The Current State of Energy Transition in South Korea: Challenges & Opportunities

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1. **The Background of Energy Transition in South Korea**
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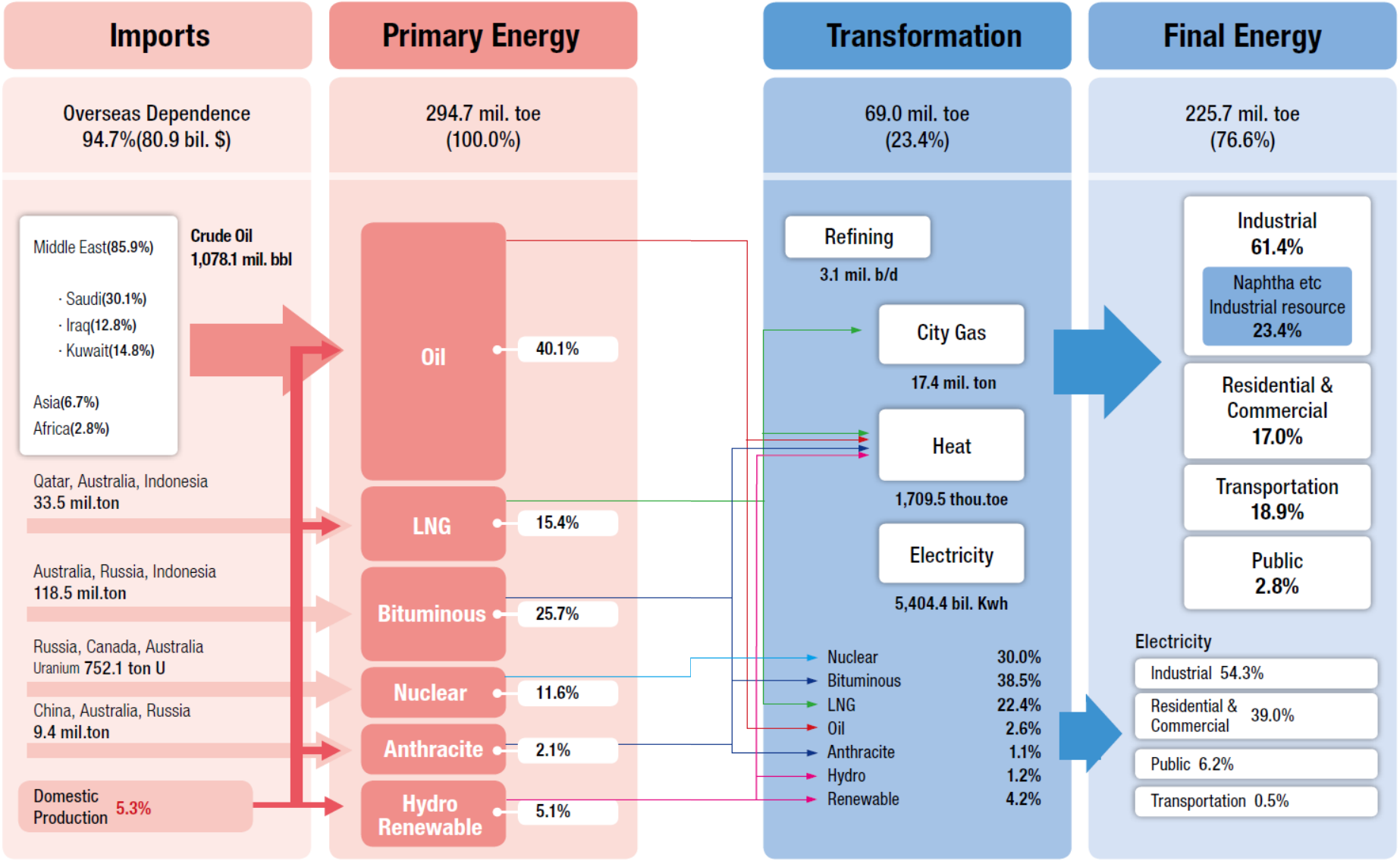
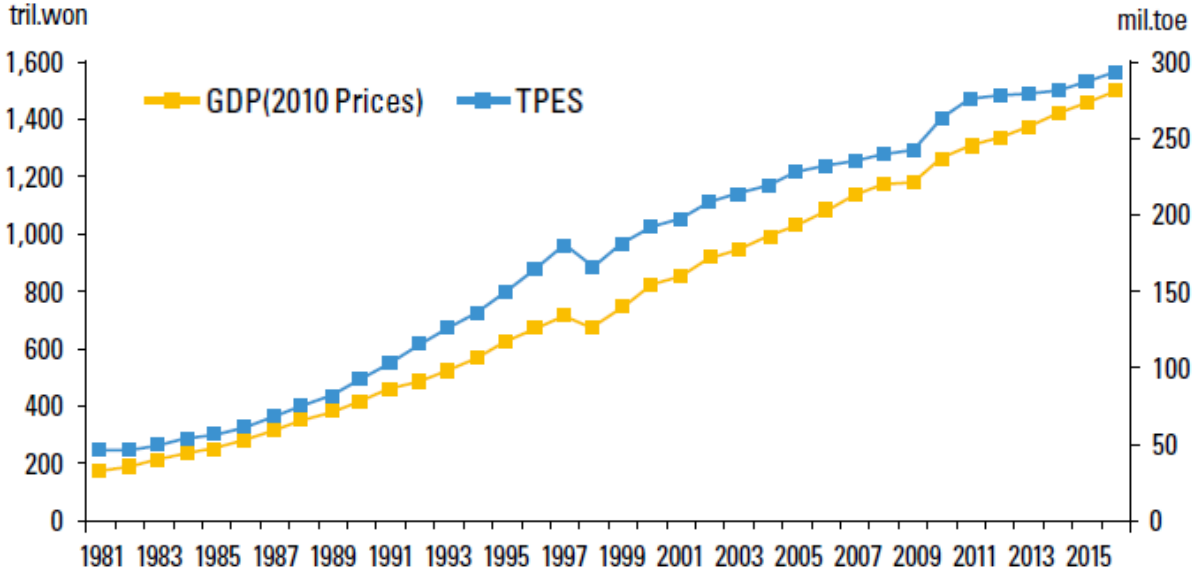
Energy Balance Flow (2016)

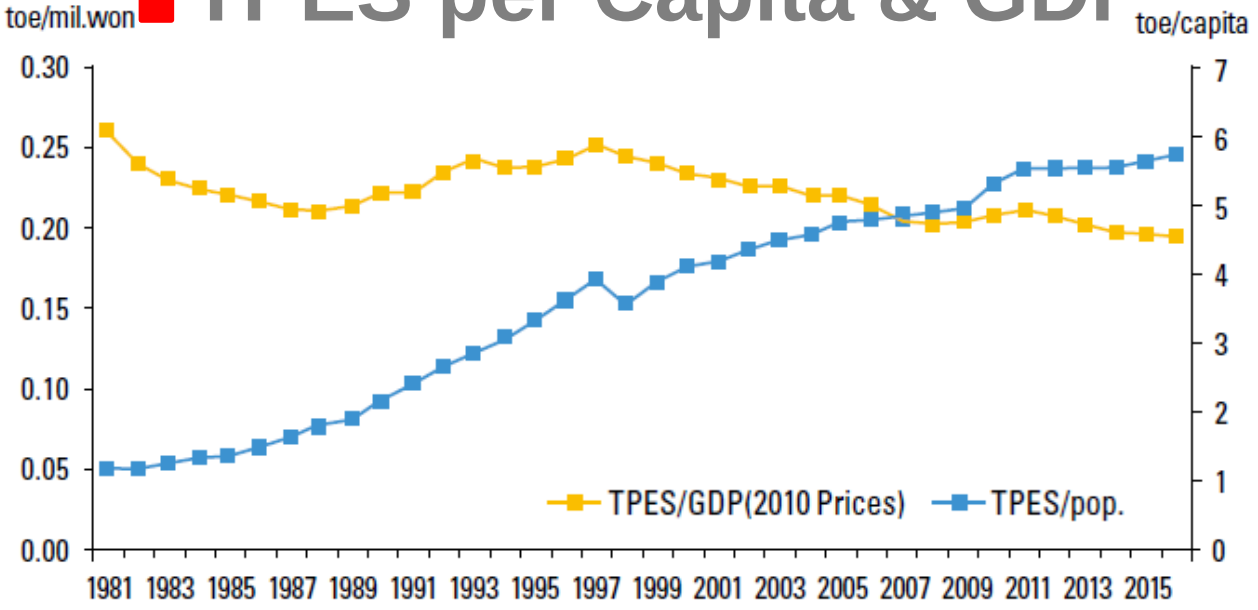


Source: KEEI, Energy Info. Korea 2017, 2018.

Trends in TPES and GDP

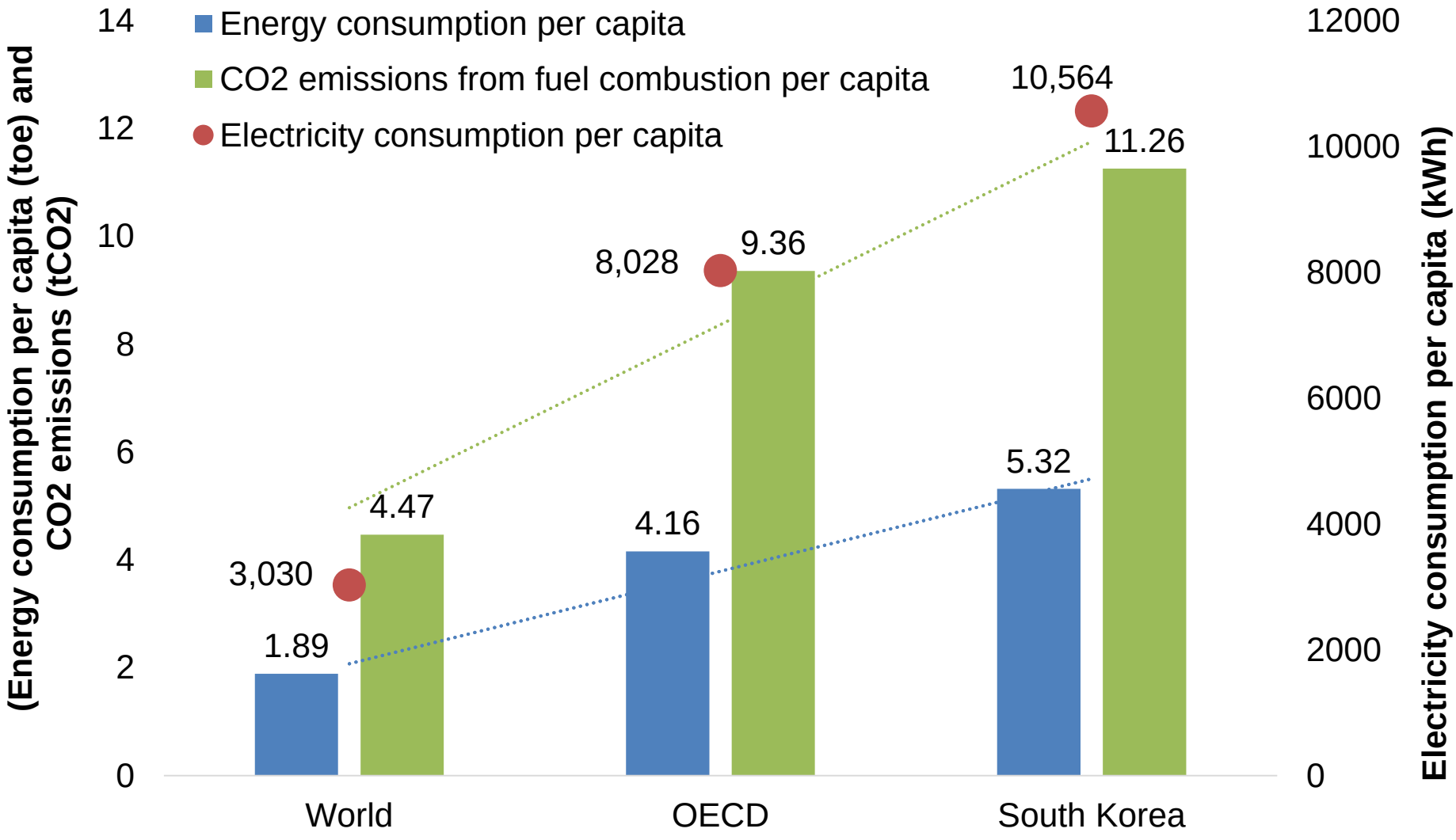


TPES per Capita & GDP

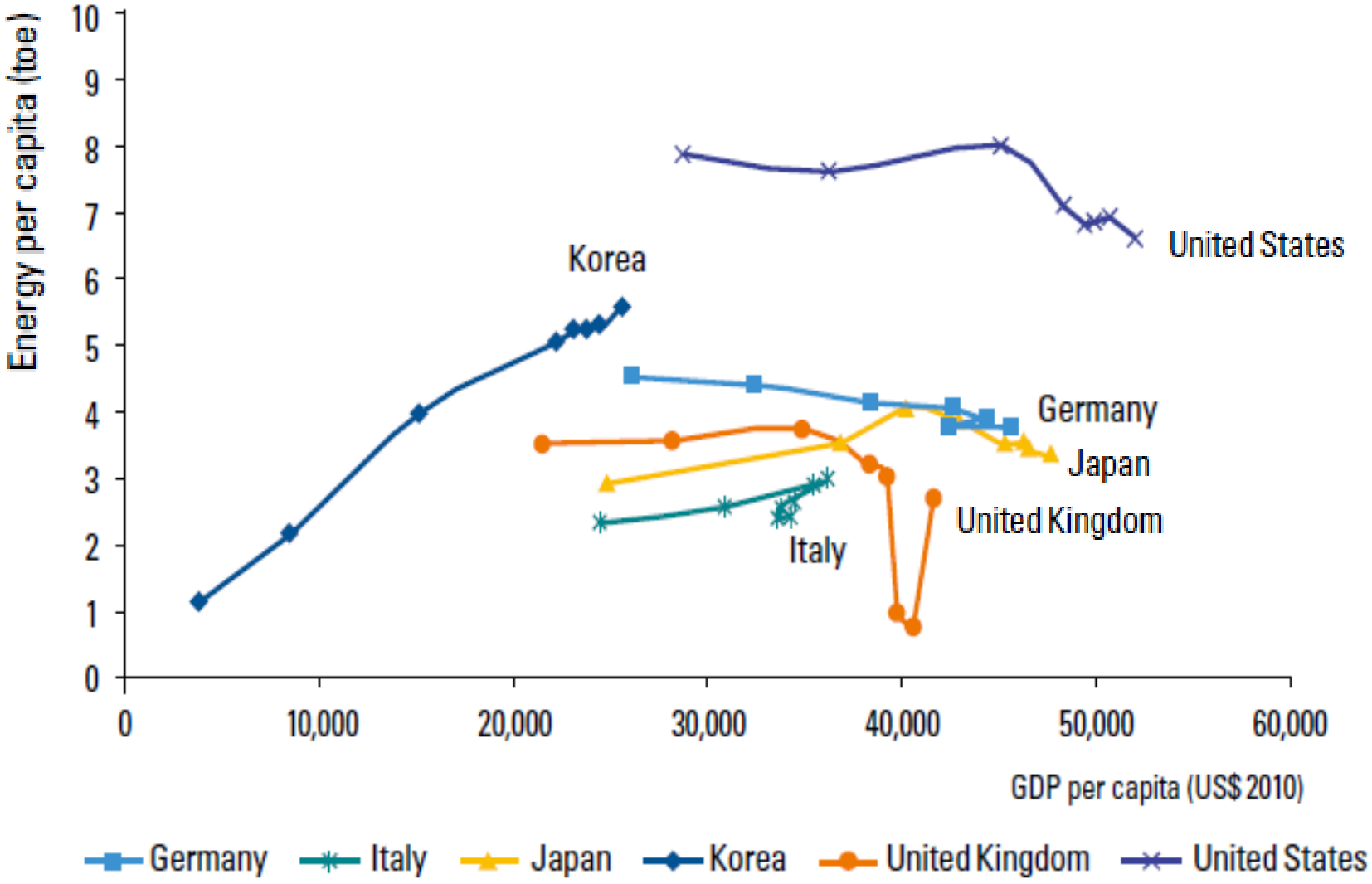


Source: KEEI, Energy Info. Korea 2017, 2018.

Comparative Energy Consumption of Korea

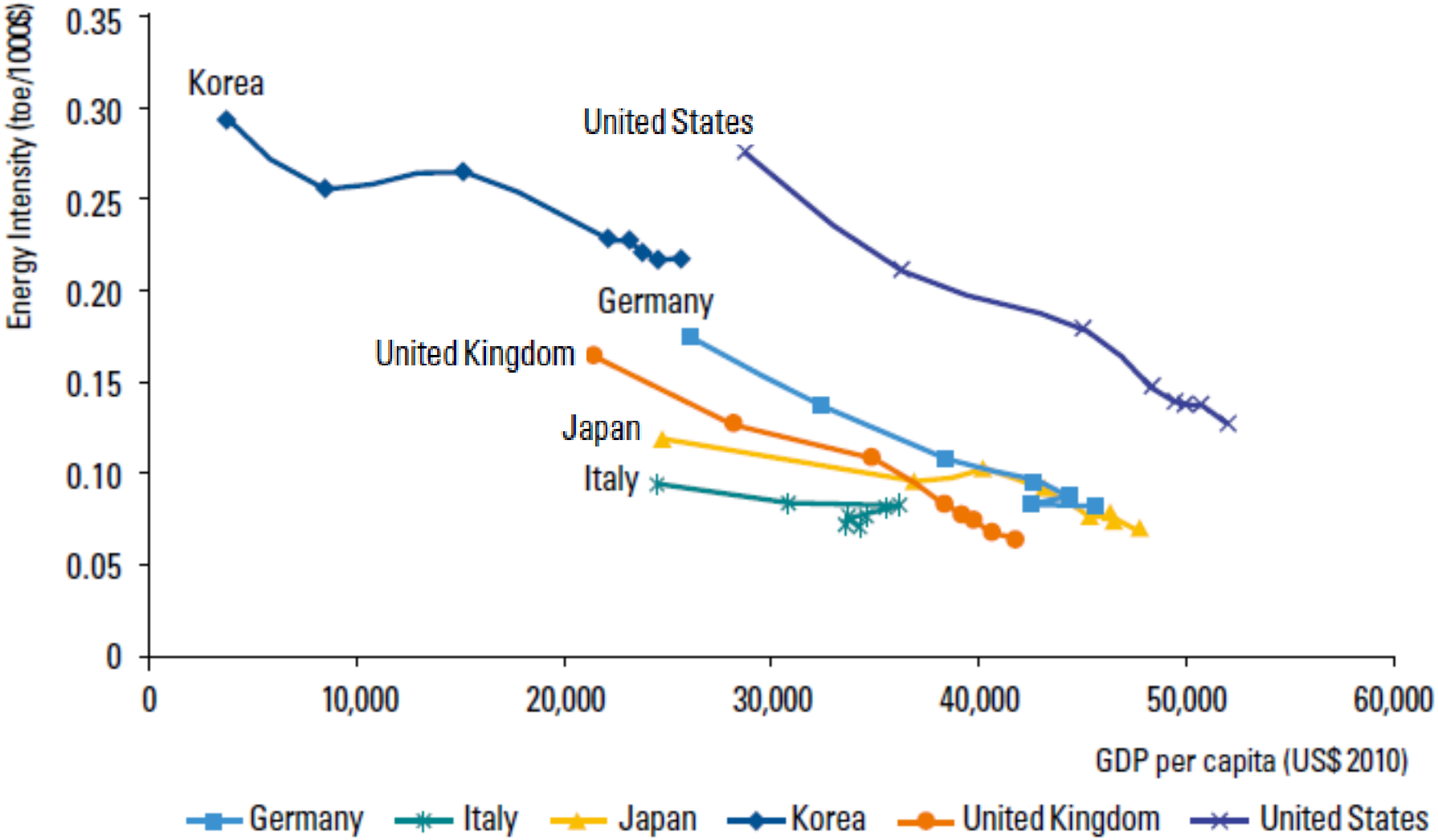


Energy Consumption per capita by Country



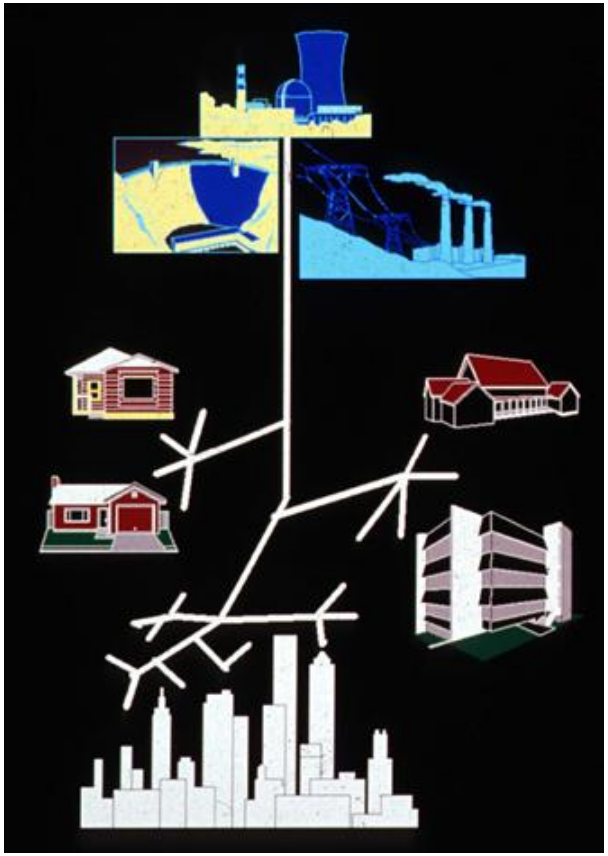
Source: KEEI, Energy Info. Korea 2017, 2018.

Energy Intensity by Country



Source: KEEI, Energy Info. Korea 2017, 2018.

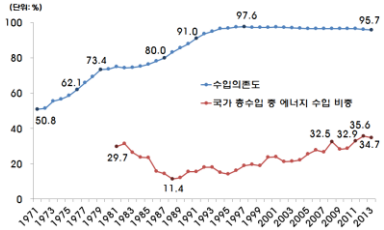
Problems of the Conventional Energy System



The Centralized Supply-oriented Fossil Fuel- and Nuclear-based Energy System (94.9% of TPES; 94.6% of electricity energy source)

Increasing energy consumption

Climate change



Vulnerable energy security

Fine dust

Deepened nuclear risk (normal accident/spent fuel)

Environmental injustice/Social gap
➡ Social conflicts

Energy-related Presidential Pledges of Mr. Moon

17. Safe & Healthy Korea

The state will take responsibility for People's life

- Establishment of Nuclear Zero Post-Nuclear State after 40 years
  - Closure of aged nuclear power plants and stopping new reactors' construction
  - Accomplishment of 20% of renewable energy by 2030
- 30% Reduction of Fine Dust within Moon's Tenure
  - Stopping construction of new coal-fired power plants and closure of aged ones
  - Temporary Shut-down of coal-fired power plants during Spring season

President Moon pledged Nuclear-free Society

"The shutdown of KORI 1 is the beginning of a nuclear-free energy country, a paradigm shift for a safer Korea"(June 19, 2017)

- Nullifying construction of new nuclear power plants under preparation
- Prohibiting lifetime extension and closure of extended Wolsung 1
- Deriving social consensus on construction of Shingori 5 and 6 with consideration on safety, completion rate, given investment, compensation costs, electricity reserved margin and so on.

Energy-related Policy Tasks among 100 Ones

National Vision	A Nation of People, a Just Republic of Korea
Five Main Policy Goals	A Government of the People
	An Economy Pursuing Co-Prosperity
	A Nation Taking Responsibility for Individual Lives
	Well-balanced Development Across Every Region
	The Korean Peninsula of Peace and Prosperity

- Safe Society Keeping People's Security and Life
  - Creation of Clean Air Quality without Worry about Fine Dust
  - Energy Transition through Post-Nuclear Policy toward a safe and clean energy society
  - Establishment of faithful implementation system of New Climate Regime

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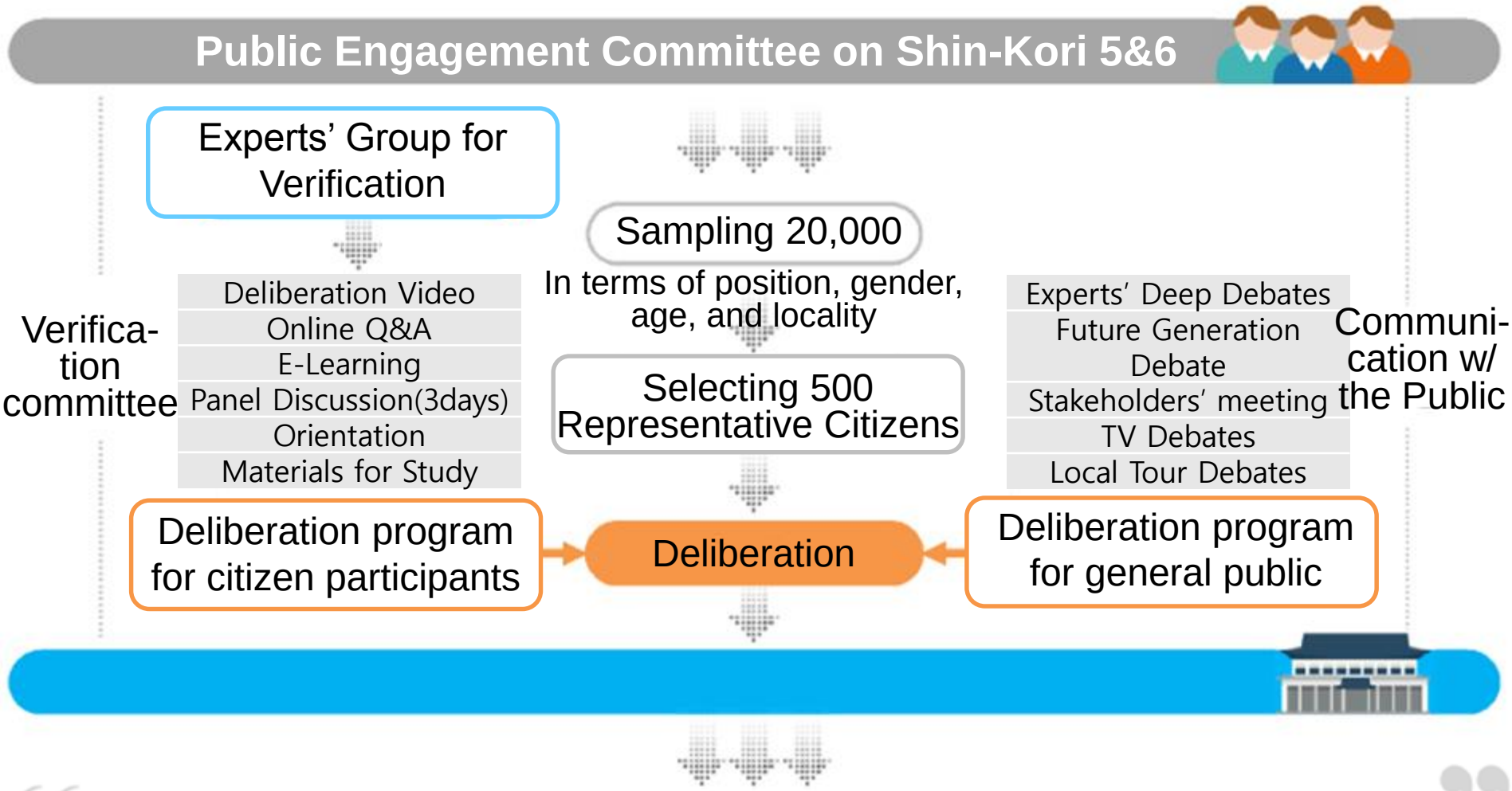
The Public Engagement Process on Shin-Kori 5 & 6

- Presidential Pledge: Stop of the construction
- Celebration Speech in the Permanent Shut-down of Kori 1 on June 19, 2017: Suggestion of decision based on social consensus
- The President moderated cabinet meeting on June 27, 2017: Decision on Public Engagement Process
- Suspension decision on the construction on June, 14, 2017
- Establishment of Public Engagement Committee on Shin-Kori 5 & 6 on July 24, 2017
- Activities of the Citizen Representative Group from Sep. 16 to Oct. 15, 2017
- Submission of the Outcome of public engagement process on Oct. 20, 2017

Public Engagement Process



"Final decision by the government based on the people's will"

Source: Report of the PEC, 2017

Recommendation of the PEC

- Resuming suspended construction of Shin-Kori 5&6
- Promoting energy policy to make the share of nuclear power reduced
- Supplementary recommendations needs to be implemented as soon as possible

Distribution of Opinions

Source: Report of the PEC, 2017

category	Resume	Stop	category	Resume	Stop
Male	66.3	33.7	Seoul	57.4	42.6
Female	52.7	47.3	Incheon·Gyeonggi	58.6	41.4
20s(+19)	56.8	43.2	Daejeon·Chungcheong	65.8	34.2
30s	52.3	47.7	Gwangju·Jeolla·Jeju	46.1	***54.9***
40s	45.3	***54.7***	Daegu·Gangwon·Gyeongbuk	***68.7***	31.3
50s	***60.5***	39.5	Busan·Ulsan·Gyeongnam	***64.7***	35.3
60s+	***77.3***	22.5	**Total**	**59.5**	**40.5**

Share of nuclear power	Reduce	Maintain	Enlarge	Don't know
	53.2%	35.5%	9.7%	1.6%

The Moon Government's Position on PEC's Recommendation

- Resuming Construction of Shin-Kori 5&6 +

  Confirming a Road map for Energy Transition

  - Pushing for follow-up measures and complementary actions: Strengthening nuclear safety standard, expanding investment in renewable energy, preparing solutions for spent-fuel of nuclear power plants
  - Strengthening nuclear safety standards: Strengthening safety evaluation of multiple reactors, Strengthening earthquake proof standard, Eradicating nuclear corruption
  - Energy transition: Transition toward safe and clean energy, Scrapping the new reactor construction plan, nuclear-phasing out through prohibiting life-time extension of aged reactors, expanding the share of renewables to 20% by 2030

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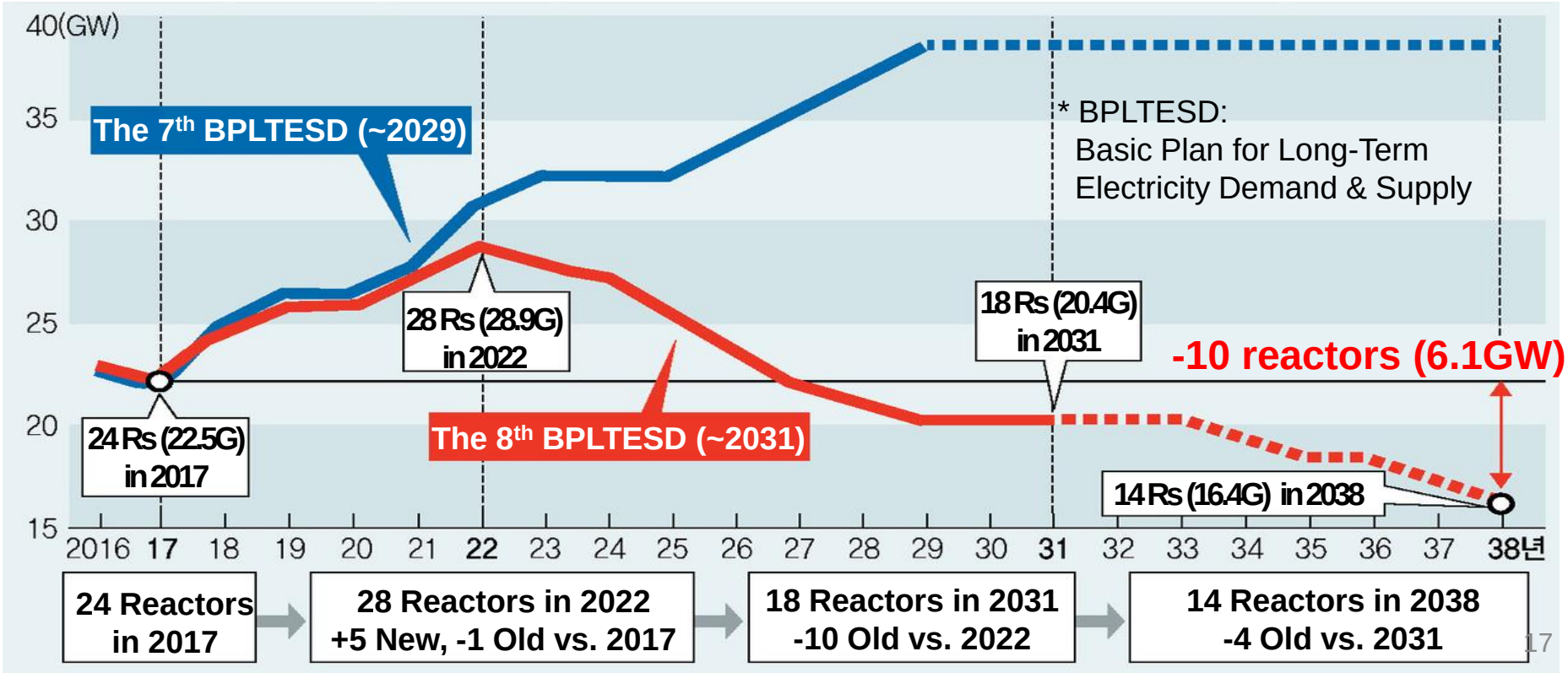
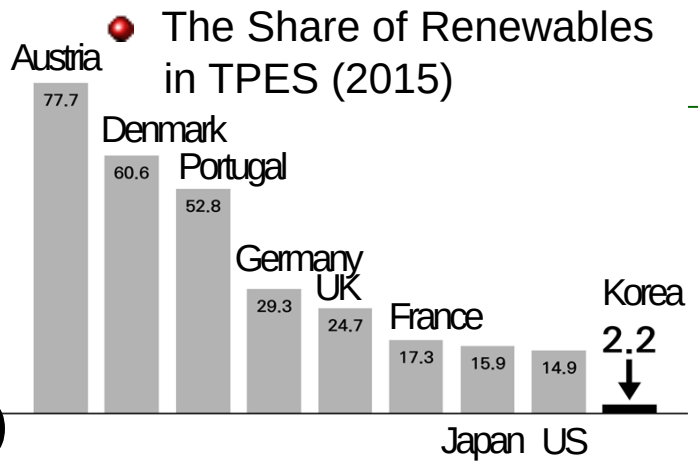
The Roadmap of Nuclear Phase-out

	#	Capacity	Object	Project
New Reactor	6	8.8GW	Shin-Hanul 3·4, Cheonji 1·2, New 1·2	Nullification
Old Reactor	14	12.5GW	14 reactors by 2038(Kori 2~4, Wolsung 2~4, Hanbit 1~4, Hanul 1~4)	No lifetime extension
Wolsong 1	1	0.7GW	Wolsong 1	Early closure



The Current Status of New & Renewables in Korea



- New & Renewable Energy in Korea (2016)

	Installed Capacity (GW)		Power Generation (TWh)	
Total	110.4 GW	100.0%	561.7 TWh	100.0%
New & Renewables	13.3 GW	12.0%	39.1 TWh	6.95%

- Comparison of the Status of Renewable Energy

	S. Korea	Germany	U.K.	Japan
Share of power generation in 2015 (PV & Wind)	6.41% (0.95%)	29.2% (18.40%)	24.8% (14.23%)	16.0% (3.96%)
Employment in 2016 (Share of population)	13,750 (0.027%)	334,000 (0.4%)	110,000 (0.17%)	313,000 (0.25%)
New installation (2011 to 2015) (PV & Wind)	6.3GW (3.5GW)	42.3GW (39.8GW)	21.0GW (18.0GW)	31.8GW (31.1GW)

Vision & Goals of Renewable E Expansion

Vision

Transition to the Participatory Energy System
to improve people's quality of life
- Energy Transition will All People's Participation, 'RE3020' -

Goals

Renewable Energy		2017	2022	2030
Share of power generation		7.6%	10.5%	20.0%
People's Power plant	Urban	290,000 households	760,000 households	1,560,000 households
	Rural	0.1GW	4.9GW	15GW
Jobs		14,000	14,000	277,000

Promotion Strategy & Implementation Plan

Promotion Strategy

- Installing renewable energy facilities in each household
- Energy transition together with agriculture
- From centralized system to decentralized one
- Expansion of local governments' and residents' participation

Tasks

Policy Goal of Renewable Energy 2030

		PV	Wind		Hydro	Bio	Waste	Marine	Total
			On Shore	Off Shore					
Installed Capacity (GW)	New (2018~30)	30.8	4.6	12.0	0.3	1.0	-	-	48.7
	Existing (~2017)	5.7	1.2	0.03	1.8	2.3	3.8	0.3	15.1
	Total (share, %)	36.5 (57.3)	5.7 (9.0)	12.0 (18.8)	2.1 (3.3)	3.2 (5.2)	3.8 (6.0)	0.3 (0.4)	63.8 (100.0)
Power Generation (TWh) (Share, %)		46.1 (34.9)	11.1 (8.4)	31.5 (23.8)	4.0 (3.1)	16.2 (12.2)	22.8 (17.3)	0.5 (0.4)	132.3 (100.0)

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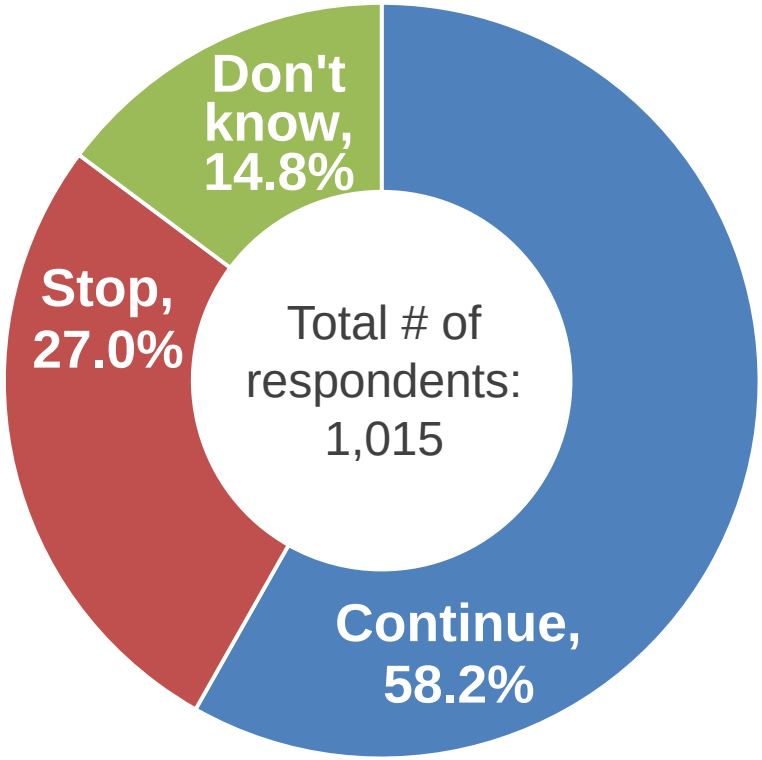
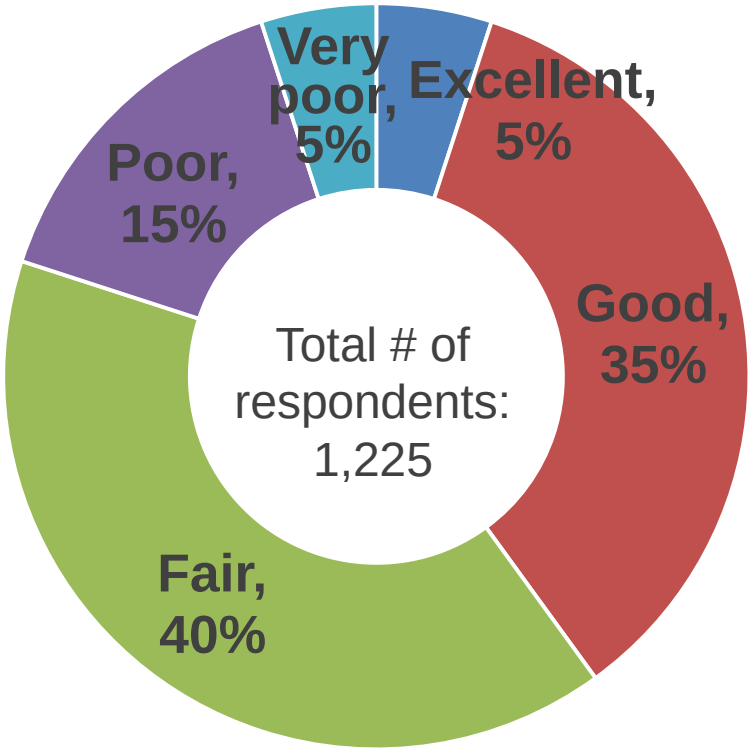
Public Opinion on Energy Transition Policy

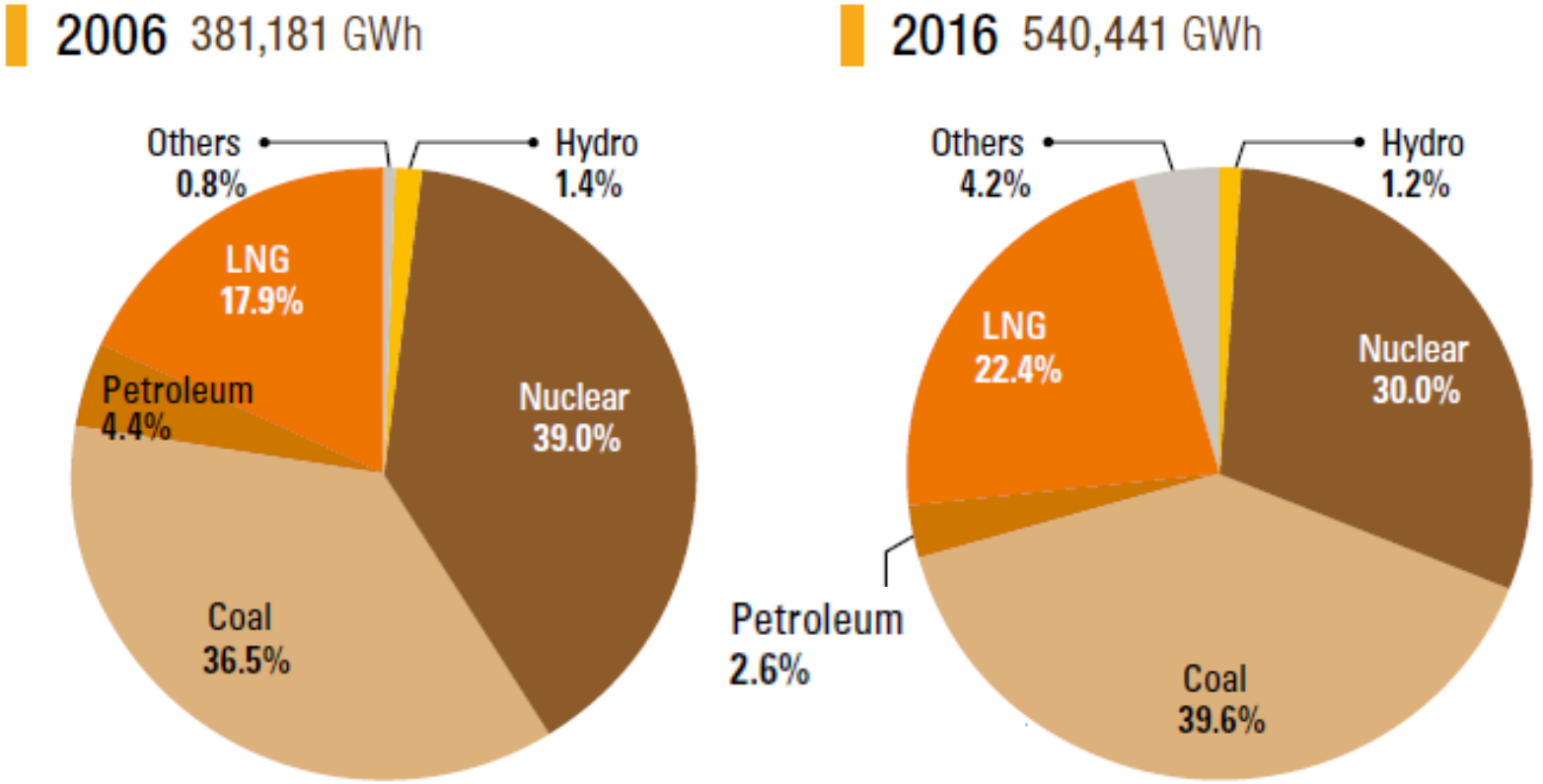


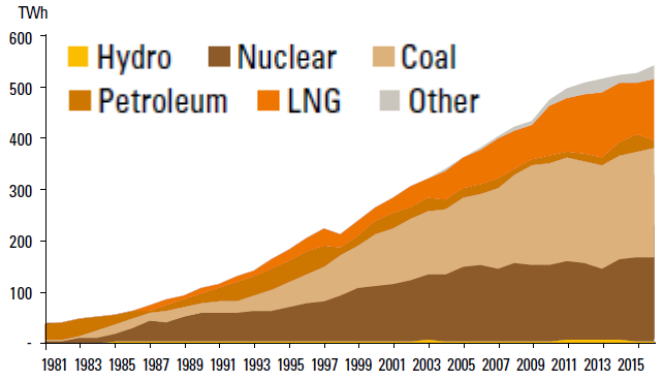
- Realmeter, 2017



- KEEI & Green Strategy Research Institute, 2018

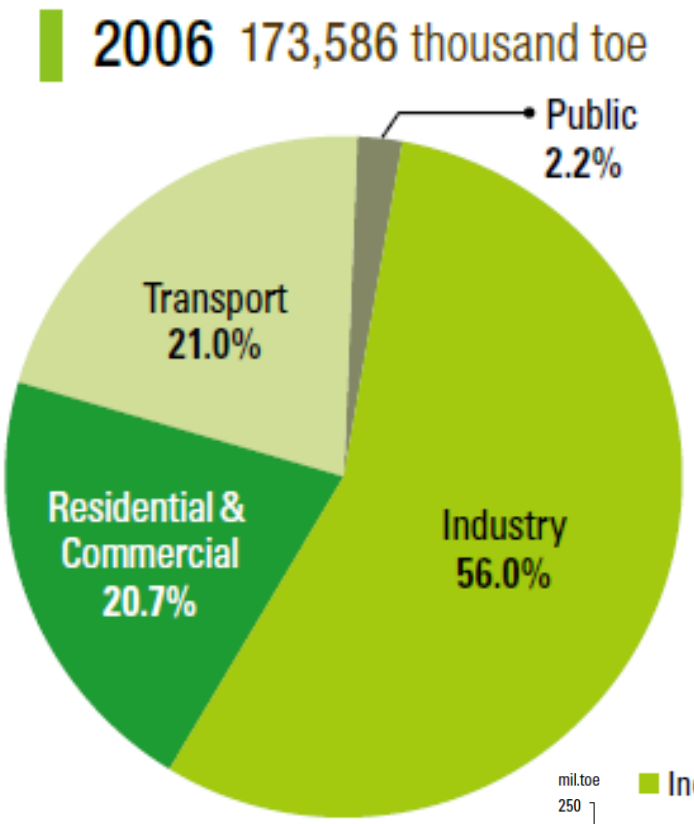
Electric Power Generation by Energy Source

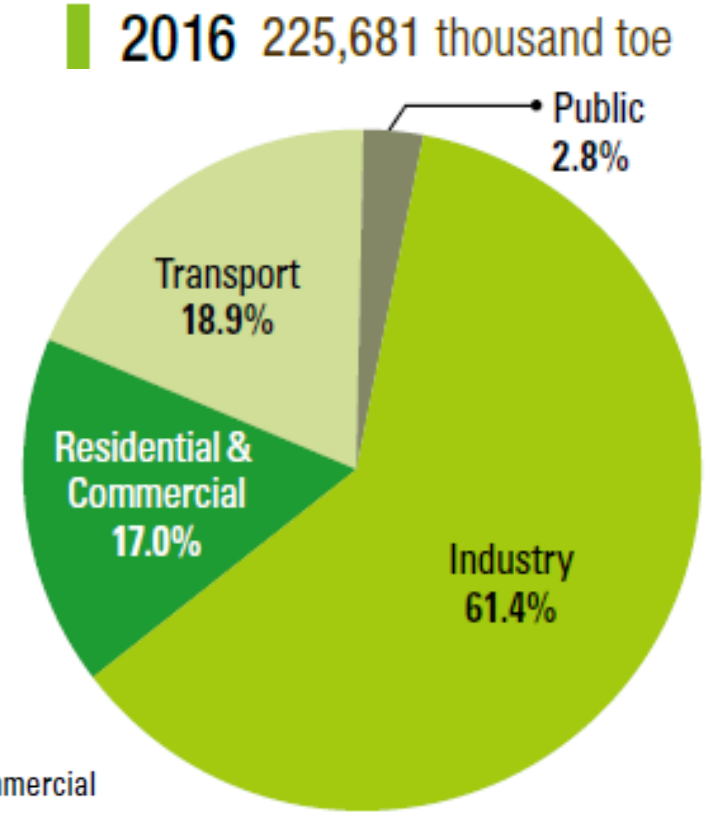


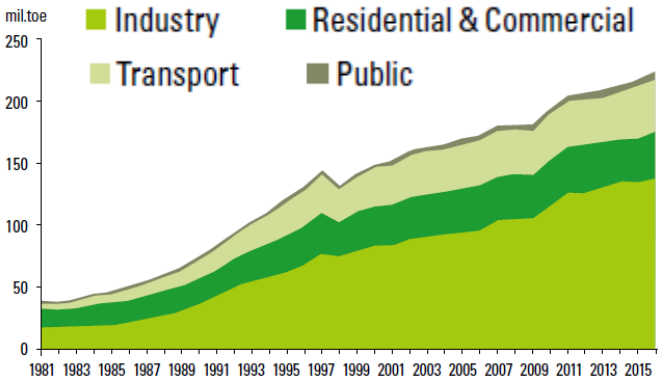


Source: KEEI, Energy Info. Korea 2017, 2018.

Final Energy Consumption by Sector



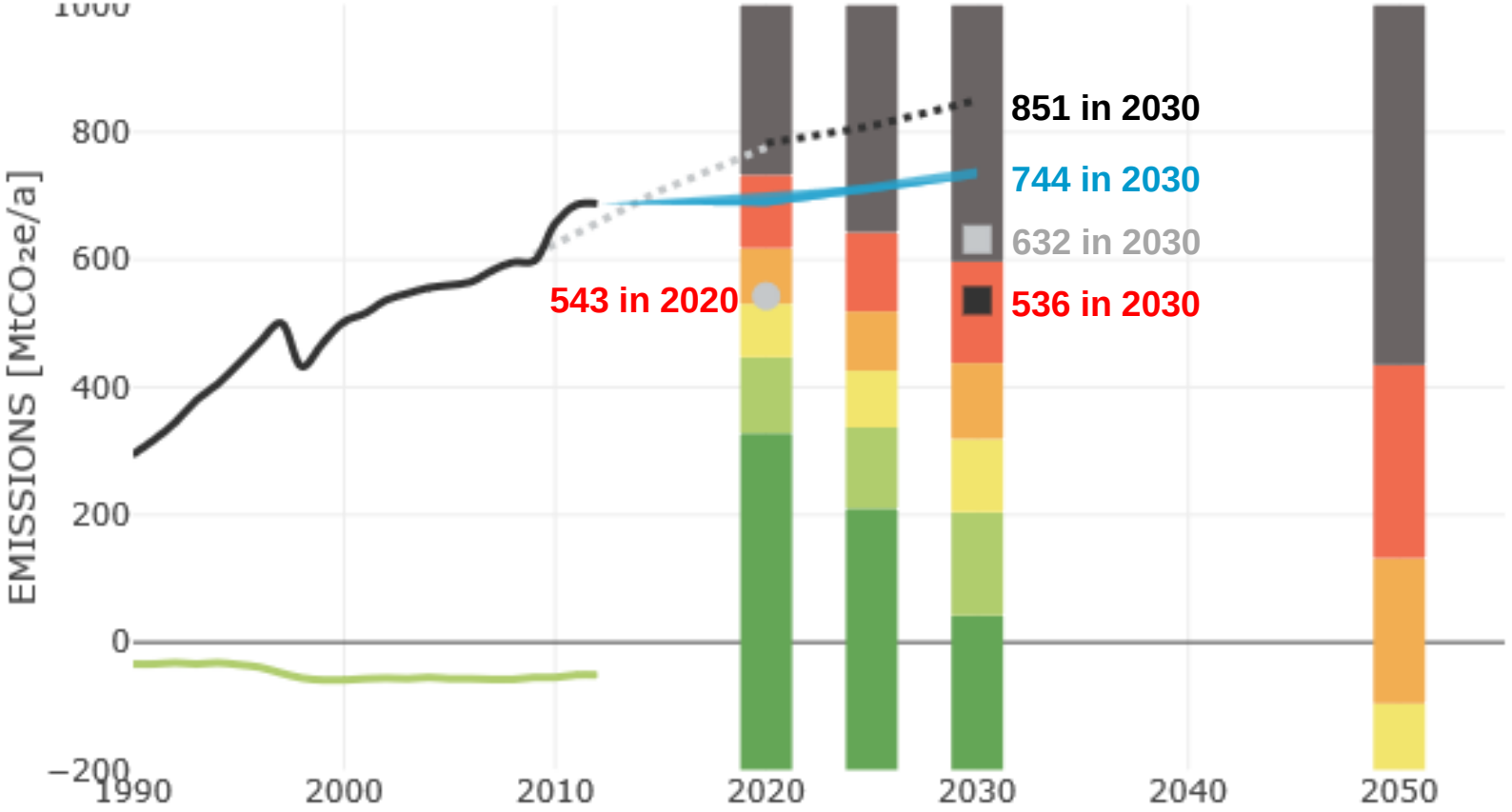




Source: KEEI, Energy Info. Korea 2017, 2018.

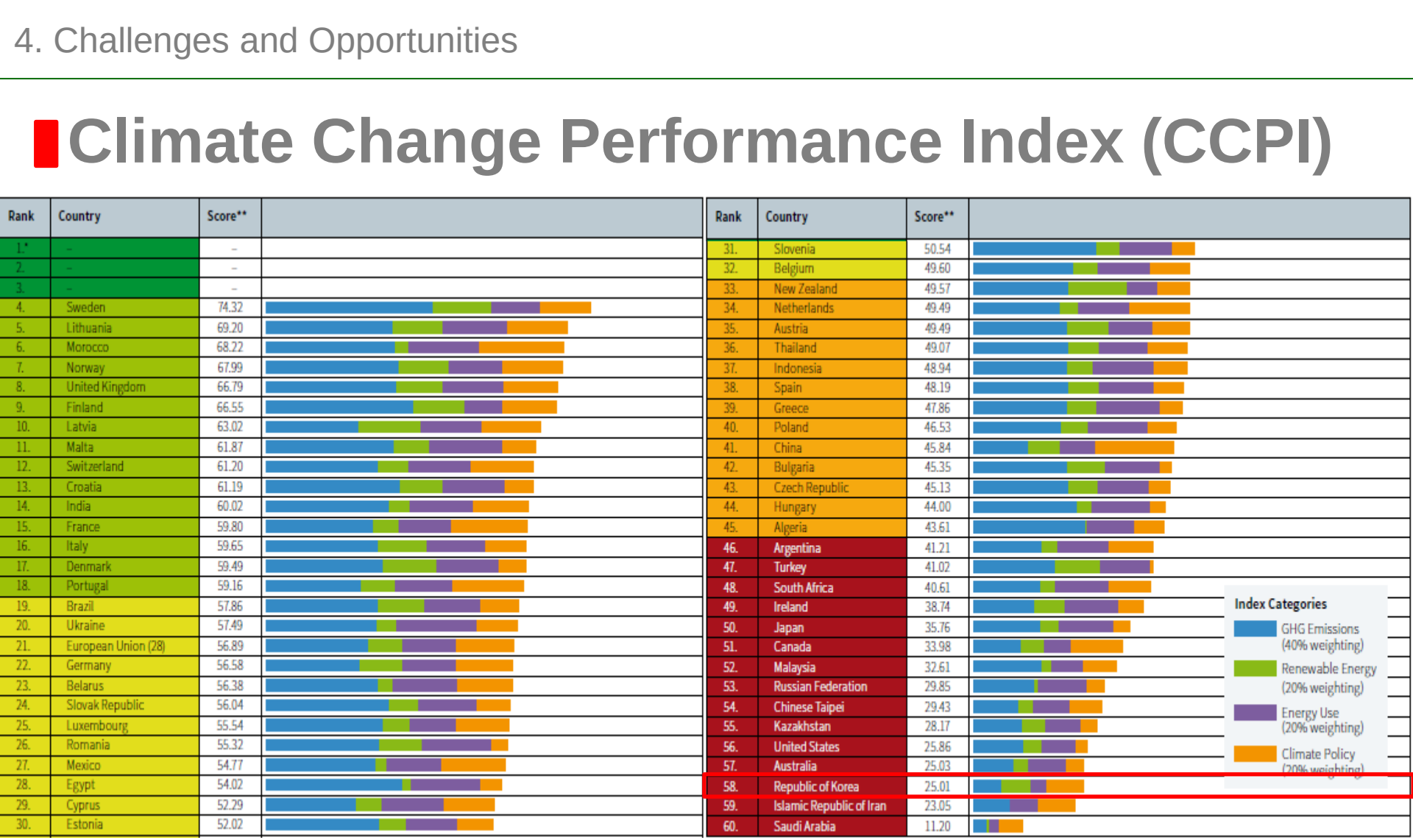
Climate Action Tracker's Evaluation

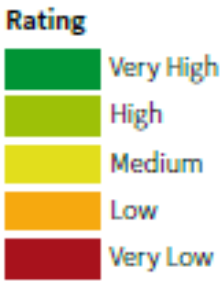
HIGHLY INSUFFICIENT
< 4°C WORLD



Climate Change Performance Index (CCPI)

Rank	Country	Score**
1.*	–	–
2.	–	–
3.	–	–
4.	Sweden	74.32
5.	Lithuania	69.20
6.	Morocco	68.22
7.	Norway	67.99
8.	United Kingdom	66.79
9.	Finland	66.55
10.	Latvia	63.02
11.	Malta	61.87
12.	Switzerland	61.20
13.	Croatia	61.19
14.	India	60.02
15.	France	59.80
16.	Italy	59.65
17.	Denmark	59.49
18.	Portugal	59.16
19.	Brazil	57.86
20.	Ukraine	57.49
21.	European Union (28)	56.89
22.	Germany	56.58
23.	Belarus	56.38
24.	Slovak Republic	56.04
25.	Luxembourg	55.54
26.	Romania	55.32
27.	Mexico	54.77
28.	Egypt	54.02
29.	Cyprus	52.29
30.	Estonia	52.02
31.	Slovenia	50.54
32.	Belgium	49.60
33.	New Zealand	49.57
34.	Netherlands	49.49
35.	Austria	49.49
36.	Thailand	49.07
37.	Indonesia	48.94
38.	Spain	48.19
39.	Greece	47.86
40.	Poland	46.53
41.	China	45.84
42.	Bulgaria	45.35
43.	Czech Republic	45.13
44.	Hungary	44.00
45.	Algeria	43.61
46.	Argentina	41.21
47.	Turkey	41.02
48.	South Africa	40.61
49.	Ireland	38.74
50.	Japan	35.76
51.	Canada	33.98
52.	Malaysia	32.61
53.	Russian Federation	29.85
54.	Chinese Taipei	29.43
55.	Kazakhstan	28.17
56.	United States	25.86
57.	Australia	25.03
58.	Republic of Korea	25.01
59.	Islamic Republic of Iran	23.05
60.	Saudi Arabia	11.20





- South Korea, along with Saudi Arabia, Islamic Republic of Iran, Australia and the United States, forms the bottom five of CCPI classification, scoring low or very low across almost all categories

South Korea's Partial CCPI by Components

Greenhouse Gas Emissions – Rating Table for the 20 Largest CO_2 Emitters*

Rank	Country	Total Rating	Current Status of GHG Emissions per Capita	Recent Emission Trends of GHG Emissions per Capita	Current Levels of GHG Emissions compared to a well-below-2°C compatible pathway	GHG Emissions Reduction Target compared to a well-below-2°C compatible pathway
59.	Republic of Korea	Very low				

Renewable Energy – Rating Table for the 20 Largest CO_2 Emitters*

Rank	Country	Total Rating	Current Share of Renewables per TPES	Development of Energy Supply from Renewable Energy Sources	Current Share of Renewables per TPES compared to a well-below-2°C compatible pathway	Renewable Energy 2030 Target compared to a well-below-2°C compatible pathway
30.	Republic of Korea	Medium				

Energy Use – Rating Table for the 20 Largest CO_2 Emitters*

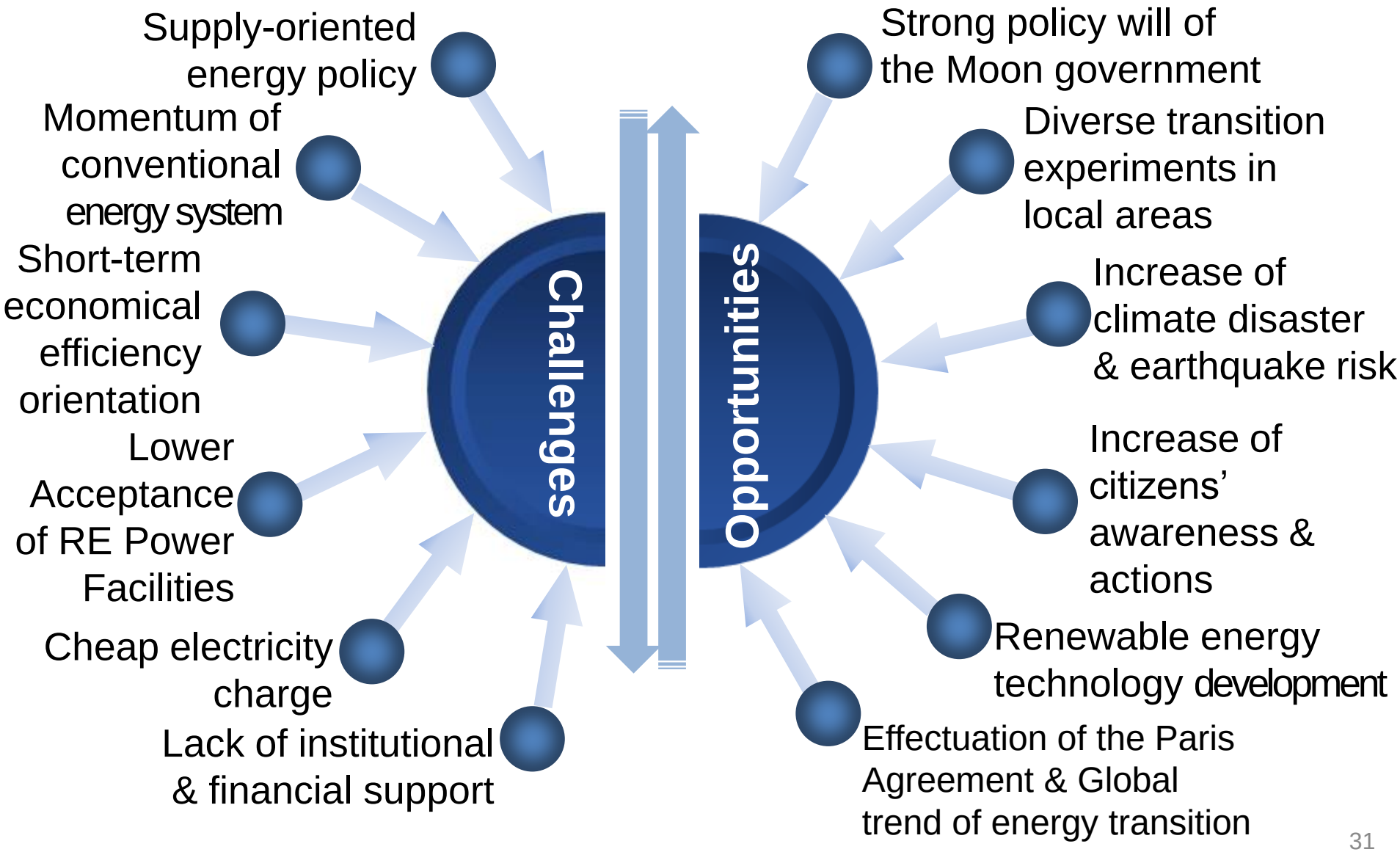
Rank	Country	Total Rating	Current Status of Energy Use (TPES**/Capita)	Recent Trends of TPES/Capita	Current Levels of TPES/Capita compared to a well-below-2°C compatible pathway	TPES/Capita 2030 Target compared to a well-below-2°C compatible pathway
59.	Republic of Korea	Very Low				

Climate Policy – Rating Table for all Countries

Rank	Country	Total Rating	National Climate Policy Performance	International Climate Policy Performance
31.	Republic of Korea	low		

Rating
- Very High
- High
- Medium
- Low
- Very Low

Opportunities and Challenges



THANK YOU!

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