

Green-Tech Issue Analysis Report

미국의 파리 협정 탈퇴를 둘러싼 주요국별 동향 및 전망

저 자 | 전은진, 성유진, 김수연, 신재영

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가	90%	195
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가 (1 : 5.2%, 2 : 18%)		2 1.5
가		가 , , , ,
	가	
(1.3 가)		
가	가	가 가
가		가



1) . (2016).

1



● G7

(17.5.27)

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* 美 6 (, , , , ,)



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(17.6.1)³⁾

, 가

*

650

가

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가

, 가



, G20

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The United States will withdraw from Paris Climate Accord, but begin negotiations to reenter either the Paris accord or an entirely new transaction on terms that are fair to the United States and its businesses, workers and taxpayers. ”



가

30

가 가 가

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0.3

가

4)



가

가

,

가



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2.



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3) 2017 8 4 UN .

4) Independent. (2017). “Scientists explain what will happen if Donald Trump pulls out of Paris climate change agreement”. 2017 5 27 ,

▣ ()

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* , , , ,

● ()

, FY2018

R&D ,

● ()

, , , R&D 4

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가

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- (R&D) 2016

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▣ ()

가

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R&D

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II

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▣ ()

(Clean Power Plan; CPP)⁵⁾
(16.5)⁶⁾

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Keystone XL

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7)

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1,375 50

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*

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, ESS

5) 2013 (Climate Action Plan; CAP) (2015)

가 2030 2015 32%

6) . (2016). “ ”, 16-29 , , pp.3- 19

7) KOTRA. (2017). “ ” 2017 1 31 .

< 2>

		Wilbur Ross	前 ,	- 가
		Rick Perry	前 * * 가 現 Energy Transfer Partners* *	- (11) - , , 가 , (17.1.19)
		Tom Price	前 6	- 가 - 가
		Ben Carson	現	-
		Ryan Zinke	前 , 現	- 가 - - - 3
		Jeff Sessions	前 現	-
		Rex Tillerson	前 現 Exxon Mobil* CEO *	- - (17.1.11)
		Elain L. Chao	前 ,	-
	(CIA)	Mike Pompeo	前 4	-
	(EPA)	Scott Pruitt	前 ,	- 가 - * 가 - 가 - 가 (17.1.18)

: New York Times, Guardian



前
(17.3.28)⁸⁾

* Presidential Executive Order on Promoting Energy Independence and Economic Growth



(CPP) *

* CPP 390 가 , 41 10 %



9) , 가 , ,

2. FY2018

10)

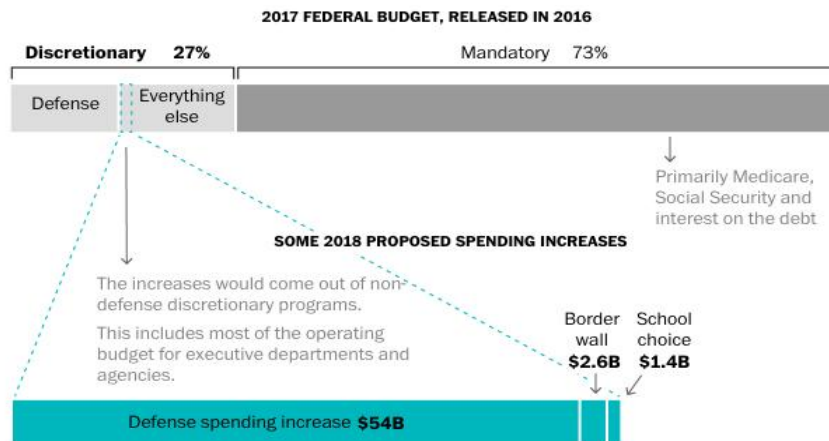
(discretionary spending)

가 *

* 가



540



: Washington Post(2017)

[1] FY 2018

11)

8) The White House. (2017). President Trump's Energy Independence Policy. 2017. 03.28

9) . (2017). . p.30

10) 3 16 (A Budget Blue Print to Make America Great Again), 5 23

(A New Foundation for American Greatness) FY2018

(A Budget Blueprint to Make America Great Again(17.3.13)) (A New Foundation For American Greatness

Major Savings and Reforms(17.5.23))

FY2017 (Omnibus Appropriation Bill) (Annualized Continuing Resolution; CR)

11) Washington Post. (2017). "What Trump cut in his agency budgets", 2017 3 23 .

< 3> FY2018

R&D

(:)

				2017 CR	2018	2017
EPA	Research and Development		- R&D * R&D	483	249	- 234
			* Extramural Science to Achieve Results(STAR) grants			
	Advanced Research Projects Agency- Energy(ARPA- E)		- R&D	290	- 26 ¹²⁾	- 316
DOE	Applied Energy Programs* * Energy Efficiency and Renewable Energy, Fossil Energy, Nuclear Energy, Electricity Delivery and Energy Reliability		- , , 가 R&D	3,760	1,606	- 2,154
NOAA	National Oceanic and Atmospheric Administration Grants and Education* * Sea Grant, National Estuarine Research Reserve System, Coastal Zone Management Grant, Office of Education, Pacific Coastal Salmon Recovery Fund		- 가	262	0	- 262
NASA	Five Earth Science Missions* *RBI, PACE, OCO- 3, DSCOVR, CLARREO Pathfinder		- RBI 가 - 4 가 NASA	191	0	- 191
NSF	National Science Foundation, Research and Related Activities and Education Grants		- , , * * Clean Energy R&D, Ocean Observatories Initiative, Innovation at the Nexus of Food, Energy, and Water Services	6,900	6,124	- 776

: Office of management and budget, Major Savings and Reforms - budget of the U.S. Government Fiscal Year 2018- "



● () (DOS), (USAID) (U.S. Treasury)

< 4> FY2018

(:)

		2017 CR	2018	2017
DOS	Green Climate Fund	998	0	- 998
U.S. Treasury	Clean Technology Fund	170	0	- 170
	Strategic Climate Fund	60	0	- 60
DOS/USAID	Bilateral Global Climate Change Initiative(GCCI)	362	0	- 362
(Base Budget Authority)		1,590	0	- 1,590

: Office of management and budget, Major Savings and Reforms - budget of the U.S. Government Fiscal Year 2018- ", p.75.

■ (*)

*

● () ,

- 가 . *

가

*

가52 (60) ,

< 5> 5 DOE EERE ARPA-E

(:)

DOE	2012 (: / :)			2013 (: / :)			2014 (: / :)			2015 (: / :)			2016 (: / :)		
	(A)	(B)	(B- A)	(A)	(B)	(B- A)	(A)	(B)	(B- A)	(A)	(B)	(B- A)	(A)	(B)	(B- A)
EERE	3,200	1,810	- 1,390	2,337	1,821	- 516	2,776	1,901	- 875	2,317	1,914	- 403	2,723	2,069	- 654
ARPA-E	650	275	- 375	350	277	- 74	379	280	- 99	325	280	- 45	325	291	- 34

*

: DOE FY 2012~2017 Budget Request

- , 新
가

13)

가

가

< : FY2018

R&D

14), 15)>

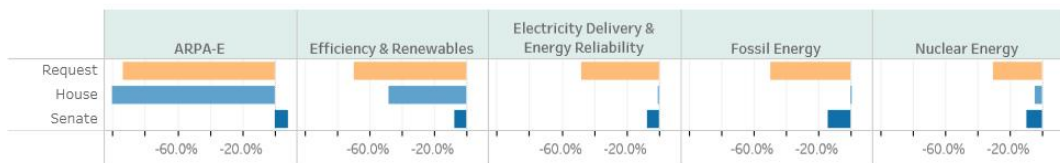
■ (DOE)

()

● (Office of Science) 가 17.1%
(2.9%)

● (ARPA-E) * ARPA-E , 7.8%
* , 20 93.5%
(OS) 가

● (EERE) 16)



: AAAS(2017)

[2] DOE Energy Technology Office FY2018

■ (EPA)

EPA Science & Tech

44.4%

11.8% *

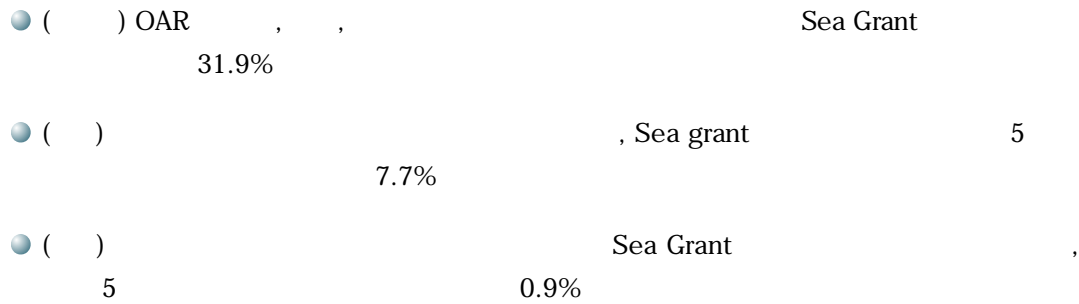
* 5 S&T 15% 4,800

13) 2017 , (兩院) (Party Government)

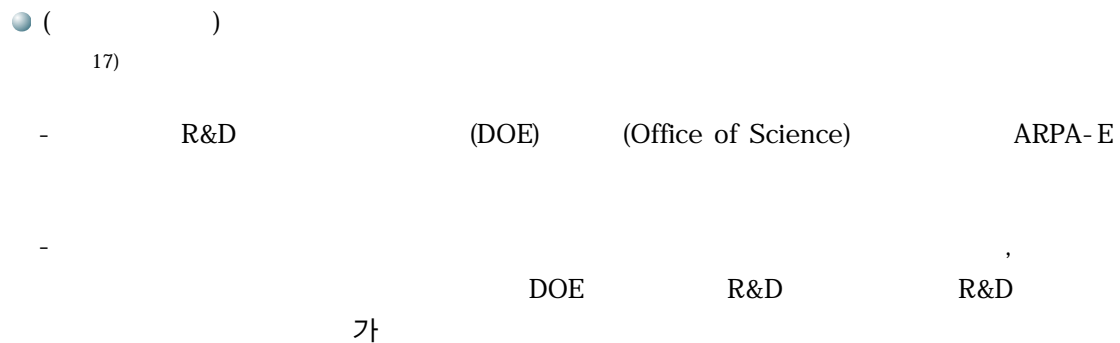
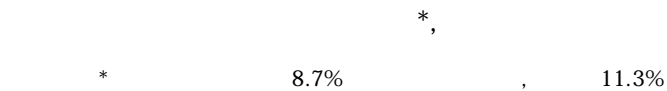
14) (AAAS) 'FY2018 Appropriations Tracker'
(2017.8.31.). AAAS R&D
가 Major Savings and Reforms - budget of the U.S. Government Fiscal Year 2018- "



■ (NOAA) Office of Oceanic & Atmospheric Research(OAR)

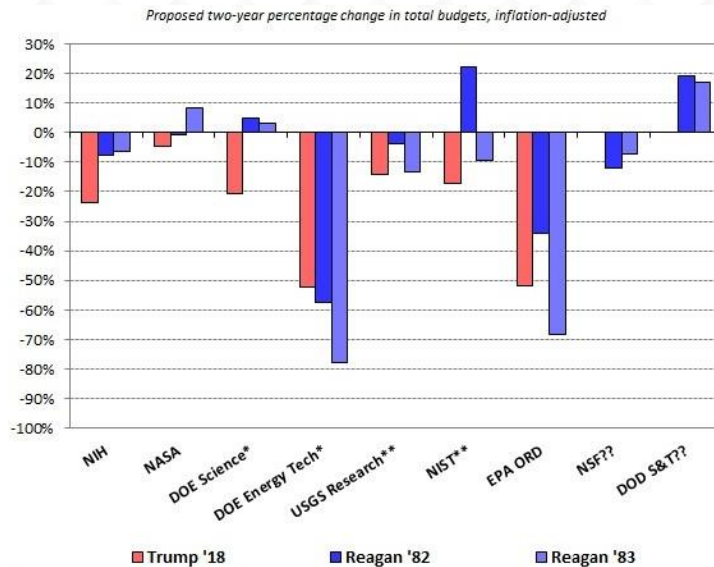


■ (NASA) Earth Science



가 .

- 15) , 9 7 (Senate Appropriation Committee)
UNFCCC, IPCC UN 1,000
(: Reuters, (2017). "Defying Trump, Senate panel
approves funding for U.N. climate body", 2017 9 8 .)
- 16) Office of Fossil Energy CCS R&D , Office of Nuclear
Energy R&D (Energy Technology Program Office DOE
R&D).
- 17) 가
5 FY2017 Omnibus
Appropriation Bill(2017) 가 (: AAAS.
(2017). "Congress Rejects White House Approach, Pursues Targeted Science & Technology Boosts", 2017
5 1 .)



*FY82 and FY83 figures are estimates. **FY18 figures are very preliminary.
Based on initial AAAS assessment of the FY 2018 budget summary and historical budget documents, analyses, and news reports. FY 2018 figures for NSF and DOD Science & Technology are not yet available. March 2017 | AAAS

: AAAS(2017)

[3] R&D (18) R&D (82, 83)
R&D 18)

● () EPA
19)

- , EPA 1,200 2017 9 (17.6)²⁰⁾

3.

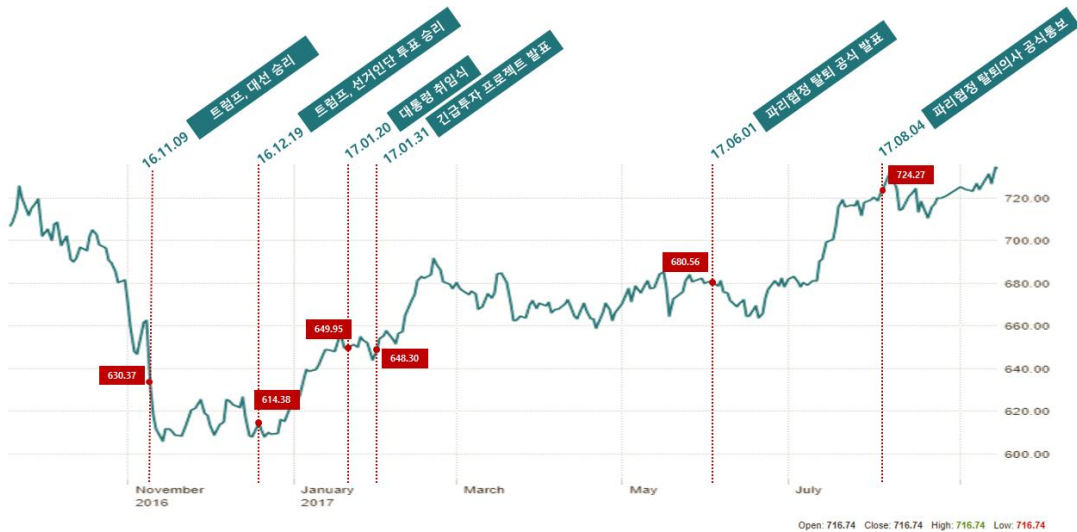
■ ()

18) AAAS. (2017). "The Trump Administration's Science Budget: Toughest Since Apollo? ", 2017 3 17 .
FY2018 NSF DOD S&T
. AAAS
R&D , 2)

19) EPA (: Reuters. (2016).
"Exclusive: Trump could seek new law to purge government of Obama appointees ", 2016 6 20 .)

20) Washington Post. (2017). "EPA plans to buy out more than 1,200 employees this summer ", 2017 6 20 .

S&P Global Clean Energy Index



: Financial Times Markets Data

[4] 1 S&P Clean Energy Index 26)

가 ()

가

3

가

27)

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EPA

9

AAAS

Joint Society Letter (6.27)

(6.28)

ARPA-E

가 ()

9 , 125 , 183 1 2

We are still in '

1,500

UNFCCC 2

26) Financial Times Markets Data S&P Clean Energy Index DB
(: <https://markets.ft.com/data/indices/tearsheet/charts?s=SPGTCLTR:REU>)

27) AAAS. (2017). 'Use Scientific Advisers and Protect Scientific Data, Joint Society Letter Urges', 2017 6 27 .



III

1.

▮ ()



G7, G20

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가



3

(佛),

(伊)



() 50
(16.11)* ’

가

1990
가

80~95%

2050

* Klimaschutzplan 2050 , 가

UNFCCC



2050 50 가
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2030

(, , , ,)

* 가 2018 가



4

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28)



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29)

28) Newsweek. (2017). "Most Important Issues: Germans, Unlike Americans, More Worried About Climate Change Than War Or Terror", 2017 8 2 .

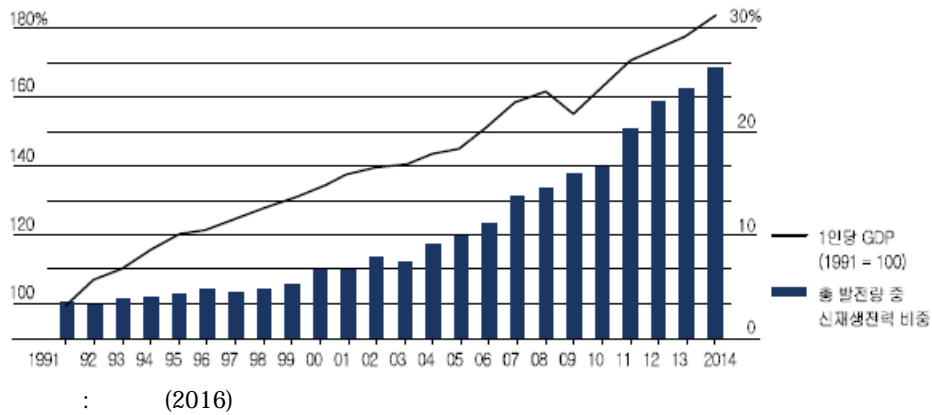
29) . (2016). " " , KERI BRIEF 16-04, .

05 26.2% 14 15.5% ,
11.7%(05) 28.0%(14) 30)

65~70% ,
2

가* 1 GDP

* 2015 (BMWi) 가 2030 10 , 2050
23



: (2016)
[5] 1 GDP

▣ (R&D) (BMBF) ‘ (Kopernikus
Projekte für die Energiewende) ’ (16. 4)

가 4 3 120 , 25 280

< 6>

ENSURE	, 가 , ,
P2X	

30) : IEA Statistics(:2017-08-23). 2 .



SynErgie	
ENavi	가 ,

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2.

▣ () * "Make our Planet great again" ,

* “ (Make America great again) ’ , FY2018
SNS

● 가

-

● 31)

* , , , , ,

● G20 - (17.7)

▣ () 32) 前

● ‘ (15)* ’

* 16 (PPE) 가 (SNRE)

● 33) 가

31) , (2017). “ , ” 2017 6 25 .

32) 1 .

33) 2017 7 , 2025 50% 2025 17

- 40 가 23 2050
(17.7)

▣ (.)

가

70% 가 ,
2012 15% 34)
9
(16)

< 7> 9

	. , , 5 , . 2020 2 가 . 2025 30% 60% 가
	. (Smart Grid), , , 가 . 2020 1,000 : 2020 11
	. , 2 , 가 , , . 2016 2 가 . 2017 . 2021 30% . 2030 8,000~2 5,000
	. TGV, , , . 50% . 80 . TGV 25% 30% 25%
	. . .
	. , , , , , . 2017 APS(Application Service Provider) SaaS(Software as a Service) . 2020 ((exascale)) . 2020 13 7,000
	. , , , , ,

34) : IEA Statistics(:2017- 08- 23). ,
가

(2)



	· 2020 · 5 20 가
	· , , , , , , , · 2020 (Crolles) · 2020 5G · 2020 50% 100%
	· , , · 2017 9 · 10 1,500

: 가 (2017)

● Areva, , EDF, , 가

- (Veolia), (Suez) ,

● , , EV,

< 8>

	Areva	- , , 4 - 100 ,
	Alstom	- - 가 ,
	EDF	- EDF (EDF RE) - (EDS) (17)
	Schneider Electric	- IoT
가	Air Liquide	- ()
, ,	Veolia	- 가 , ,
가 , ,	Suez	- 가

	Peugeot	- * ** (HYbrid)4 35% * ZEV(Zero- Emission- Vehicle) 100% 가 ** 100% 가 iOn
	Citroën	- 가 * * 5% 10% 가
	Renault	- , , - , -

:

- ▣ (R&D) , (MESRI) 35)
가, 6
- , 3
- 3 (PIA3) , 5 50
- 가 , 4 가가 (Tech Visa) 36)

3.

- ▣ () BREXIT ,
가
- 가
 , , UN (regret) (major disappointment) ,
(disappoint)
- ,

35) MESRI, (2017). "Make our planet great again: programme prioritaire de recherche sur la lutte contre le changement climatique", 2017 6 17 .

36) , (2017). " ' ' " , 2017 6 21 .



- G20 * 가

* G20 4 (, , , 37))

■ () (17.1.)* 10
(pillars) ‘ (Clean Growth) ’
* (BEIS) Building Our Industrial Strategy ‘ (Green Paper)

● 2016 11 , 2050

- 가 (가)

● 4 2017 - 2018 (Main Supply Estimates 2017 to 2018)³⁸⁾ ,
(BEIS) ‘ 39)

● 40

- 2017 (Queen s Speech 2017) EV
(17.6)⁴⁰⁾

● (Hung Parliament)
, 가 가
- , 08
(Climate Change Act)

■ () 가 ,

37) Independent. (2017), ‘Climate change not an objective for UK at G20 as Theresa May meets Donald Trump - The Prime Minister has not made the environment one of her four key priorities’, 2017 7 6 .

38) HM Treasury, (2017). Central Government Supply Estimates 2017-18 -Main Supply Estimates-.

39) . ‘Work towards international agreement on climate change; Promote and support actions to reduce national and global greenhouse gas emissions; climate modelling and risk assessment.’

40) Prime Minister s Office. (2017). THE QUEEN S SPEECH AND ASSOCIATED BACKGROUND BRIEFING.

05 5.6% , 가 14
20%

- 가 , 가
41)

- (Committee on Climate Change; CCC)
16 가 08 * (17.3)⁴²⁾

*

Hornsea Project Two (£60) 43)

, , - ,

- 20
(17.9)⁴⁴⁾

▮ (R&D) R&D ,

‘ (Industrial Strategy Challenge Fund) ’ , , AI 3
2 7 (17.3.)

(Office of Low Emission Vehicle; OLEV) V2G 3 * 2,000
(17.7)⁴⁵⁾ **

* V2G , V2G ,
** 50
46)

(BEIS) Energy
Innovation Board*

* : (Government & Chief Scientific Adviser)

41) : IEA Statistics(:2017-08-23). 2 .

42) Committee on Climate Change. (2017). Energy Prices and Bills –impacts of meeting carbon budgets.

43) . (2017). 17-23 , p.11.

44) Guardian. (2017). “Jaguar Land Rover to make only electric or hybrid cars from 2020”, 2017 9 7 .

45) BEIS. (2017). “Innovative vehicle to grid technology to receive £20 million”, 2017.7.8 .

46) Carbon Brief, (2017). “Election 2017: What the manifestos say on energy and climate change”, 2017 5 17 .



4.

❖ () , EU,

* 가 , 가 가

● 가 ,

47), 48)

● ,

❖ () 1 (06~ 07)

49)

● ‘ ((13)) ’ , ‘ ((15)) ; ‘ ((16)) ; ‘ ((16)) ’

● ‘ (17.4)

- ‘ 가 , 3 *

* ,

- (CSTI) 16

50)

47) (衆議院)

, 17.6.2) , (質問 第三六

가 .” (答弁 第三六 , 17.6.13)

48) G20 - EU

49) AMED() 가

50) 閣府 政策統括官(科 技術 イノベーション). (2017). “エネルギー | 環境イノベーション 略(NESTI)推進ワ | キングゲル | プ(第3回)の開催について ”; 2017 6 17 .

▣ ()

,

● (11.3) 가 가⁵¹⁾,

*

* 05 9.2% 14 14.9% 가

● 52) 가

가

● (連) 15 2030 53) ,
(17.4) ,

▣ (R&D) 17 R&D ‘ 54) ’ * ‘
, 55)

* , 가 , ,
4

● , , , CO₂ 5
Bottle-neck

51) : IEA Statistics(:2017- 08- 23).

2

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52) (2016 JST
)

53) 日本 連合 . (2017). 2030年に向けた 連低炭素社 行計 (フェイズ)”

54) , () ,
가 (:
POC)

55) 2017 7 19 .(: <http://www.jst.go.jp/mirai/jp/application/index.html> (: 2017. 09. 14))



에너지·시스템 통합기술	에너지 효율화 기술	에너지 저장 기술	에너지원 기술	CO ₂ 고정화 유효이용
<p><u>Bottle-neck 과제</u></p> <ul style="list-style-type: none"> 초전도 시스템용 냉각계 시스템의 저손실화 및 메인テナンス성 강화 100MHz동작 스위칭을 향한 고속반도체 디바이스 및 저손실 자성 재료 사회실현을 목적으로 하는 저비용 폐열 에너지 회수 시스템 	<p><u>Bottle-neck 과제</u></p> <ul style="list-style-type: none"> CO₂의 대규모·효율적 자원화 기술 고효율 GHG 분리막·흡수제 고효율·고성능 분리기술을 이용한 프로세스 강화기술 구조재료 적응조형에 적합한 합금 및 합금분말 기술의 개발 접합강도와 분리·해체성을 양립하는 혁신적 접합·분리 기술 	<p><u>Bottle-neck 과제</u></p> <ul style="list-style-type: none"> SOFC 자온 작동화 고전압 하에서 안정적인 커패시터용 전해질·전극소재 사이클 특성과 에너지 밀도를 양립하는 음이온 전지 전고체 전지의 계면형성에 적합한 분체합성 및 형성 프로세스 기술 금속·공기 전지를 위한 분리막 기술 축전 디바이스의 혁신성 향상을 목적으로 이상계면 해석·설계 	<p><u>Bottle-neck 과제</u></p> <ul style="list-style-type: none"> Pb-free 페로브스카이트 태양전지 양자효과를 응용한 초고효율 태양전지 태양전지의 초박형화에 의한 고효율·저비용화 기술 Si 탠덤형 태양전지의 접합 계면 해명과 프로세스기술 	<p><u>Bottle-neck 과제</u></p> <ul style="list-style-type: none"> 바이오매스 유래 고성능 소재 합성 기술 환경변동 내성을 가진 미세조류 최소한의 자원 투입으로 바이오매스 생산성을 향상하는 기술 합성생물기술에 의한 유효물질 생산성이 높은 세포설계 차세대 CNG 제조를 위한 고차 구조제어 기술과 그 구조·성능 평가

: JST

[6] ‘ ,

5.

❖ () EU



“ 가 , , 가 . ”

- 가 (47 2017 , 2017.1.17)⁵⁶⁾

200

(15)

(十百千)

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(16)

*

10 ,

100 ,

1,000

EU

*

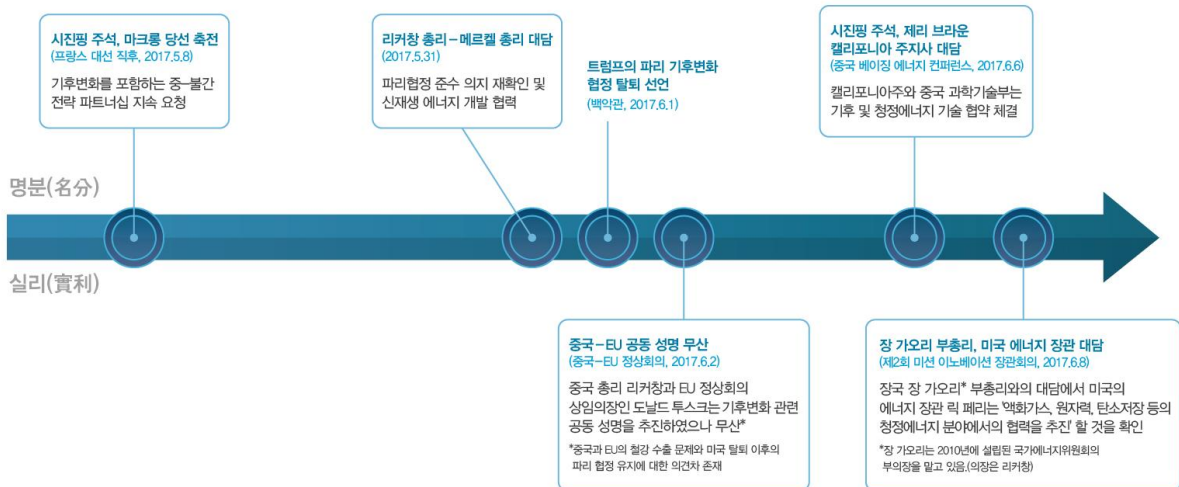
*

가

EU

-

, 가



[7]

13.5

13.5

가

13.5

(16.11)

1

31%

57)

56) The New York Times. (2017). 特朗普 代, 近平 起 “ 全球化 ” 大旗, 2017 1 18

57) . (2017). “ ” .

. 2017.02.16.



103

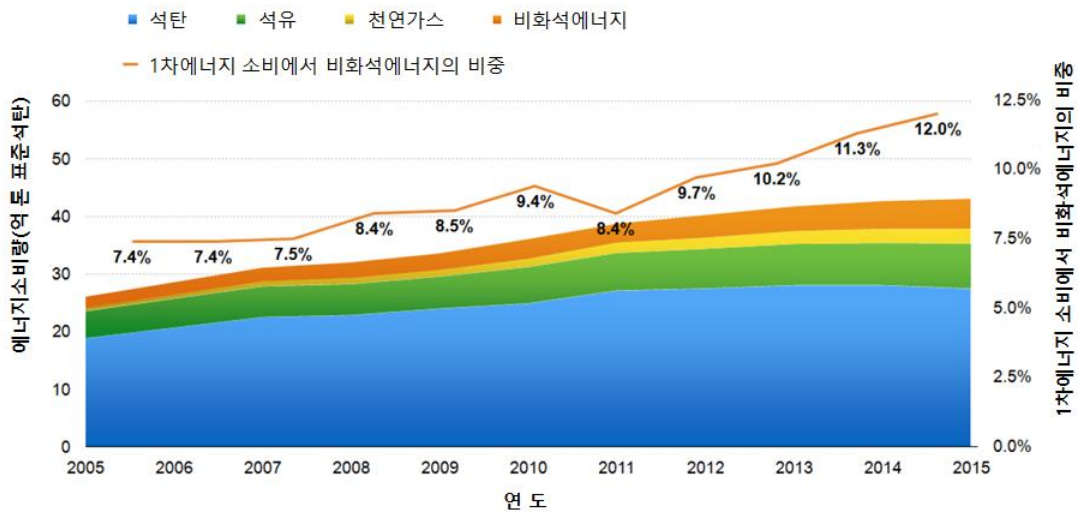
(17.1)⁵⁸⁾

● ‘ 13.5 ’ 2020 50 (tce) ,
41 (17.1)⁵⁹⁾

▢ ()

● 05 16.2% 2014 23.0% ,
* 60)
* : 15.9%(05) 18.7%(14)

- 1 05
7.4% 가 15 12.0% 61)



: 中 人民共和 候 化第一次 年更新 告(2016)

[8] (05~ 15)⁶²⁾

58) . (2017). “ , 13.5 103 ” .

59) 中 新能源 . (2017), “ “十三五”我 可再生能源 展 及 ”, 2017 4 10 .

60) : IEA Statistics(:2017-08-23). 2

61) 中 人民共和 候 化第一次 年更新 告(2016. 12) ,

62) 中 人民共和 候 化第一次 年更新 告(2016. 12) (: 2017-04-18)

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63) KOTRA, (2016). “ 13.5 ”, , 2016 12 30 .

64) 易新 . (2017). ‘美媒：全球 暖威 珠三角 展 失 峻’, 2017 4 9 .

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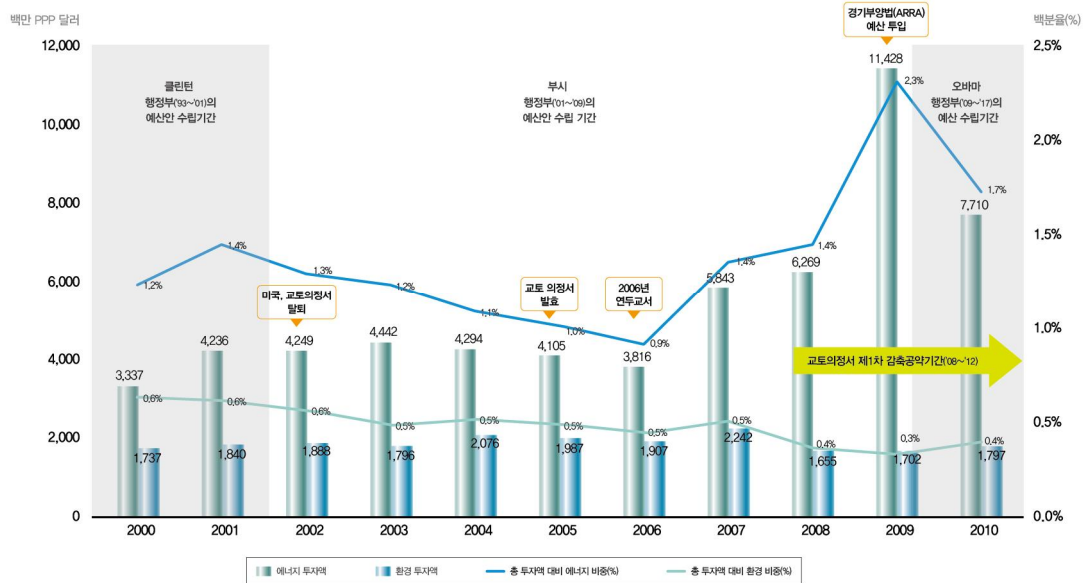
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* The American Competitiveness Initiative(ACI):

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: OECD, Science, Technology and R&D Statistics DB

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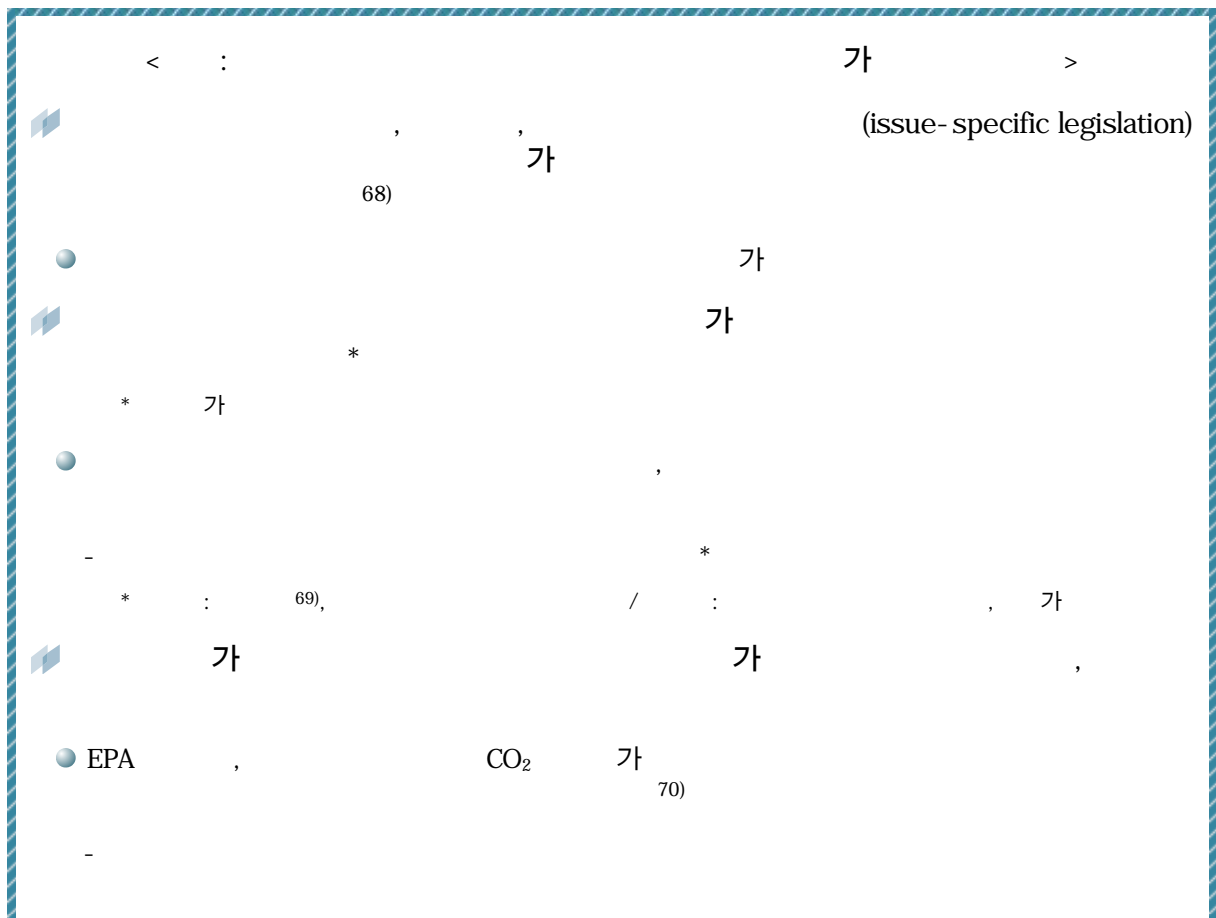
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67) 上野貴弘(一般財団法人電力中央研究所 主任 研究員), (2017). "トランプ新政 と 暖化 策", ALPS 際シンポジウム2017 - パリ協定の下での各 の政策と 策, その課題 - 発表資料,

68) Michael Mehling David John Frenkil. (2013). "Climate Law in the United States: Facing Structural and Procedural Limitations", Climate Change and the Law, Springer, p. 474.

69) (red and blue state map)

70) EPA. (2017). "Climate Impacts on Agriculture and Food Supply", 2017 1 19 .



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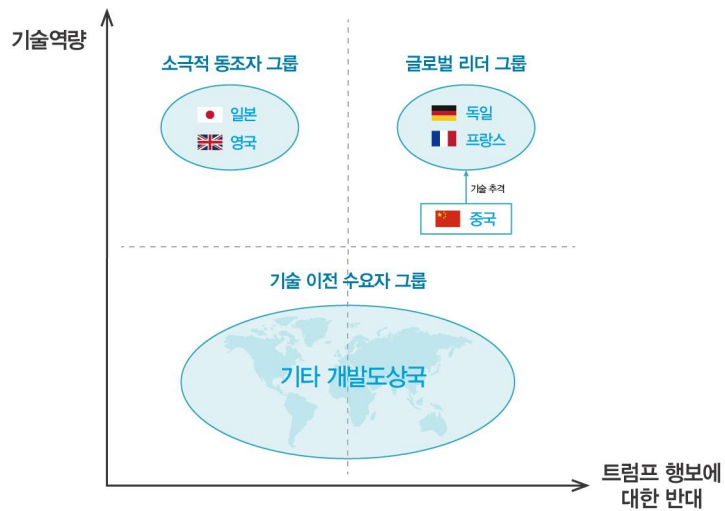
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71) . (2016). “ ”, 2016 6 21 ,

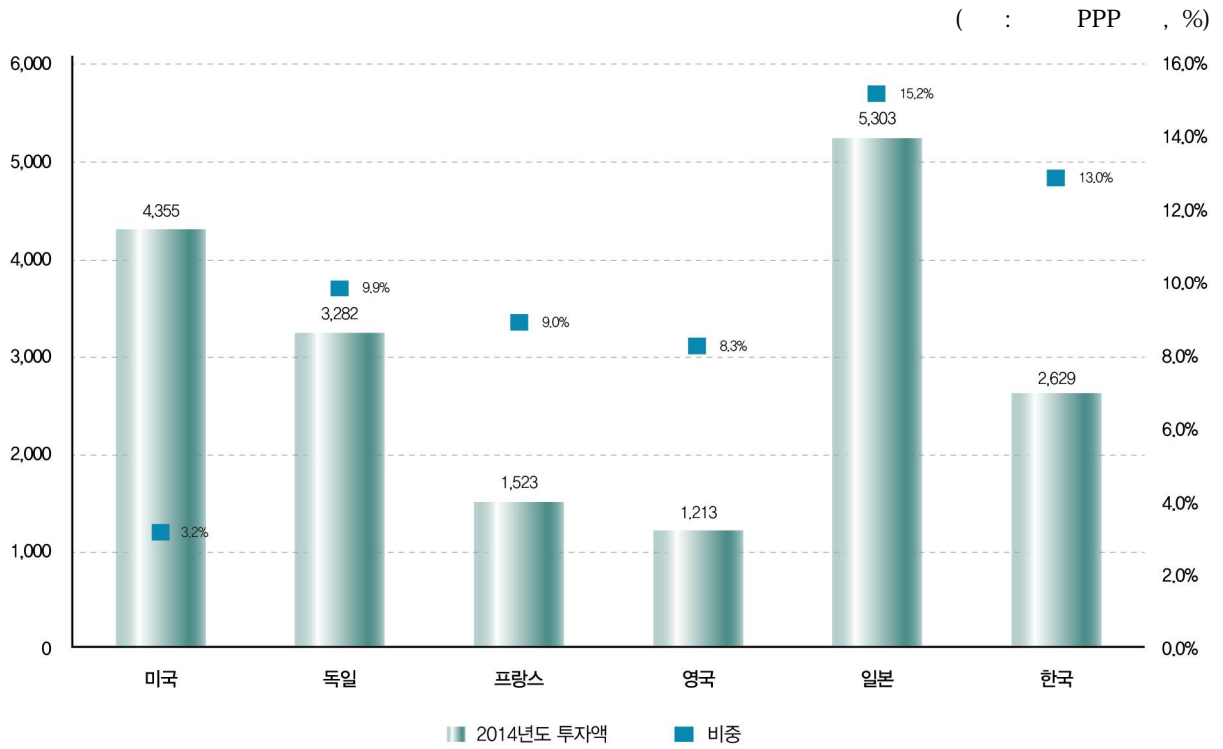
72) 가 ,

73) 3.2% R&D 가 , R&D가 50%
R&D 가 .

* OECD

(GBAORD)

3



출처: OECD, Science, Technology and R&D Statistics DB

[11]

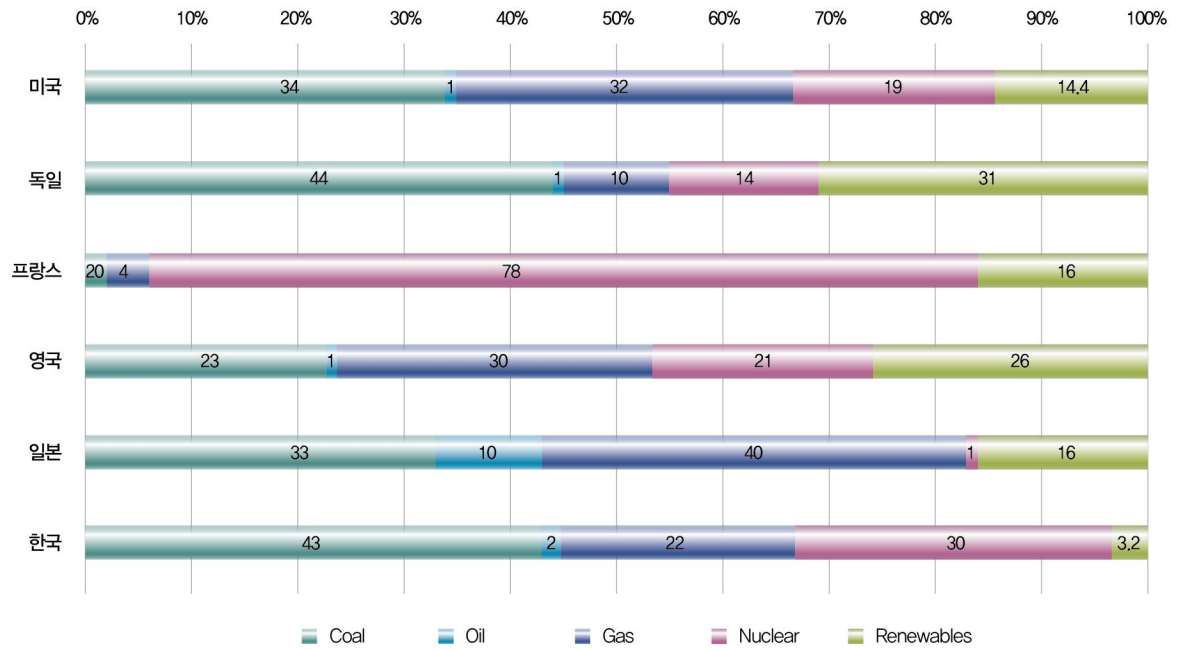
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Most Recent Key Energy Data

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- 2016 10 Breakthrough Energy Coalition(BEC)*
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* Bill Gates Jeff Bezos(Amazon), Jack Ma(Alibaba), Mark Zuckerberg(Facebook) 10
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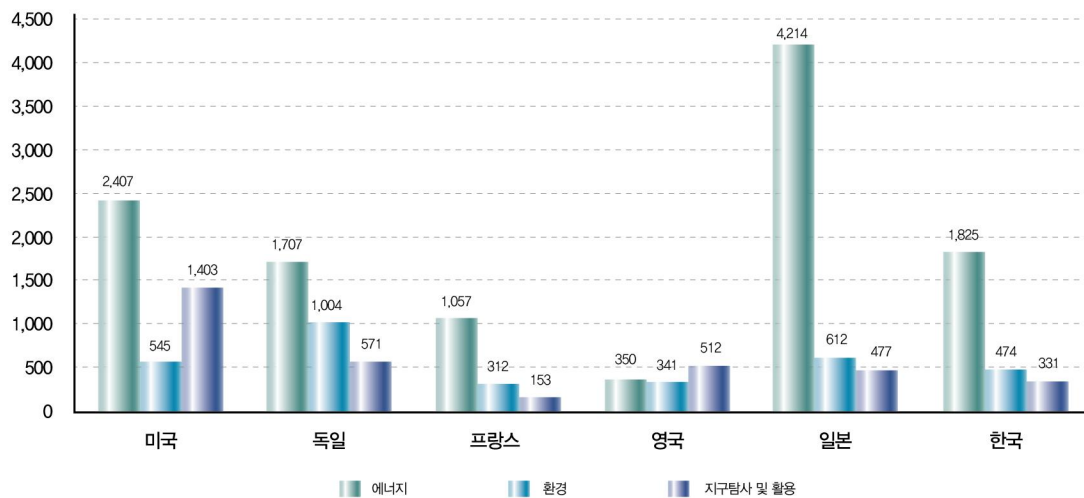
- MIT Technology Review ,

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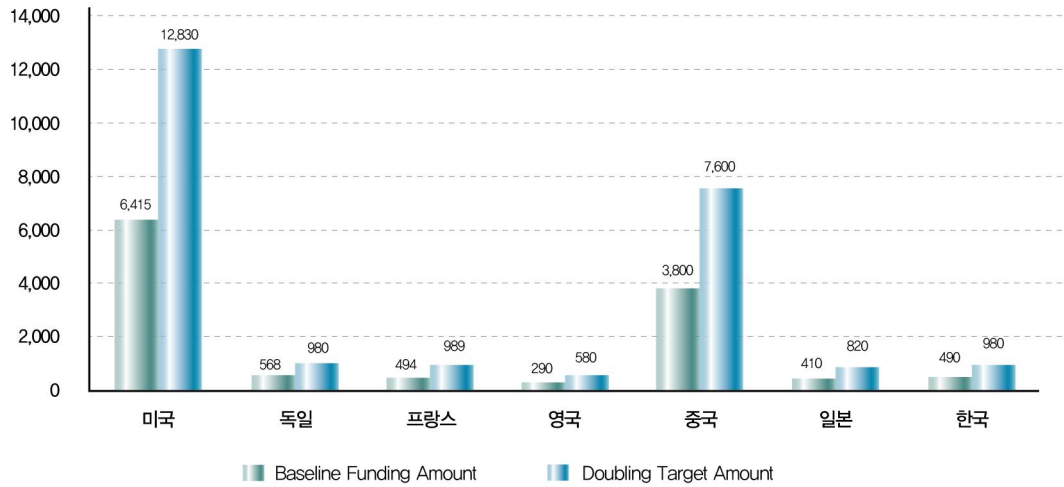


: OECD, Science, Technology and R&D Statistics DB

[13] 가 . R&D (2014)



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: Mission Innovation Secretariat(2016)

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- Areva : <http://www.new.areva.com>
- EDF : <https://www.edf.fr>
- Peugeot : <http://www.peugeot.co.uk>
- Renault : <https://www.renault.fr>
- Veolia : <https://www.veolia.com/en>
- Schneider Electric : <http://www.schneider-electric.us/en>
- Suez : <https://www.suez.com/en>



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4		19.58%	France insoumise ()		(2016 2)
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66.06% 對 33.94%)

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* 2015 ‘ (La loi relative à la transition énergétique pour la croissance verte) ’

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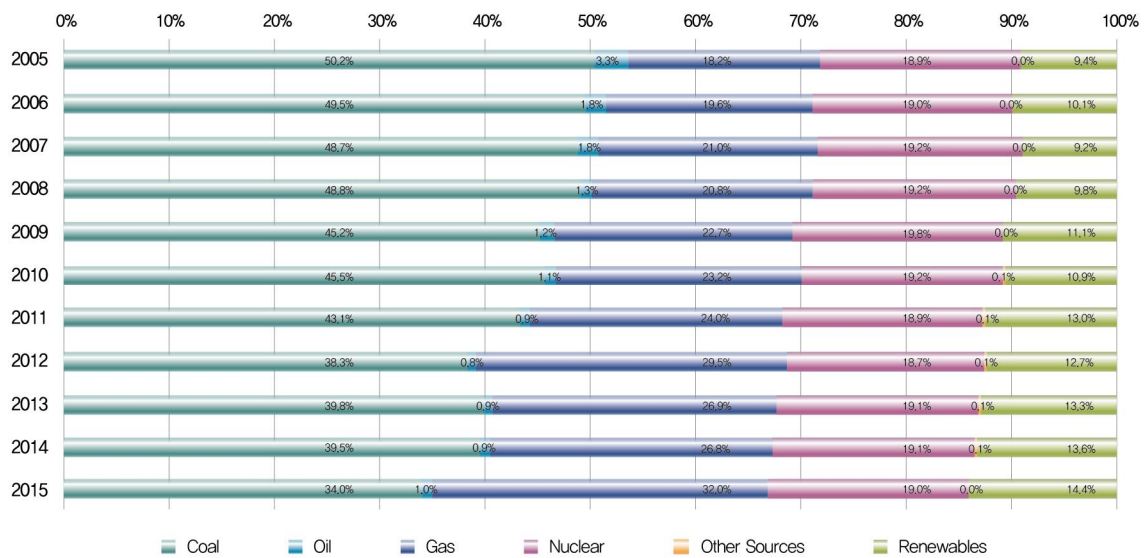
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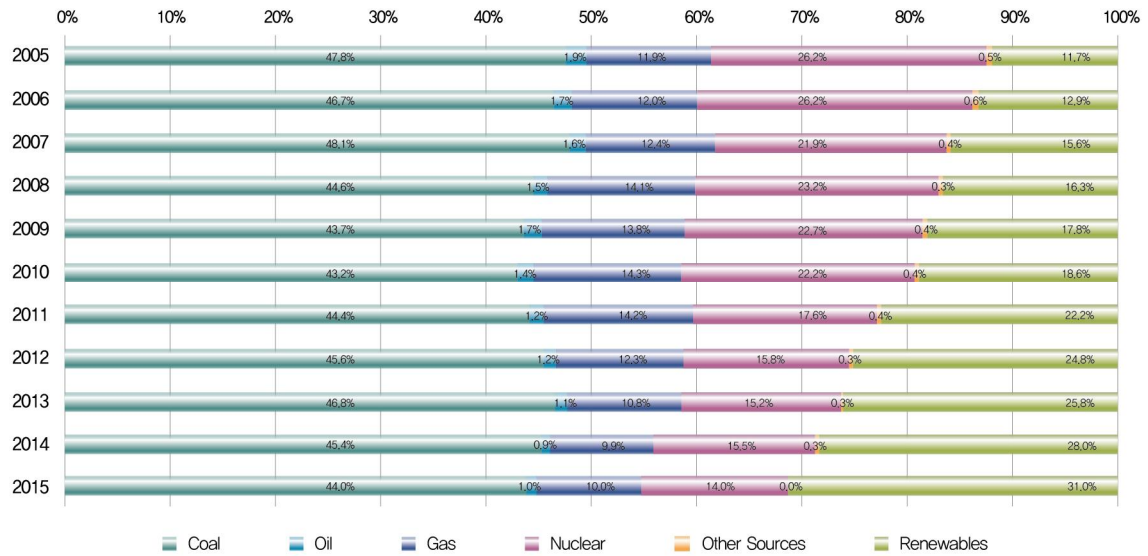
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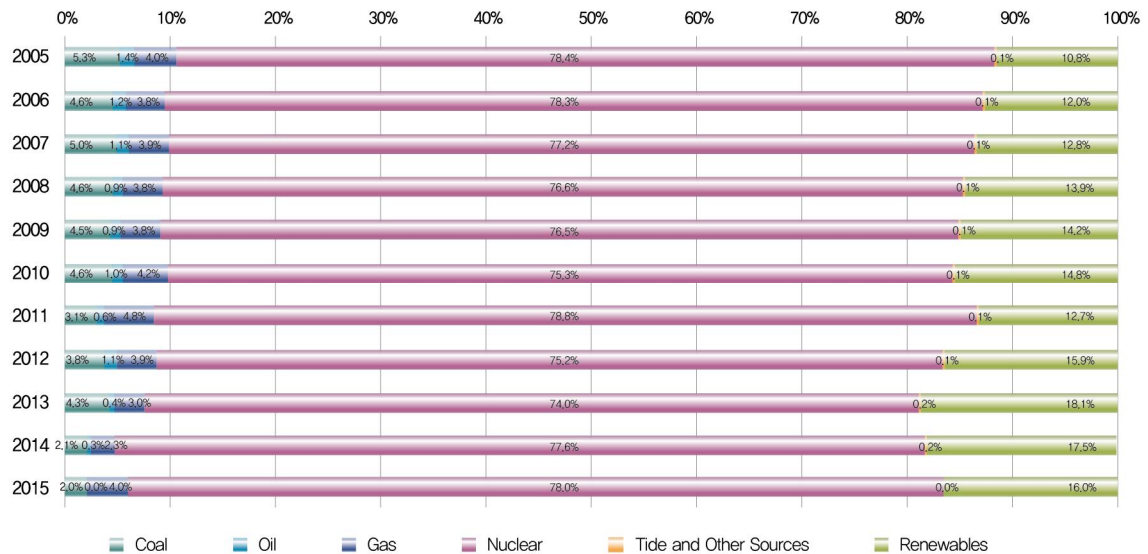
80) IEA Statistics 가 Electricity and Heat Electricity (GW)
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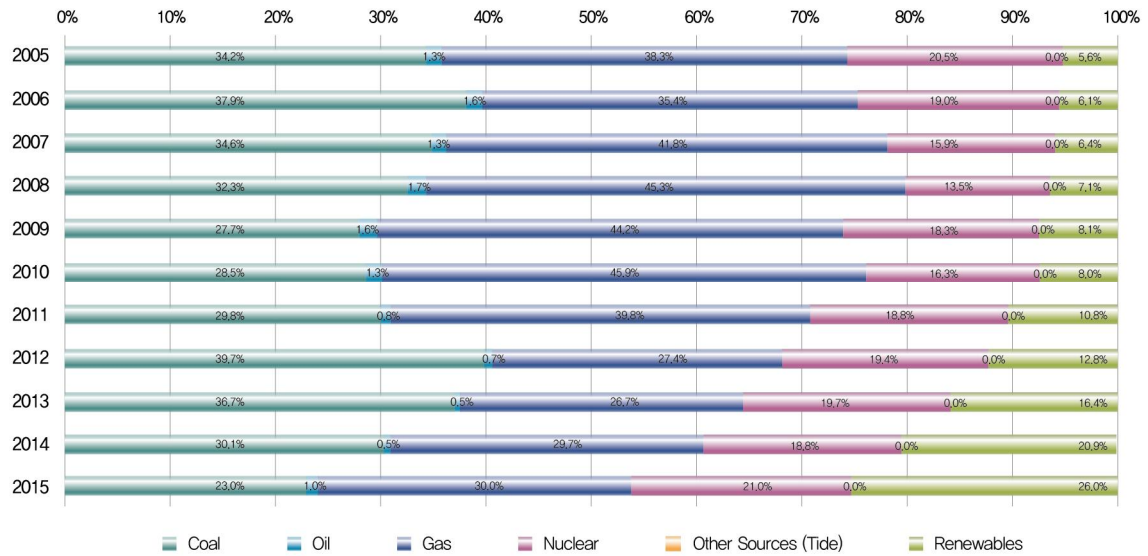
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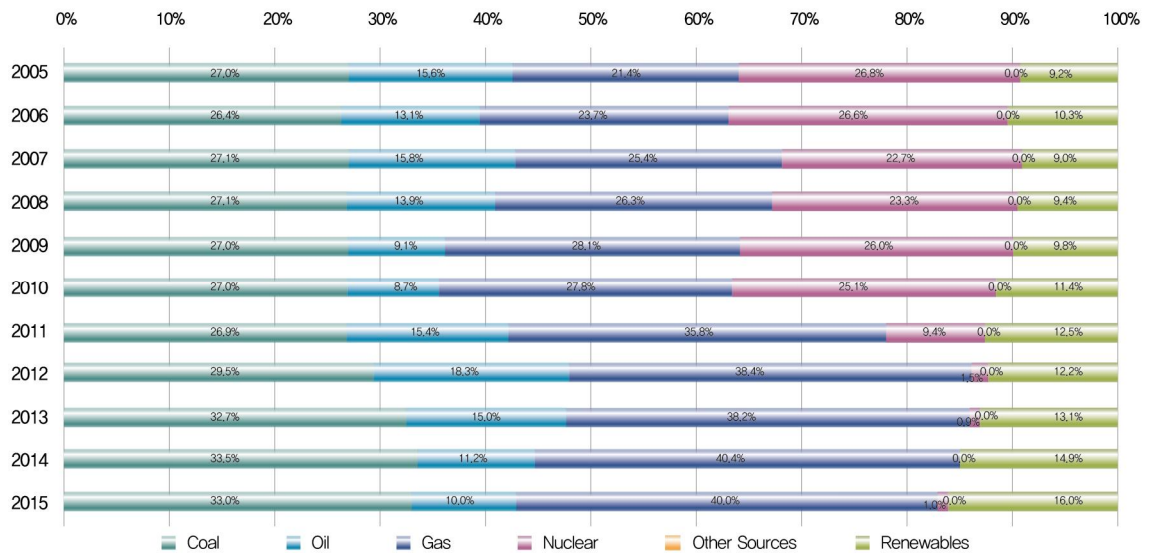
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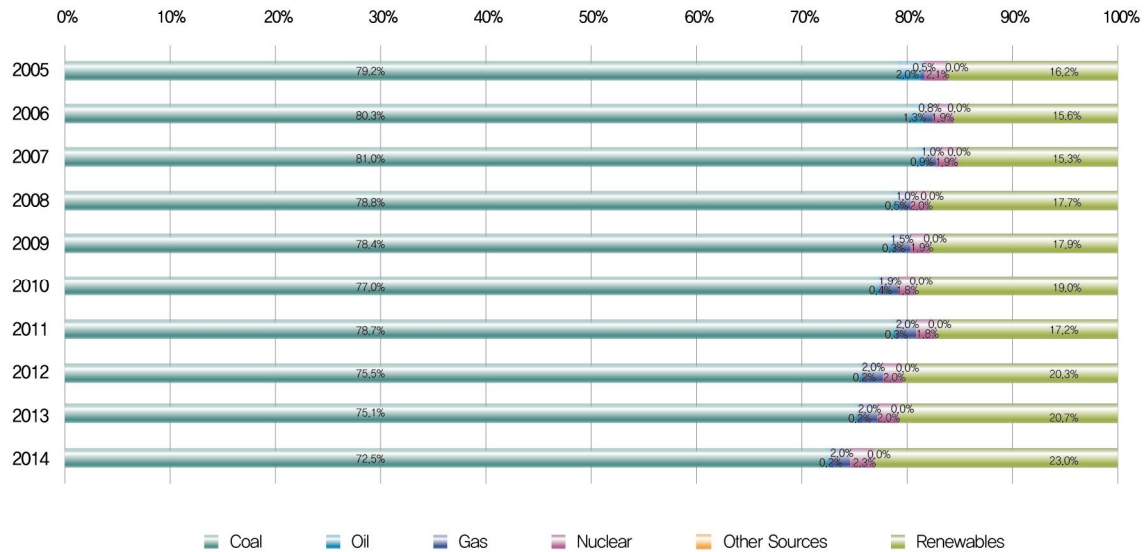


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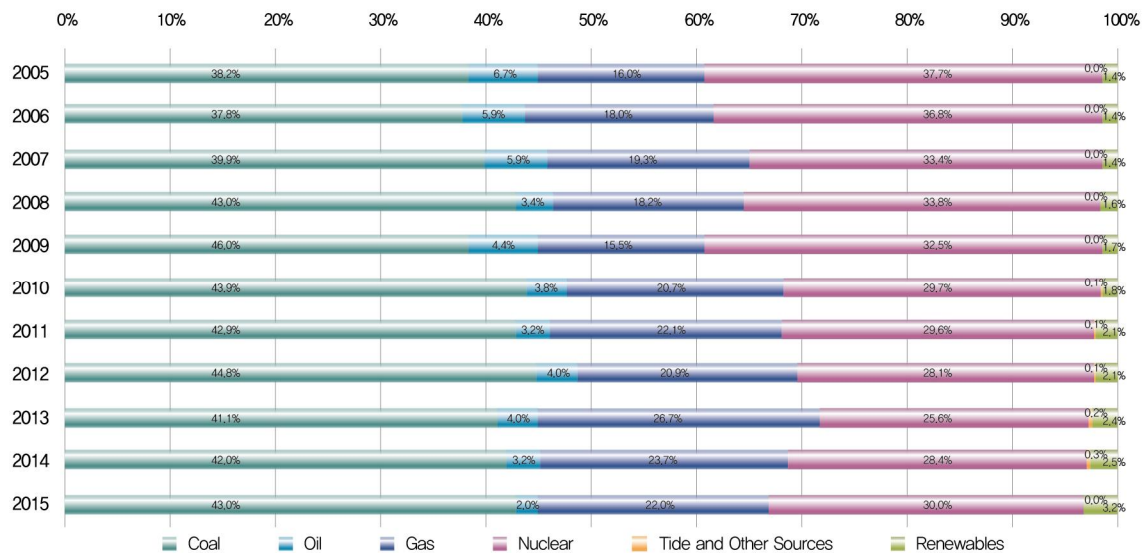




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