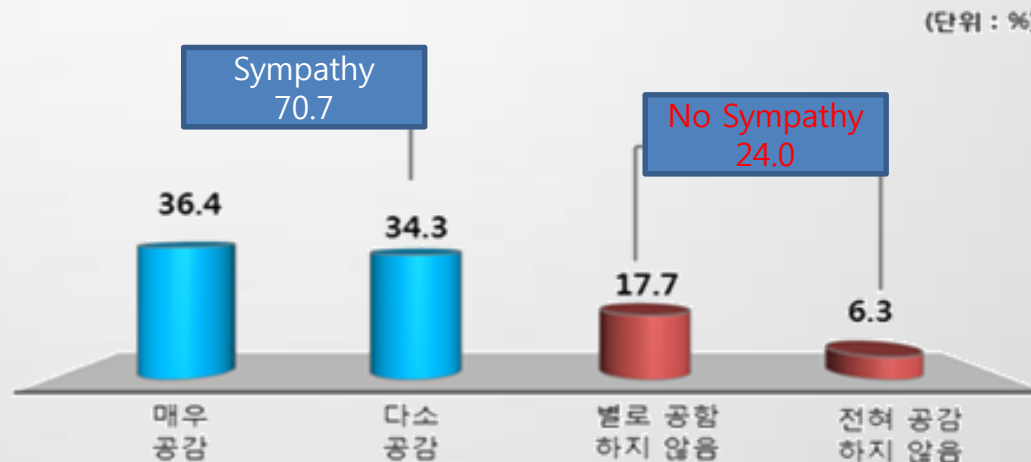


## 2-7. Survey of Chungnam residents' perception regarding fine dust (Sep.2017)

- Priority for fine dust reduction measures: Closure of old power plant as a priority



- Intention to raise electricity tariffs to reduce fine dust: Sympathy for Increase in electricity rates





3

## Efforts to transform de-coal energy in Chungnam

---

## 3-1. Fair power supply system requirements

- Chungnam demands a policy change for a decentralized energy system, emphasizing that the present energy system based on the sacrifice of a specific region is not sustainable.
- Charge of local resource facilities tax rate, increase of tax rate for coal-fired power generation, reinforcement of compensation around power plant and transmission line, demand for reorganization of electricity rate system reflecting social cost
- Chungnam uses the local resource tax as a financial resource for environmental management and energy business.

Trend of local resource tax(Yr. 2015~2020)

Unit: Million Won

Region	Yr. 2015	Yr. 2016	Yr. 2017	Yr. 2018	Yr. 2019	Yr. 2020
Total	32,428	39,869	47,686	49,334	49,449	51,173
Chungnam	11,349	13,954	16,600	17,266	17,289	17,910
City level	21,078	25,915	30,996	32,067	32,109	33,262

## 3-2. Strengthen environmental regulations on coal-fired power plants

- Plans for mid-term air quality improvement management in Chungnam
- Goal to reduce pollutant emissions by 35% compared to 2013 by 2025

✓ Enacted by July 1, 2017, the ordinance for strengthening emission allowance standards of thermal power plants

✓ Signed an agreement to reduce voluntary air pollutants (Top 20 enterprises)

✓ Reduction of mobile emission sources(Early scrap for 100,000 of old diesel cars, conversion to natural gas bus )

✓ Distribute air purifiers to 44 schools in 4 cities around thermal power plants.

✓ Installation and operation of air pollution measuring station in all cities

- Investigate the health effects of local residents and take measures

✓ Since 2013, a public health impact survey on vulnerable areas with environmental pollution has been conducted (within steel complexes, chemical complexes, and thermal power plants in Chungnam)

✓ Enactment of ordinances for strengthening the acceptance standards for sulfur oxides, nitrogen oxides, and dust emitted from power plants

✓ Continuous monitoring of the health of local residents in Chungnam, such as expansion of air quality comprehensive management center and establishment of atmospheric metal monitoring network



### 3-3. Establishment of regional energy plan and promotion of energy business

- Through the establishment of the regional energy plan, we carry out the energy business such as the renewable energy supply business, the energy efficiency improvement business, and the energy welfare business.

- Targeting 11.21 million tons of CO2 reduction by 2020 through the production of new and renewable energy and energy conservation.

➡ Replacement effect of 3.3 units of coal-fired power plant

#### Vision and Goals of Chungnam Regional Energy Plan (2015 ~ 2020)

##### 비전

도민과 함께 청정 · 행복 · 희망 에너지를 만들겠습니다

##### 목표

2020년 온실가스 1,121만tCO<sub>2</sub> 감축

\* 신재생에너지 생산량 2,287천toe \* 에너지 절감량 732천toe

공정하고 정의로운  
에너지 소비

미래대응 에너지  
신산업 육성

버려지는 자원의  
에너지화

신재생에너지  
보급 확산

도민과 함께하는  
행복에너지 실현

## 3-4. Promotion of energy new industry promotion business

• The government intends to foster the energy industry as a new growth engine for the future, and Chungnam is promoting various new energy industries in connection with government policies.

- ▶ Eco-Friendly Energy Town: Utilization of Waste Heat at Waste Incinerator (Asan City Environmental Science Park)
- ▶ Unused energy utilization project: heat-water drainage from thermal power generation (Central power station, West power station)
- ▶ Floating solar farm: Large-scale floating solar farm using water in the Boryeong Dam reservoir (Korea Water Resources Corporation)
- ▶ Energy Independent Island: Installation of renewable energy and smart grid for Island where electrical grid unconnected (Juk island, etc.)
- ▶ Smart Grid Project in Naepo new town: Implementation of 15,000 AMI by 2018
- ▶ Fostering solar venture business: Establishment of Seosan solar venture complex (Hanwha Cussel, etc.)
- ▶ Promoting hydrogen economy: Promoting hydrogen economy as a future economic growth engine, using hydrogen generation from petrochemical and steel mills, hydrogen forum, car sharing project connected with hydrogen filling station, planning of hydrogen theme town, practical use of hydrogen fuel cell vehicle parts



비전	2030년까지 30만 프루슈머 육성, 30% CO <sub>2</sub> 감축
	<b>목표</b>
	■ 최종에너지 믹스 중 수소 비중 13.5%
	■ 수소소비량 100% 자체 생산, CO <sub>2</sub> Free 수소 비중 70%
추진전략	1. 충남도민 주도의 수소사회 전환 2. CO <sub>2</sub> Free 에너지 생산 확대 3. 공정하고 정의로운 에너지시장 확립 4. 수소생태계 구축을 위한 연구개발

### 3-5. Local government responsibilities and authority requirements for energy policy

- Development and announcement of energy policy discussion in Chungnam



- Policy debate in the National Assembly and the need to change national energy policy and environment policy



- Promoting regional energy conversion cooperation with leading local governments



# 4

## Vision Establishment to convert Energy in Chungnam

---

## 4-1. Background and purpose of Vision establishment

---

- So far, we have focused on post-measures to mitigate the damage of coal-fired power plants.
  - In the supply-oriented energy system, local governments passively respond to government energy policies due to lack of authority, responsibility and capacity.
    - ▶ Establish long-term vision and goals that set the principles and direction of de-coal energy conversion.
- 
- In order to promote energy conversion, policy intervention and action by local governments, corporations, and citizens are important factors
  - Citizens need to discuss and decide the energy future of Chungnam directly for the sympathy and participation of local citizens and stakeholders
    - ▶ Establish vision as an opportunity to collect various values and ideas about energy future in Chungnam

## 4-2. The ways to establish vision

- Recruitment and selection of the Chungnam Energy Planning Department (77 citizens of Chungnam )
- Preparation of 2050 Future Energy Scenario in Chungnam (Three Scenarios)
- The first workshop (liberal arts), the second workshop (basic discussion), the third workshop (in-depth discussion and scenario selection)
- Development of detailed goals and action plans based on the final selected scenario



# 충남 2050 에너지전환 비전을 수립할 도민 에너지기획단을 모집합니다



## 도민이 직접 충남 2050 에너지 미래를 결정한다

- **왜 하나요?** 도민이 직접 참여하여 충남 2050 에너지전환 비전을 수립하기 위함입니다.
- **누가 신청할 수 있나요?** 충남에 거주하는 누구나 참여 가능합니다.  
에너지에 대한 전문지식이 없어도 지속가능한 미래에 관심이 있다면 신청하실 수 있습니다.  
다만, 총3회 워크숍에 모두 참석해야 합니다.(총3회 참석자에게 소정의 참가수당 제공)
- **누가 선정되나요?** 신청자 중 거주지, 연령, 성별, 직업 등을 고려하여 75명을 선정하여 '충청남도 도민 에너지기획단'으로 위촉합니다.(에너지기획단은 일반 도민으로 구성되어 때문에 에너지 전문가는 제외되며, 3차 워크숍에서 개최되는 별도의 컨퍼런스에 초청됩니다.)

● ● ● ● ● 충청남도 에너지전환 비전 수립을 위한 도민 에너지기획단 워크숍 개요 ● ● ● ● ●

<h3>1차 워크숍</h3> <p>고양교육 10/14(토) 오후 1~6시 (5시간) 충남도청 대회의실(4층)</p>	<h3>2차 워크숍</h3> <p>기초토론 10/21(토) 오후 1~6시 (5시간) 충남도청 대회의실(4층)</p>	<h3>3차 워크숍</h3> <p>심층토론과 비전선택 10/28(토) 오전 10~오후 6시 (8시간) 예산 리튬스파라셀 로즈마리룸(2층)</p>
--	--	--

### 지원신청서 제출 방법 안내

- 충청남도([www.chungnam.go.kr](http://www.chungnam.go.kr))와 충청남도지속가능발전협의회([www.cncd.kr](http://www.cncd.kr)) 홈페이지에서 지원신청서(양식)를 내려 받아 인터넷(이메일)으로 직접 신청하거나, 읍·면·동 주민센터에서 지원신청서를 작성하여 우편이나 팩스로 발송(9/18(일) 신청 마감)
- 이메일 제출 : [cnagenda@hanmail.net](mailto:cnagenda@hanmail.net)(충청남도지속가능발전협의회)
- 구글폼 작성 : <https://goo.gl/cd5h42>
- 우편 발송 : (3244) 충청남도 예산군 삼교동 도청대로600 충청도청 회회로 102호 충청남도지속가능발전협의회 앞
- 팩스 전송 : 041634-8061(충청남도지속가능발전협의회)
- 서군 불편용 주민센터 : 현장 지원신청서 작성(→충청남도지속가능발전협의회로 팩스 전송)



**충청남도**

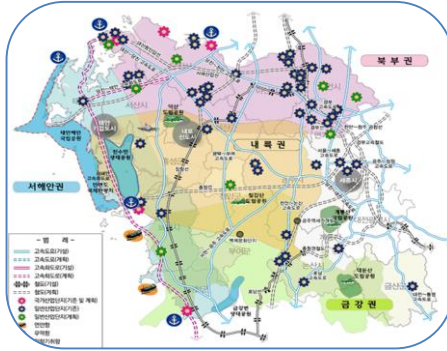
☎ 1차 충청남도 : 충남녹색성장모임 충남연구원  
 ☎ 2차 충청남도지속가능발전협의회 에너지기후정책연구소  
 ☎ 3차 충청남도지속가능발전협의회 041634-8081, 041634-8060

## 4-3. Comparison of Future Energy Scenario (Plan)

1

### Base Scenario : BAU

"Assuming that the current trend will continue in the future"



2

### Plan A. Carbon Economy Scenario

"Economic growth through continuous development of clean coal energy industry"



그림: Bristol 2050 Low Carbon Scenario X

3

### Plan B. New Energy Industry Scenario

"Hydrogen-powered energy new industry, Leading the future economy of Chungnam"



그림: bobbeth.com

4

### Plan C. Energy Citizen Scenario

"Renewable energy economy to create local jobs, a joint effort for a sustainable future"



그림: Bristol 2050 Low Carbon Scenario Y

## 4-3. 미래 에너지 시나리오(안) 비교

1

### Base Scenario : BAU

- ❖ Lifestyle: Convenience is better.
- ❖ Industry and Economy: The mainstream industry is not changeable.
- ❖ Energy: coal / petroleum consumption continues to increase
- ❖ Ecological environment: GHG / Sustainable increase of fine dust
- ❖ Governance: Centralized & Power Supply Bases

2

### Plan A. Carbon Economy Scenario

"Economic growth through continuous development of clean coal energy industry"

- ❖ Lifestyle: The cheapest and most reliable supply is the biggest concern
- ❖ Industry and Economy: Sustainable Growth in Export to China
- ❖ Energy: CCS technology continues coal generation
- ❖ Ecological environment: GHG emissions are reduced.
- ❖ Governance: Centralized & Power Supply Base

3

### Plan B. New Energy Industry Scenario

"Hydrogen-powered energy new industry,  
Leading the future economy of Chungnam "

- ❖ Lifestyle: Moves to a hydrogen car
- ❖ Industry and Economy: Hydrogen industry boosts
- ❖ Energy\_Demand stagnates and natural gas and hydrogen boost.
- ❖ Ecological environment\_ GHG emissions are reduced, Hydrogen network is constructed
- ❖ Governance: local energy corporation leads

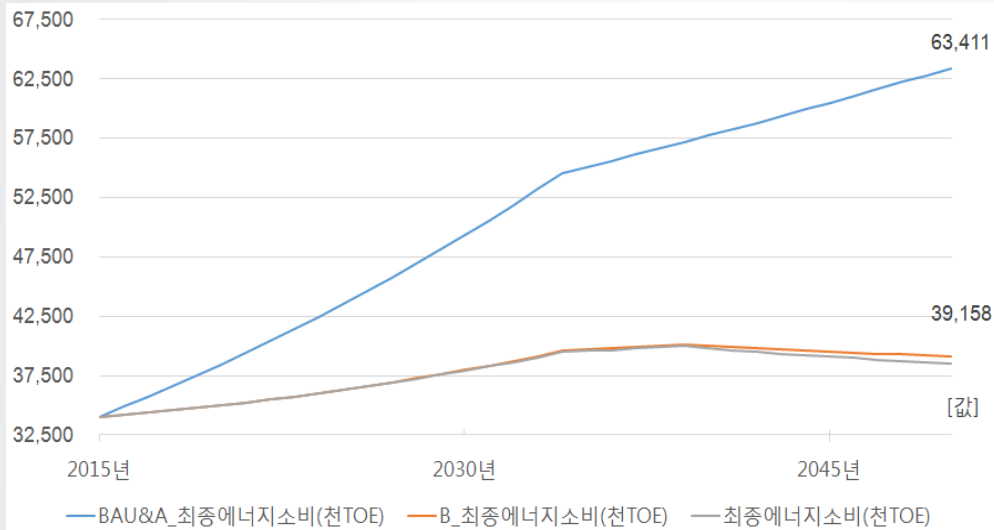
4

### Plan C. Energy Citizen Scenario

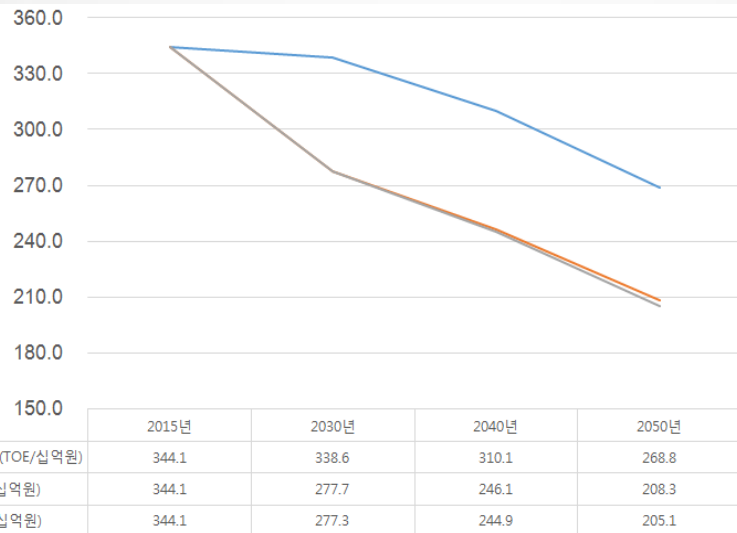
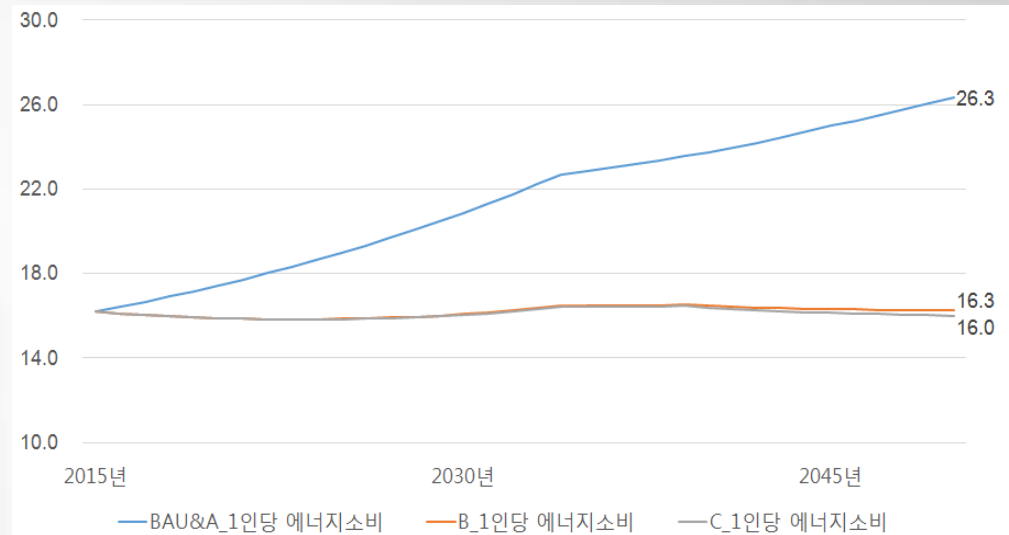
"Renewable energy economy to create local jobs, a joint effort for a sustainable future"

- ❖ Lifestyle: dominated by energy citizens
- ❖ Industry and Economy: made by renewable energy industry
- ❖ Energy: Coal power plant disappeared, replaced by renewable energy
- ❖ Ecological environment: GHG emissions are reduced and every single house has solar farm
- ❖ Governance: Energy self-government and community energy diffusion

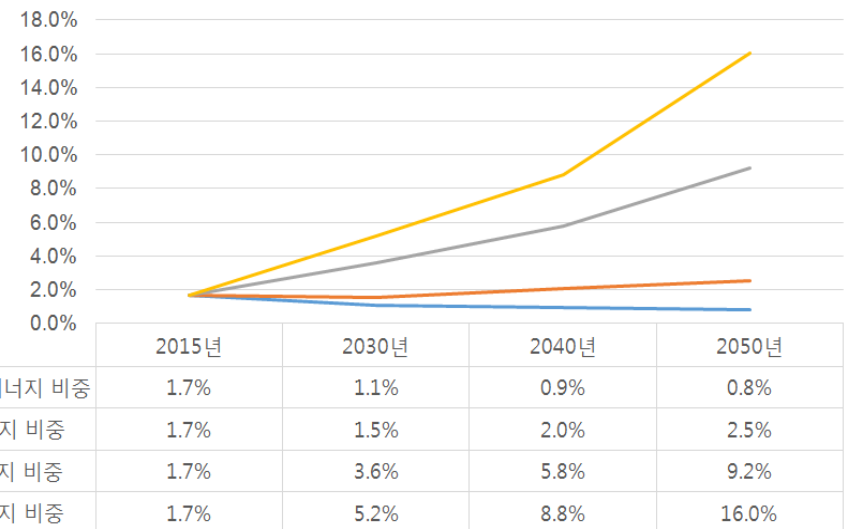
## Final Energy Consumption



## Energy Consumption per capita

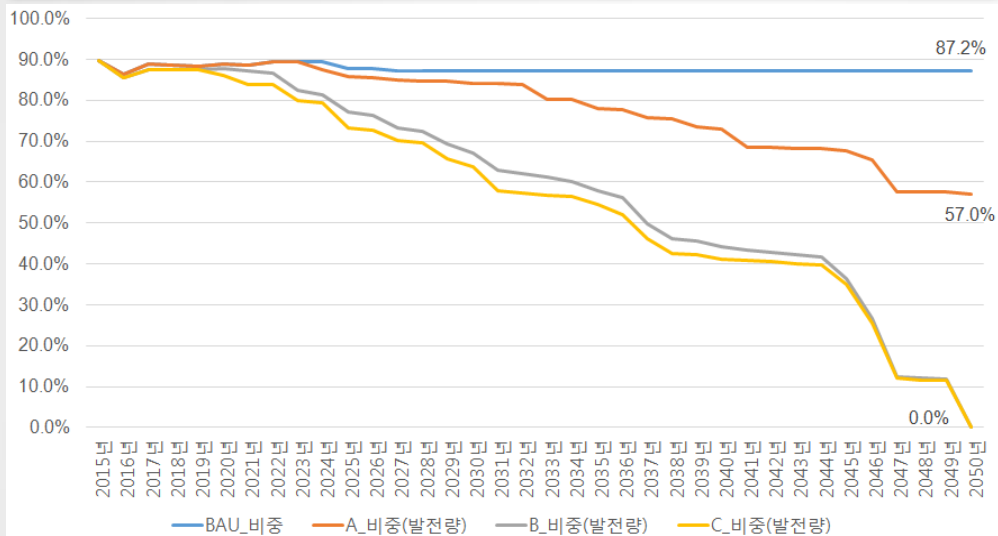


## Energy Consumption per value added

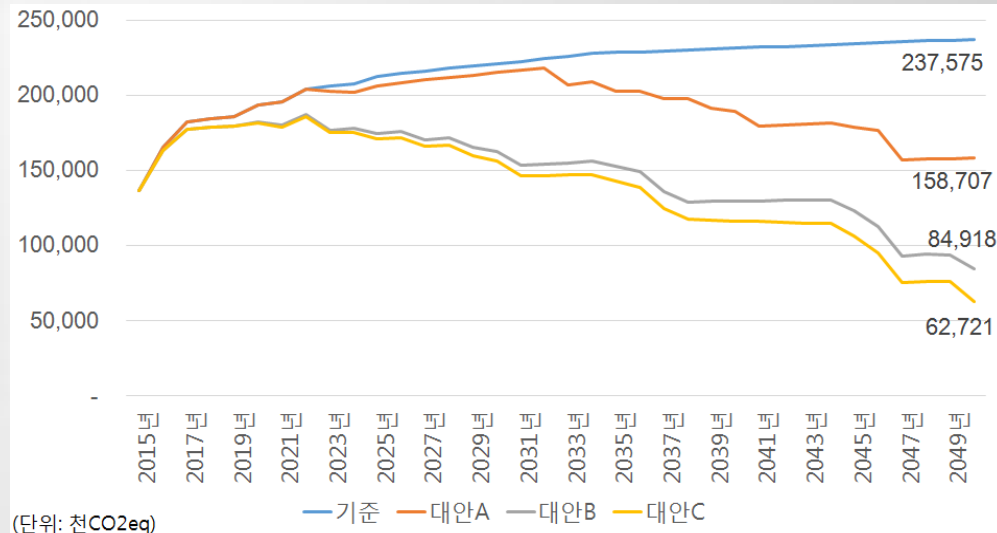
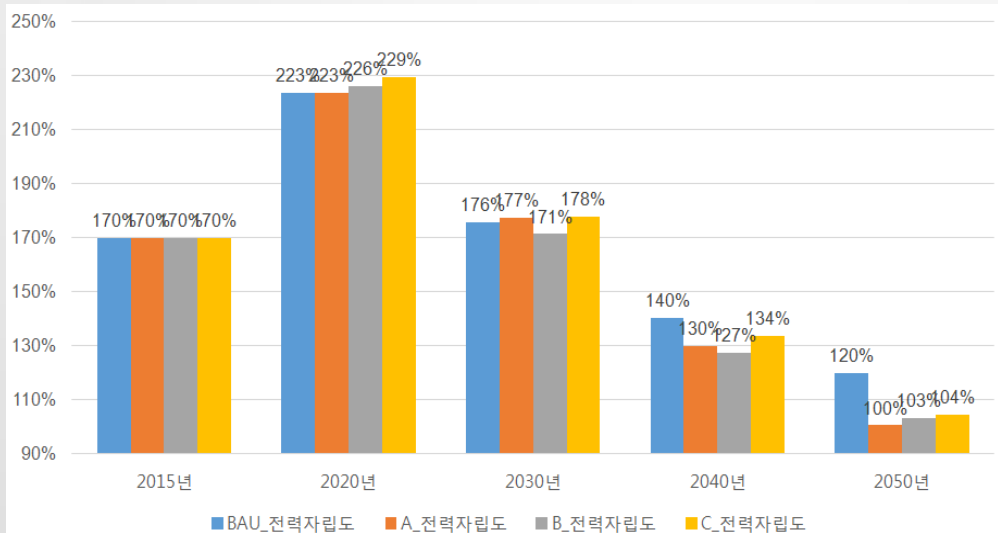
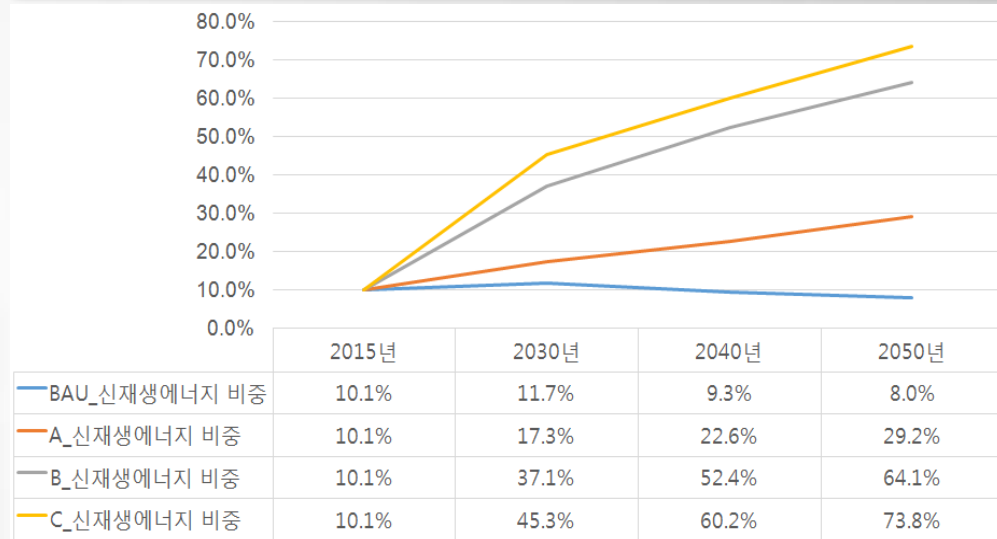


## Proportion of renewable energy among final energy

## Proportion of coal power generation



## Proportion of renewable energy among power consumption



## Power self-sufficiency

## GHG Emissions Outlook

# 5

## Local Government Tasks for Conversion of De-coal Energy

---



## 5-1. Local government efforts for energy conversion until now

---

### • A joint effort of local governments

- ▶ In 2012, Declaration of Nuclear Energy Conversion (46 local governments participated by Nowon-gu)
- ▶ In 2015, Joint Declaration for Regional Energy Conversion (Seoul-Gyeonggi-Chungnam-Jeju)
- ▶ In 2016, Constitution of local government council for national energy conversion (25 of local governments)
- ▶ In 2017, Regional Energy Forum held (Seoul-Gyeonggi-Chungnam-Jeju-Busan)

---

### • Local Government Goals for Energy Conversion

- ▶ (Seoul, 2012) Reduce 1 nuclear power plant, (2014) Energy saving city, Seoul! → Substitution of nuclear power plants by 2020
- ▶ (Jeju, 2012) Carbon-free island 2030 → Power consumption by the year 2030, 100% Replacement of renewable energy
- ▶ (Gyeonggi, 2015) Gyeonggi Energy Vision 2030 → Replacement of old-age nuclear power plants by the year 2030
- ▶ (Chungnam, 2015) Clean, Happiness, Hope Energy with the Residents → 3.3 units of Replacement of Coal Power Plant in 2020
- ▶ (Busan, 2017) Clean Energy City, Busan! → 100% of Electricity independence rate through renewable energy in 2050
- ▶ (Daejeon, 2017) Smart zero energy city → 20% of power generation is covered by renewable energy in 2030

## 5-2. Things to do for Chungnam

---

- Declaration of vision to converse de-coal energy in Chungnam

- ▶ Based on the energy scenarios selected by the Chungnam Energy Planning Team, Chungnam declared its vision and goal of converting de-coal energy publicly
  - ▶ Support the establishment of city unit energy vision or energy conversion plan
- 

- Establishment of an implementation system for achieving vision

- ▶ Expansion of Energy Commission
  - ▶ Sustainable operation of the Chungnam Energy Planning Team
  - ▶ Establishment of dedicated energy department, establishment and operation of city unit energy center in Chungnam
  - ▶ Conduction of energy conversion experiment (energy living lab, coal-free day, etc.)
- 

- Establishment and utilization of energy conversion fund (institutionalization at national level, allocation of municipalities)

- ▶ Establishment of Chungnam conversion energy fund(use the existing local resource facility tax, request to distribute some fund among electricity industrial fund to local government), request to raise fund for eco-friendly energy conversion fund, establishment of energy tax/carbon tax and request for allocation to local government)
- ▶ Support for early closing costs of power plants, support for renewable energy projects, job conversion training, research and development, and budget for education and publicity.

## 5-3. Things to do for local government for energy conversion

---

### ○ Request for inclusion for de-coal roadmap in the third National Energy Basic Plan

- ▶ Limitation of facility capacity and power generation of coal-fired power plants

∴ Reviewing various methods such as the total amount of coal-fired power generation, total emission of air pollutant, total amount of greenhouse gas emissions

- ▶ Regular and comprehensive survey and research on social costs (environment, health damage etc.) of coal-fired power plants
- ▶ A plan to reflect the energy mix of renewable energy companies (renewable energy proportion etc.), environmental performance and contribution of community to company evaluation and power purchase

---

### ○ Securing Local Authority to Determine the Social Life of Coal-Fired Power Plants

- ▶ Authority of regular review of the operation of coal-fired power plants, improvement of facilities and early closure
- ▶ The authority to review the performance and continuity of coal-related investments (IGCC, CCUS, etc.) of public power plants.
- ▶ Obligation of local government to reflect the social life of coal-fired power plants

---

### ○ Participation and establishment of local government network on the theme of de-coal and energy conversion

- ▶ Share experiences on issues of debate, problems, and measures in the process of de-coal energy conversion



# 2017 탈석탄 친환경 에너지전환 국제 컨퍼런스

2017 International Conference on  
Coal Phase-out and Energy Transition

2017. 10.25.(Wed) / 충남 예산 덕산 리솜캐슬

# Thank you

