기후행동 컨퍼런스 2018

CLIMATE ACTION CONFERENCE 2018

[발표자료집]

주최 WWF citi 후원 산업통상자원부 Ministry of Trade, Industry and Energy 환경부 Ministry of Environment 외교부 Ministry of Foreign Affairs 한국에너지공단 KOREA ENERGY AGENCY

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CLIMATE ACTION CONFERENCE 2018

[오프닝 세션]
Opening Session

Keynote II

Mitigation pathways for 1.5 and What needs to be done

Dr. Christopher Weber

(Global Climate & Energy Lead Scientist, WWF)

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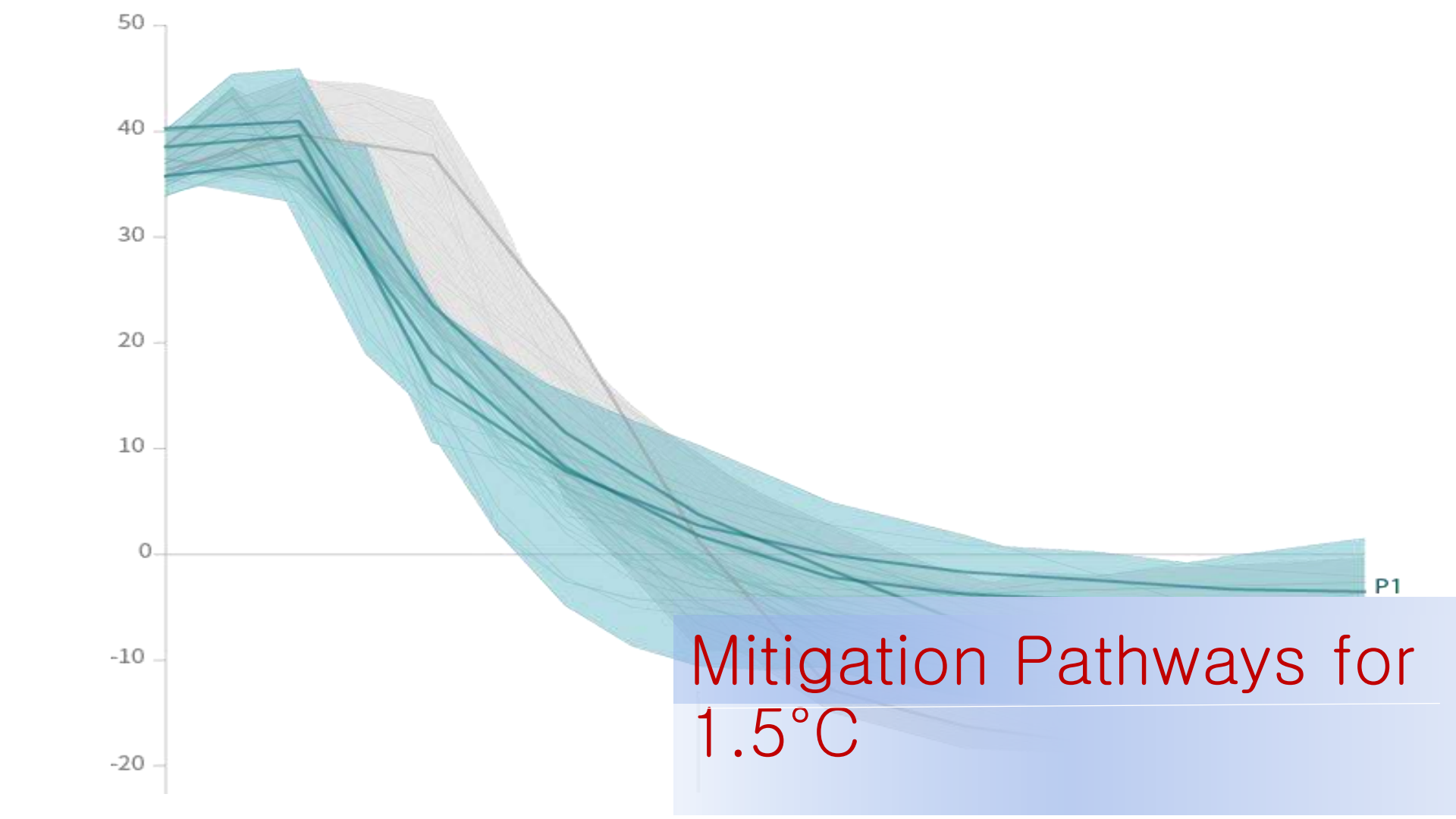
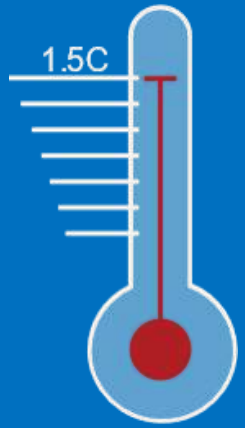


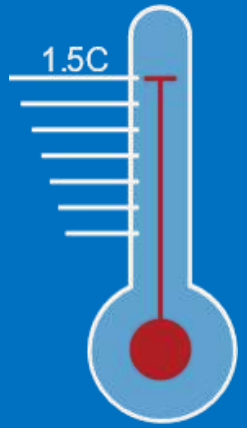
Mitigation Pathways for 1.5°C



Introduction

Outline

- High level messages on Mitigation Pathways
- Key Sector Transitions
- Implications for Companies / Science Based Targets



Mitigation Pathways for 1.5°C: High level messages

High level messages (SPM)

- **Near term action**:
  - 40-60% CO2 reductions by 2030 for 1.5°C (compared to 10-30% for 2°C)
  - 35% reductions in methane and black carbon
- **Different pathways are possible**, leading to different implications
- **Transitions must be very rapid and system-wide.** Rates of change are not unprecedented but scale is; all sectors must play their part
- **Investments** must shift to low-carbon tech and energy efficiency
- **All pathways involve some CO_2 removal (CDR),** but levels vary substantially and depend on near term action and ‘overshoot’. Most CDR measures have significant tradeoffs

Messages from >200 reviewed pathways

- Report examined pathways "consistent with limiting warming to 1.5°C above preindustrial", in year 2100
- Reviewed 90 1.5°C scenarios and 132 2°C scenarios
- Pathways are split by temperature target and level of overshoot
- Very few scenarios (9) available that limit warming to 1.5C with now overshoot

Pathway Group	*Pathway Class*	*Pathway selection criteria and description*	*Number of scenarios*	*Number of scenarios*
1.5°C or 1.5°C-consistent	*Below-1.5°C*	*Pathways limiting peak warming to below 1.5°C during the entire 21st century with 50-66% likelihood**	*9*	*90*
	1.5°C-low-OS	*Pathways limiting median warming to below 1.5°C in 2100 and with a 50-67% probability of temporarily overshooting that level earlier, generally implying less than 0.1°C higher peak warming than Below-1.5°C pathways*	*44*	
	1.5°C-high-OS	*Pathways limiting median warming to below 1.5°C in 2100 and with a greater than 67% probability of temporarily overshooting that level earlier, generally implying 0.1–0.4°C higher peak warming than Below-1.5°C pathways*	*37*	
2°C or 2°C-consistent	*Lower-2°C*	*Pathways limiting peak warming to below 2°C during the entire 21st century with greater than 66% likelihood*	*74*	*132*
	Higher-2°C	*Pathways assessed to keep peak warming to below 2°C during the entire 21st century with 50-66% likelihood*	*58*	

Source: SR1.5 Table 2.1

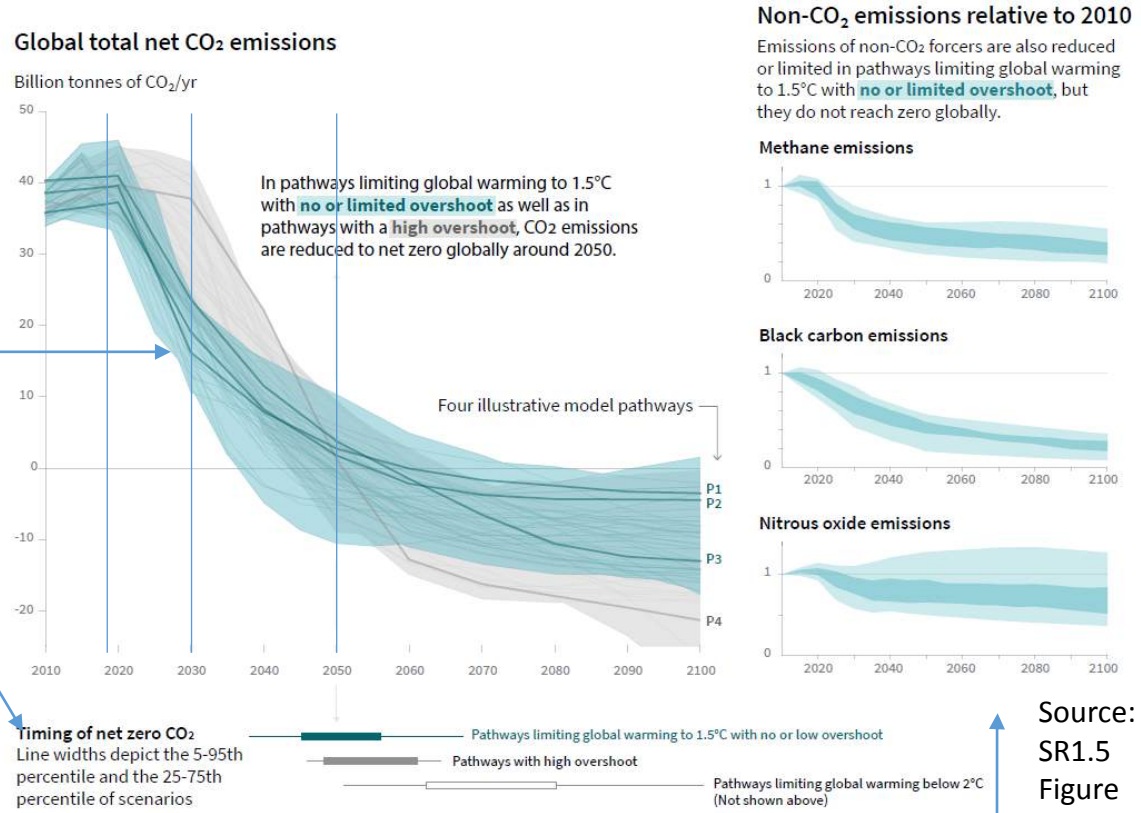
1.5°C Pathways: Near Term Action

1.5C compliant scenarios reduce CO_2 and non-CO_2 emissions substantially:

CO_2: 40-60% by 2030, net zero by ~2050

While also reducing

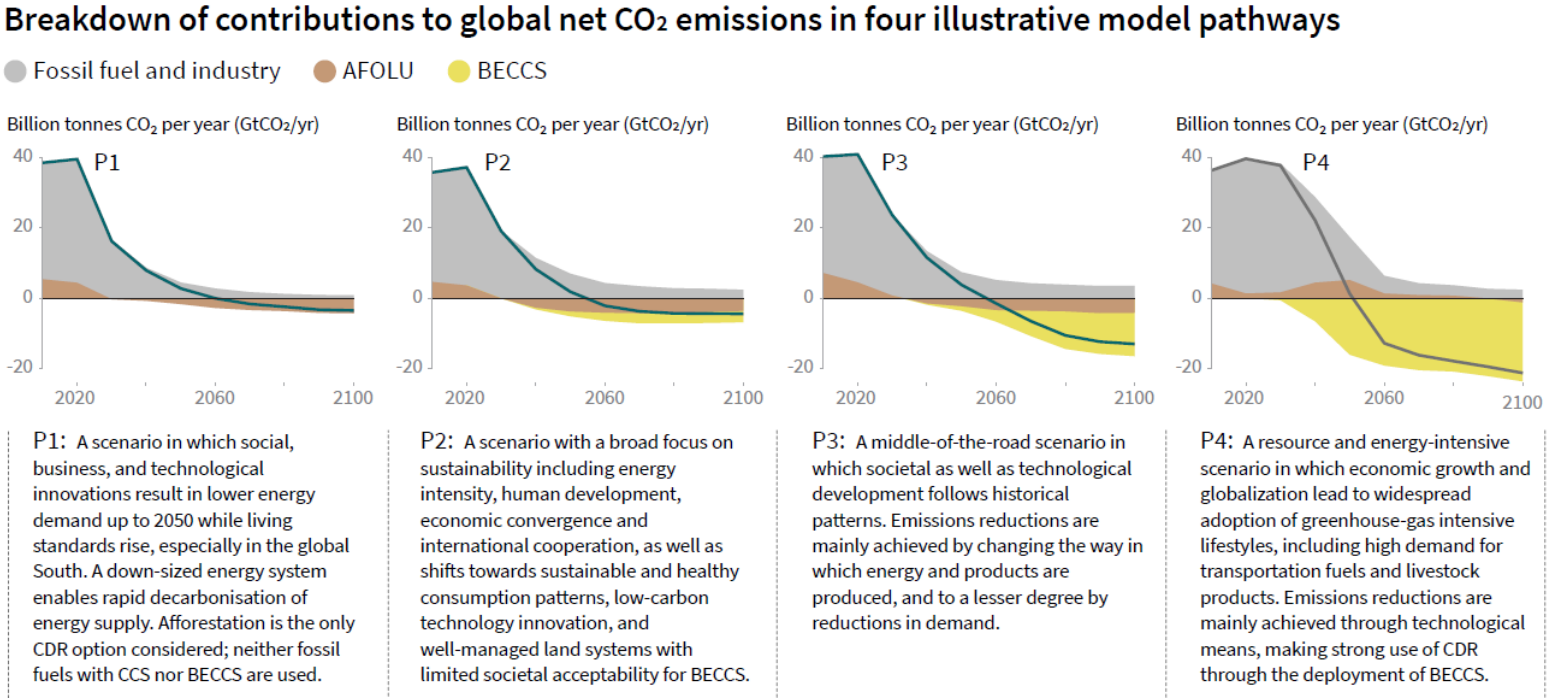
Methane and Black Carbon substantially by 2030-2050



Source: SR1.5 Figure SPM2

1.5°C Pathways: Different Pathways

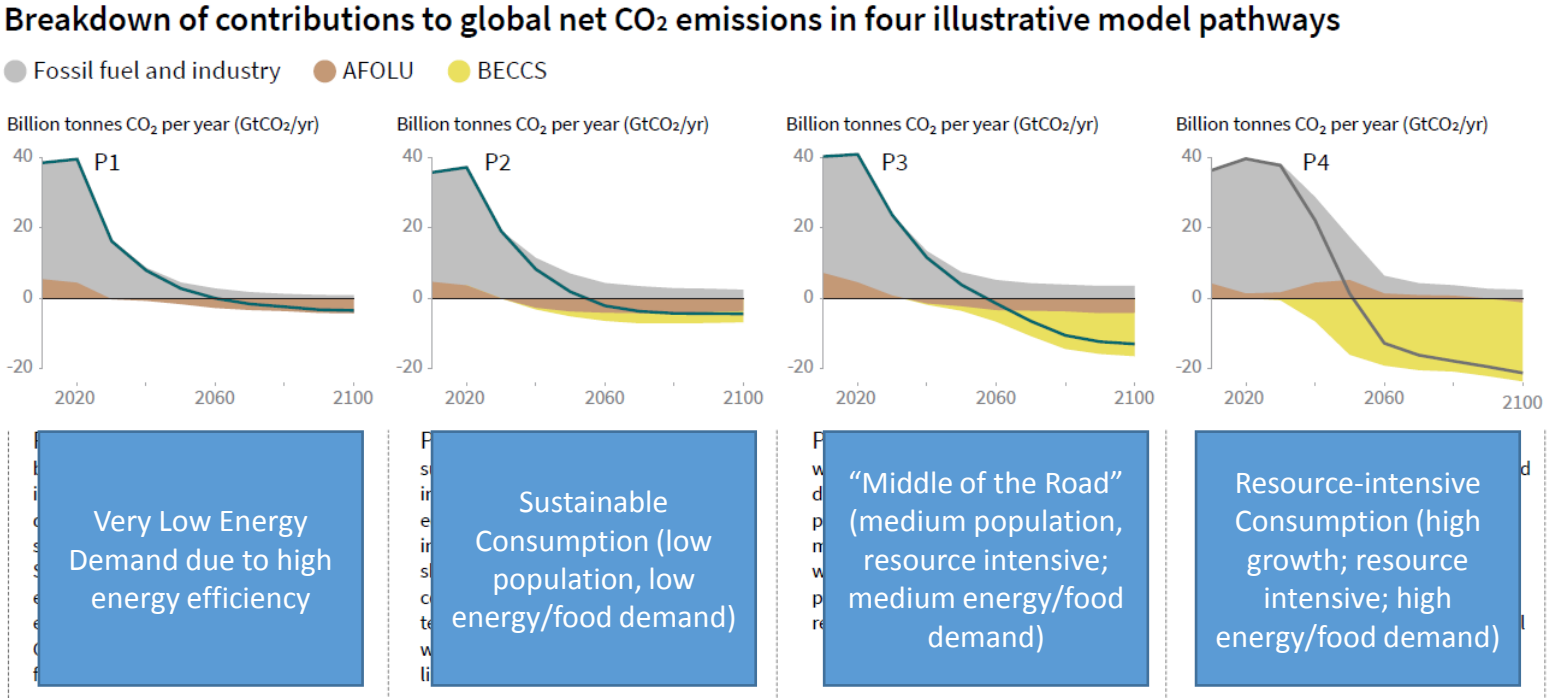
Tradeoff between near term action, CDR, and behavior, illustrated through 'archetype' pathways



Source: SR1.5 Figure SPM2

1.5°C Pathways: Different Pathways

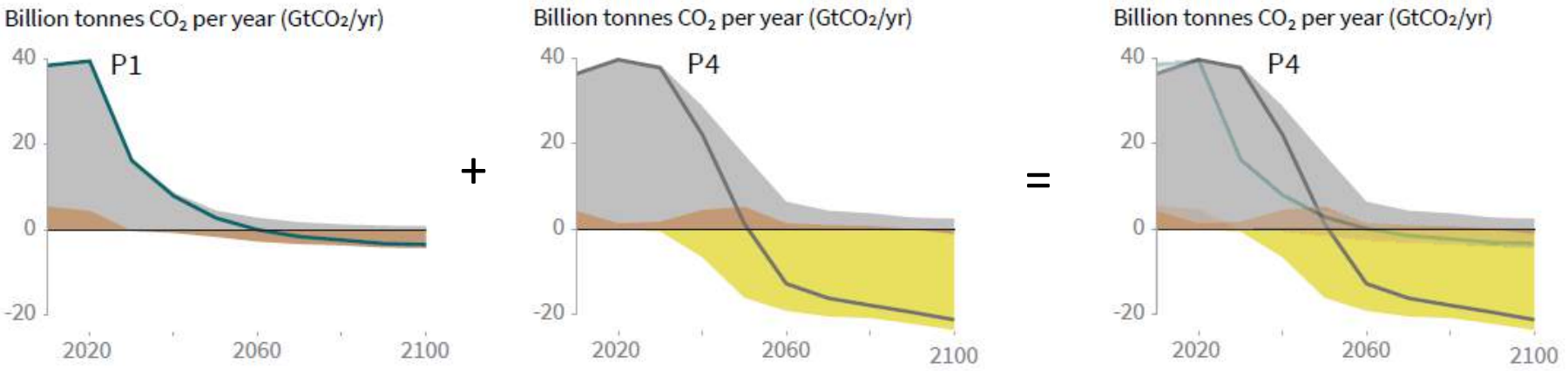
Tradeoff between near term action, CDR, and behavior, illustrated through 'archetype' pathways



Source: SR1.5 Figure SPM2

1.5°C Pathways: Near-term Action vs. CDR

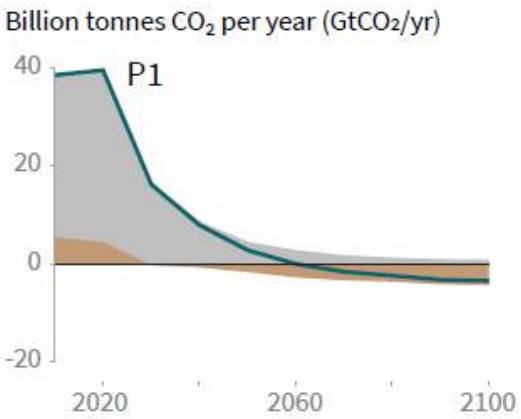
Reducing emissions less before 2030 means removing more GHGs later in the century



Source: SR1.5 Figure SPM2

1.5°C Pathways: Near-term Action vs. CDR

Reducing emissions less before 2030 means removing more GHGs later in the century ('what goes up must come down')



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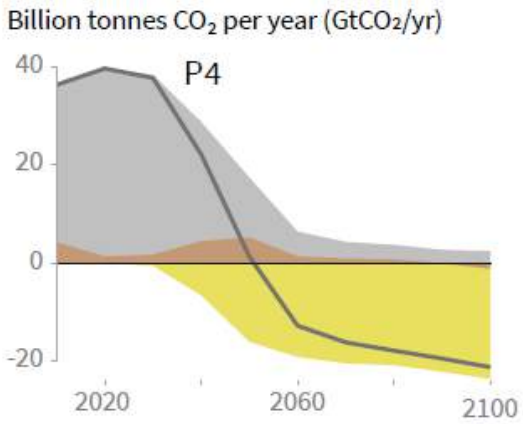

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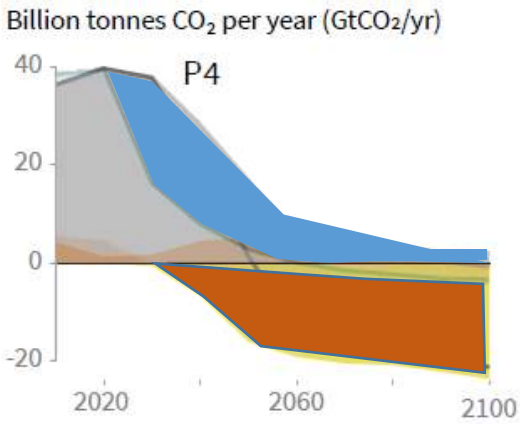
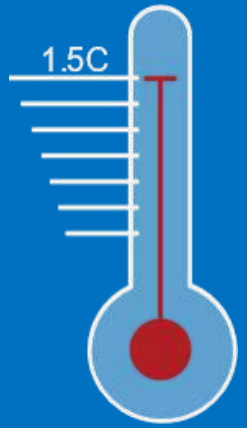


Source: SR1.5 Figure SPM2



Mitigation Pathways for 1.5°C: Key Transitions

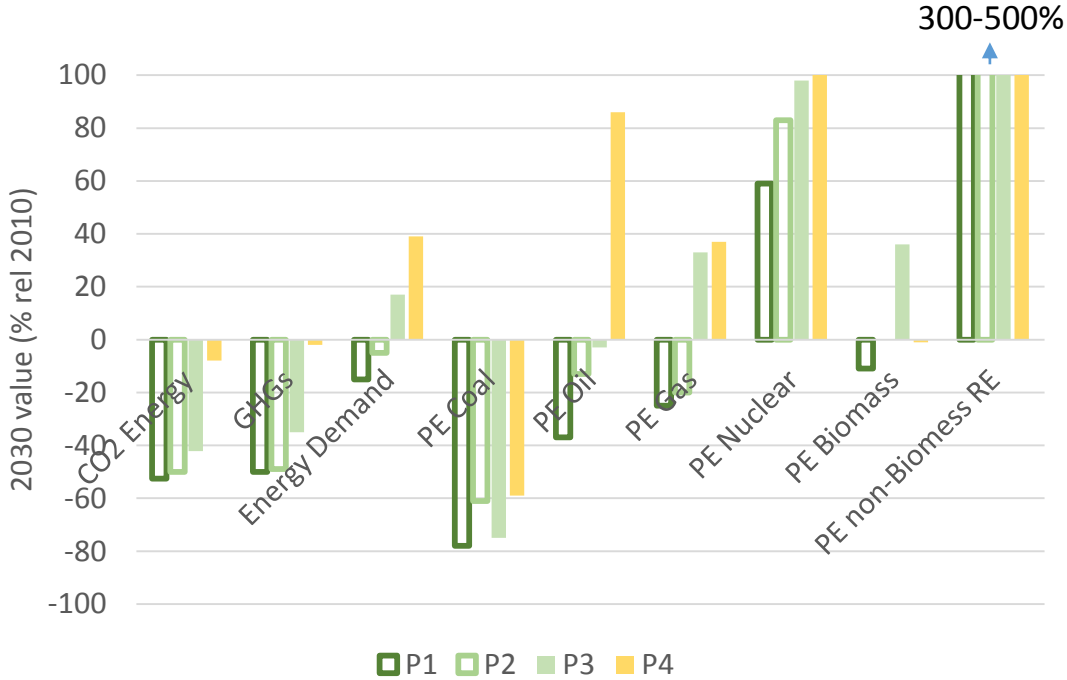
Transitions: Energy (supply)

By 2030 (12 years!)*

- CO_2/GHGs cut 40-60%
- Coal declines 60-80% in all pathways
- Renewables increase 3X-5X
- Total energy demand reduces in low-no OS
- Oil & gas vary substantially by pathway, declining in low demand pathways
- Nuclear increases substantially (But faces barriers)

Trends continue to 2050

*in low/no overshoot pathways



Source: SR1.5 Table 2.1

Transitions: Urban systems

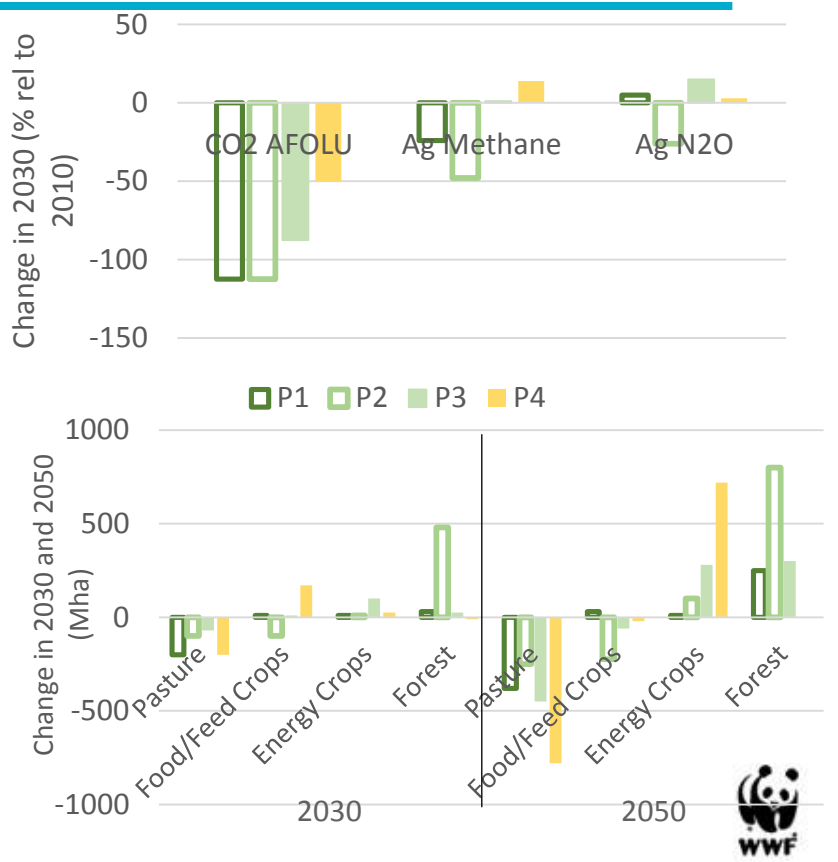
- Buildings:
  - Total energy use increases slightly or decrease, balancing access, increased demand (e.g. A/C) and efficiency
  - Significant growth in electrification (appliances, cooling)
  - Very large increases in efficiency (lighting, cooling/heating, appliances)
- Transportation:
  - Total energy use balances significant increases in demand and efficiency
  - Deep reductions require a combination of several factors:
    - Electrification
    - Energy efficiency
    - Avoided/shifted demand (e.g. greater public transport, walk/bike)
    - Biofuels in modes difficult to electrify (aviation/shipping, heavy duty road)

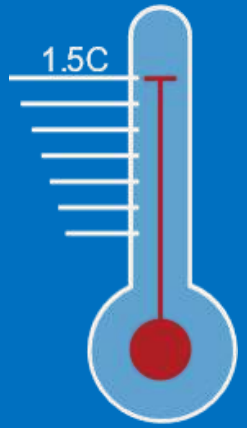
Transitions: Land and Food

By 2030 (12 years!)

- CO_2 from land (AFOLU) cut 80% to >100% (net sink) -> zero deforestation by 2030
- Agricultural emissions (CH_4/N_2O) cut by much less and mostly driven by diet changes, because:
  - Not all models assess agriculture mitigation
  - Agricultural emissions generally seen as more difficult to cut
- Land use changes depend heavily on pathway
  - By 2050 tradeoffs between land for food (pasture/ crops and land for mitigation (energy crops/forest)
  - Choice between forest and energy crops depends on overshoot

Land will be covered in detail in Special Report on Land (2019)





Implications for Companies and Science Based Targets

Implications for companies

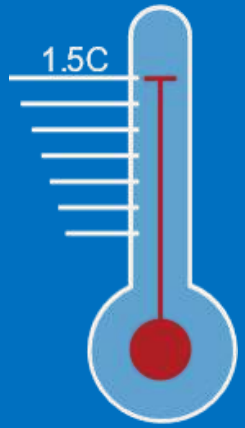
- Companies increasingly interested in mitigation pathways for several reasons:
  - Climate-related financial risk (e.g. TCFD)
  - Aligning business with 1.5°C-2°C future: Science Based Targets
- Corporate decisions play a key role in the needed transitions
- SR1.5 provides key tools around 1.5°C-2°C transitions:
  - Updated 2°C pathways (relevant to TCFD) given requirement for a “2°C scenario analysis”
  - Key scenario data will be made available (much already public at IIASA portal)

Science Based Targets Update

- Nearly 500 companies already signed up to set GHG reduction targets in line with Paris Agreement goals
- The Science Based Targets initiative (SBTi) recognizes the urgency in SR1.5 and supports its call for unprecedented transitions
- In coming months SBTi will:
  - Update underlying scenarios, in consultation with new Scientific Advisory Group
  - Update tools to allow companies to set 1.5°C compliant targets
- Revisions in early 2019

WWF

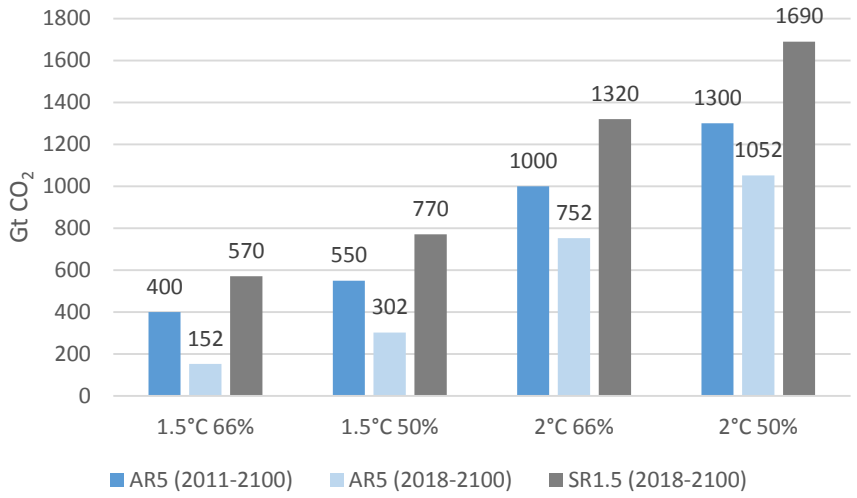
Thank You!



Backup slides

Carbon Budget Update

- Carbon budgets relative to AR5 have increased
  - ~155-275% for 1.5°C
  - ~60-75% for 2°C
- This is due to a variety of factors, including:
  - **Updated methods**: using warming to date to constrain 'remaining' budget
  - **Definitional changes**: how temperature is measured, how budget is calculated
  - **Non-CO_2 emissions**: more advanced modeling
- Significant uncertainty remains
- Changes are not a reason for delay; urgency is required!



Source: SR1.5 Table 2.2; AR5 WG3 Chapter 6

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[Session I]

Aligning climate actions of economic actors with Paris Agreement (1.5℃)

Presentation I

Corporate climate leadership with the cases of Science Based Targets Initiative and Japan Climate Initiative

Ryuji Tsutsui

(CEO, WWF-Japan)

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Stop Climate Change
-Together possible-

2018.Oct 10th
Ron Tsutsui – CEO, WWF Japan

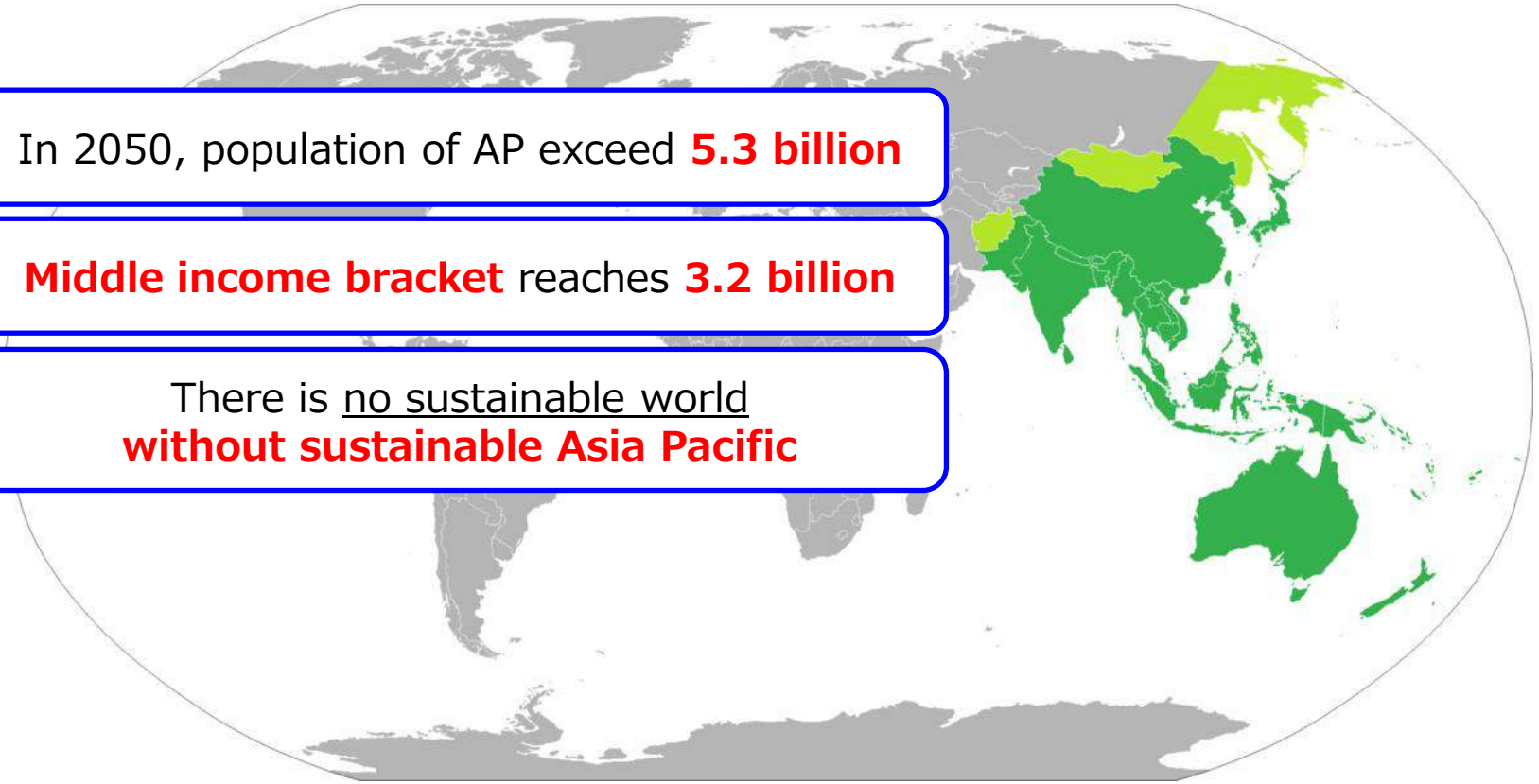
Korea: A leader of Asia Pacific Climate Actions

1997 S.Korea's solidarity to concur currency crisis and transformation
1990s~ Growth in global competition (automobile/electronics/media)
2018 Climate action tracker : "Highly insufficient"
- Carbon Tax
- Invest on Green IT Innovation

In 2050, population of AP exceed **5.3 billion**

Middle income bracket reaches **3.2 billion**

There is no sustainable world
without sustainable Asia Pacific



Japan Climate Initiative at a glance

JCI 気候変動イニシアティブ Japan Climate Initiative

japanclimate.org/english

Launched on **July 6th, 2018**
105 Initial members now up to **214**
(**148** companies, **22** local gov't & **44** other orgs)

Secretariat Orgs

CDP DISCLOSURE INSIGHT ACTION

WWF

RENEWABLE ENERGY INSTITUTE

Partner Orgs

enekei.jp

Japan-CLP Japan Climate Leaders' Partnership

I.C.L.E.I Local Governments for Sustainability Japan

The Frontier Network
Innovation for sustainable business

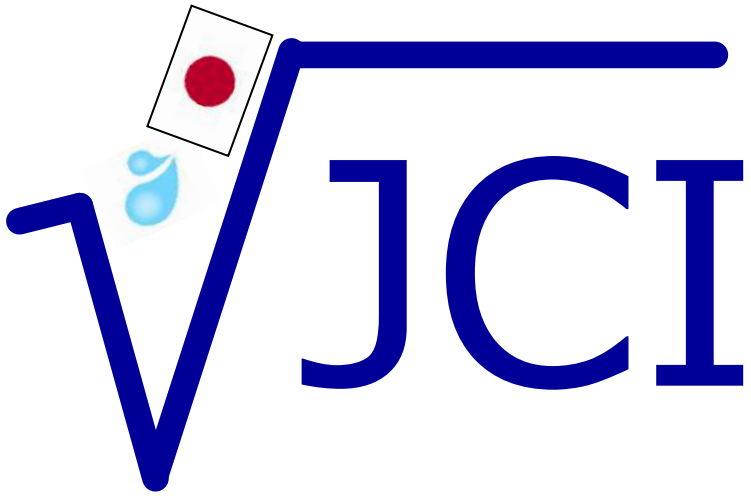
Why JCI is needed for Japan

1. **To Respond to the Increasing Role of Non-State Actors in the Paris Agreement**
   - Wanted to create movement from Japan
2. **To Create a level-playing field for Japanese NSAs**
   - Ambitious actions taken by progressive companies/local governments to **receive fair recognition**.
3. **To Tap on the Advocacy Power of the NSAs to the Central Government**
   - Japan needs to stand on the front line of global de-carbonization.

What JCI aims at (from the Founding Declaration)

Japanese **energy efficiency and expansion of renewable energy** is vital to realize a de-carbonized society. We believe it bring **benefits to Japan** and narrow the gap in achieving the **well below 2℃ target** through our own activities.

1997 Japan's leadership at Kyoto Protocol



It is Non State Actors to enhance Japan's commitment to climate efforts in international society.

2017 Japan is far from the forefront of climate action.

JCI promotes collaborations in 4 fields

POLICY Advocacy

- Government's advisory council for **strategy to meet Paris Agreement.**
- Prepare the strategy for **G20 2019 in Osaka, Japan.**

JCI will support ministries.

Engage and Act

Expand community through **RE100 (7 companies)** and **Science Based Targets (31 co,.)** and share experiences and knowledge in non-competitive field among members.

Expand community

JCI will showcase and work with other partners in Japan.

"Japan Climate Action Summit" on Oct 12th.

International Partners

We will communicate and act with **international partners.**

SBT: Science Based Target initiative

139(J:29)
492(J:64)
As of Oct01,2018

GOAL: Increase corporate ambition on climate action with the level of de-carbonization required by science to limit global warming to **less than 2°C** compared to preindustrial temperatures.

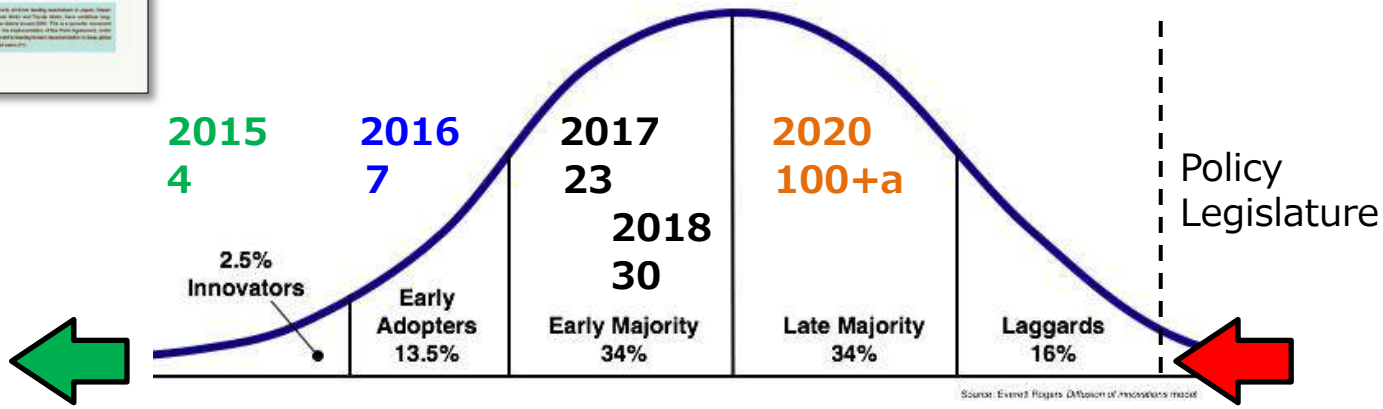
Objectives: Enlist 100 companies in 2015, and 250 companies by 2018. Demonstrate to policy-makers the scale of ambition achievable among leading companies to positively influence international climate negotiations

Merit of Engagement: – why join?
- Allows companies to **manage risk**
- Gives long-term competitive advantage and safeguards future profitability
- Spurs **Innovation**
- Makes companies more resilient to developing climate regulation and policy
- Enhances corporate **reputation**
- Compatible with strong **financial returns**

Concerns::
Prerequisite : Assuming clean energy become available. Plan can be revised if altered.
Penalty & Risk : No legal/financial penalty. No reputation risk.

To enlarge SBT community

- **Introduction**/Encouragement from Gov't and NGOs
- **Support** by NGOs (WWF Technical Seminar)
- **Pressure** from NGOs (WWF Ranking Report)
- **Recognition** by financial communities
- **Influence** of early adaptors to entire industry



◆Sony, Honda, Nissan, Kao

◆Toyota, Yokohama Rubber, Daikin,,,,

TOP 1-200th company : 360,000 - 16,000 employees

Ranking on Climate Change Action by WWF

Table 2 Ranking of investigated companies

Evaluated companies: 25 in total
●Average score: 46.7 ●highest score: 87.5 ●lowest score: 2.1

* Top 4 companies obtained T-score above 60.

Ranking	Overall scores (out of 100 points)	Companies	Targets & Performance (out of 50 points)	Information disclosure (out of 50 points)
1	87.5	Nissan Motor	37.5	50.0
2	70.4	Honda Motor	27.3	43.1
3	65.0	Toyoda Gosei	28.9	36.1
4	63.9	Toyota Motor	26.0	37.8

high

More than 50 points and less than 60 points (Second grouping)	Mazda Motor Suzuki Motor Tokai Rika Denso
More than 40 points and less than 50 points (Third grouping)	NOK Toyota Boshoku Toyota Industries KYB Kawasaki Heavy Industries Mitsubishi Motors Hino Motors IHI Aisin Seiki Isuzu Motors
Less than 40 (Fourth grouping)	Calsonic Kansei Yamaha Motor EXEDY TS TECH Fuji Heavy Industries (Subaru) Mitsui Engineering & Shipbuilding Shimano
Out of ranking (no environmental reports issued in 2014)	Daihatsu Motor Takata Nissan Shatai

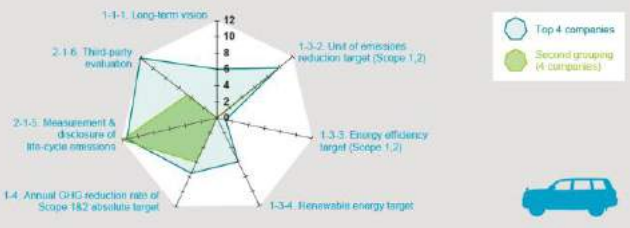
Above average within this industry

Below average within this industry

Low

* Companies are listed in order of overall scores.

Figure 1 Comparison of average scores for 7 Key Indicators between the top 4 companies and the second goruping (4 companies)



▼Dismay
▼Challenge
- Debate
▲Change
▲Declare
▲Collaborate

Collaboration with Local Governments

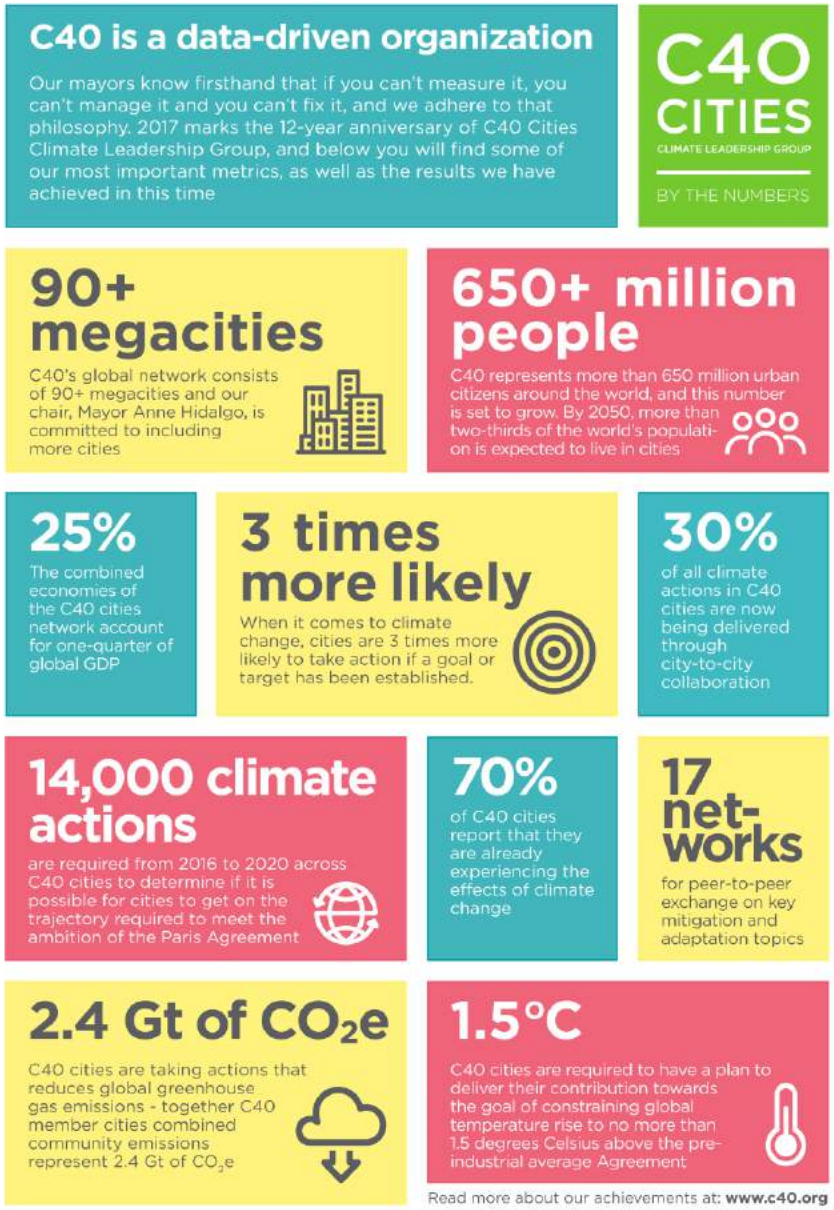
TOKYO METROPOLITAN GOVERNMENT

DR. Konishi for Sustainable Olympic 2020

OPEN YOKOHAMA

Mr. Tokugawa
R.Tsutsui,
N.Yamagishi

Collaboration with International Community



Tokyo Metropolitan Gov't, City of Yokohama engaged in **C40** to share ambition at scale

"Deadline 2020"

https://www.c40.org/other/deadline-2020

https://resourcecentre.c40.org/

C40 CITIES
CLIMATE LEADERSHIP GROUP

Fun to save Our Blue Planet with WWF

Donail

WWF

“Ask not, what your country can do for you.
Ask, what you can do for your country” J.F.Kennedy 1961

“Act together to stop climate change, and save our blue planet”

Together possible

CLIMATE RISKS: 1.5°C VS 2°C GLOBAL WARMING

EXTREME WEATHER

100% increase in flood risk. | VS | 170% increase in flood risk.

SPECIES

6% of insects, 8% of plants and 4% of vertebrates will be affected. | VS | 18% of insects, 16% of plants and 8% of vertebrates will be affected.

WATER AVAILABILITY

350 million urban residents exposed to severe drought by 2100. | VS | 410 million urban residents exposed to severe drought by 2100.

ARCTIC SEA ICE

Ice-free summers in the Arctic at least once every 100 years. | VS | Ice-free summers in the Arctic at least once every 10 years.

PEOPLE

9% of the world's population (700 million people) will be exposed to extreme heat waves at least once every 20 years. | VS | 28% of the world's population (2 billion people) will be exposed to extreme heat waves at least once every 20 years.

SEA-LEVEL RISE

46 million people impacted by sea-level rise of 48cm by 2100. | VS | 49 million people impacted by sea-level rise of 56cm by 2100.

COSTS

Lower economic growth at 2°C than at 1.5°C for many countries, particularly low-income countries.

OCEANS

Lower risks to marine biodiversity, ecosystems and their ecological functions and services at 1.5°C compared to 2°C.

CORAL BLEACHING

70% of world's coral reefs are lost by 2100. | VS | Virtually all coral reefs are lost by 2100.

FOOD

Every half degree warming will consistently lead to lower yields and lower nutritional content in tropical regions.

■「気候変動イニシアティブ」に関するＱ＆Ａ

Ｑ：「気候変動イニシアティブ」って何ですか？
Ａ：気候変動対策に積極的に取り組む企業や自治体、団体、NGOなど、いわゆる
「非国家アクター」のゆるやかなネットワークです。米国では、企業、州政府、自治体などが "We Are Still In“ というネットワークを作り、トランプ政権のパリ協定の離脱表明後も、気候変動対策の強化に取り組んでいます。「気候変動イニシアティブ」は、いわばその日本版です。

Ｑ：どんなところが参加の対象ですか？
Ａ：呼びかけ文に賛同する企業、金融機関、自治体、研究機関、NGOなどです。
個々の参加でも、その連合体が参加するのでもかまいません。

Ｑ：何をするのですか？
Ａ：参加メンバーが自発的に積極的に気候変動に取組むことが基本です。
「気候変動イニシアティブ」では、ホームページでの活動紹介やセミナー、イベントの開催でメンバー間での情報共有や経験交流を行い、メンバーの取組みをサポートします。

Ｑ：2018年度には何か大きなイベントの予定はありますか？
Ａ：10月12日（金）に「気候変動アクションサミット（仮称）」の開催を予定しています。詳細はこれからですが、日本での非国家アクターの取組みを活発にする契機となるものです。ぜひご参加ください。

Ｑ：会費はありますか？また何か決まった義務はありますか？
Ａ：募金は歓迎ですが、会費はありません。また決まった義務もありません。参加団体の自発的な取組みを進めてください。

Ｑ：事務局はどこがやっているのでしょうか？
Ａ：ＷＷＦジャパン、ＣＤＰジャパンと自然エネルギー財団が共同で事務局をやっています。
今年度の活動経費はこの３団体が負担します。

Ｑ：参加するにはどうしたらいいのですか？
Ａ：申し込み用紙(別紙ワードファイル）に記入して、事務局あてにメールでお送りください。

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[Session I]

Aligning climate actions of economic actors with Paris Agreement (1.5℃)

Presentation II

The Evaluation of the Efforts of Korean Corporations to Address Climate and Energy Issues : Focusing on the Electric Equipment and Transportation Sector

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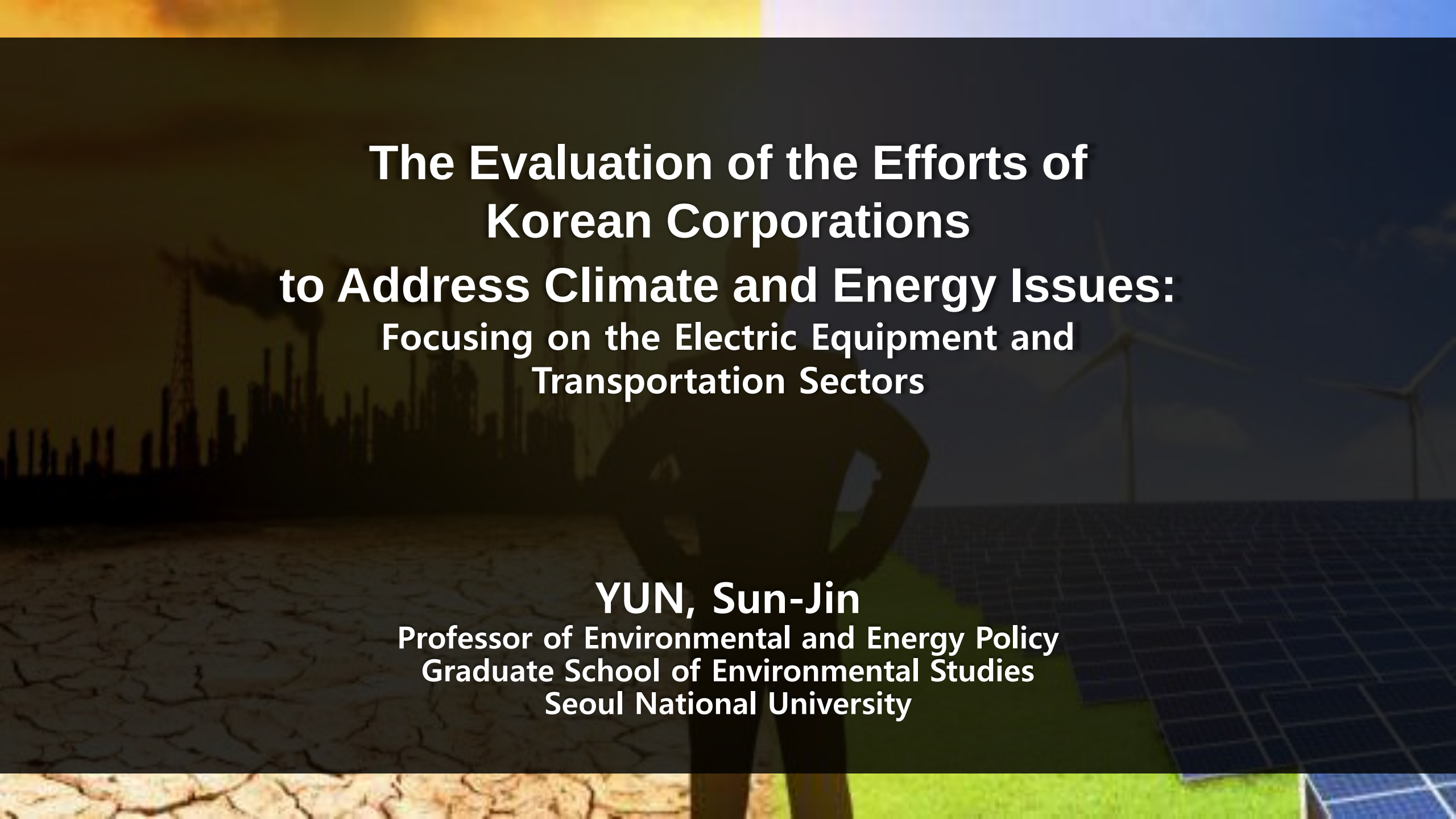

The Evaluation of the Efforts of Korean Corporations to Address Climate and Energy Issues:

Focusing on the Electric Equipment and Transportation Sectors

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Contents

Introduction

Introduction
Business & Global Climate Change

- **Global climate change** with extreme weather disasters like intense storms, floods and droughts is becoming realized, imposing **real costs** on companies and the communities they help support.
- Climate change threatens facilities and operations, supply and distribution chains, and access to electricity and water. It can also prevent employees from coming to work and customers from buying products or services.
- Leading companies recognize climate change as both a **risk** and an **opportunity**.
- A growing number of companies are taking steps to **strengthen their resilience** to climate impacts, reduce their greenhouse gas emissions, produce innovative low.carbon technologies, and support policies enabling a smooth transition to a low.carbon economy.

Introduction
Leading companies for Global Climate Action

- **Google,** a global technology leader, carbon neutral since 2007 and sourcing 100% renewable electricity in 2017

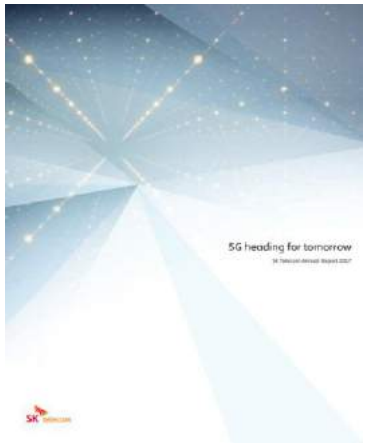
- **Tata Motors,** the India's largest automobile manufacturer, setting the goal of using 100% renewable energy across all its own operations by the year 2030. Sourcing around 16.25% of its electricity from renewable sources in 2017

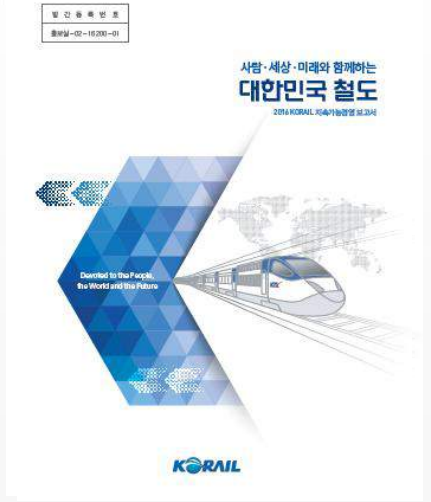
- **Swiss post,** operating in the communication, logistics, retail financial and passenger transport markets, sourcing 100% of its electricity from renewable, "nature made basic" certified energies. Its entire fleet of electric vehicles powered by green electricity produced

- **Apple**, using 100% of the electricity from renewable sources in 2018 and investing in renewable energy projects to address upstream emissions

Introduction
Research Background

- Korean companies are making efforts to publish their own **Corporate Social Responsibility (CSR)** reports or to disclose their carbon emissions information to the **Carbon Disclosure Project (CDP).**
- There is **a need to assess** the level of corporate goals and information disclosure at the NGO level.





Research Method

Targets of the Study

- **Investigated companies:**

  Electrical and transportation equipment companies that issue **Corporate Social Responsibility (CSR) reports** and belong to the **'Korea 200'**, to which the CDP sent its annual information request in 2017.

  Electrical/Electronics/Telecom Industries: 16
  Transportation/Logistics/Automobile Industries: 17

- **Scope of investigation:**

  Open-access information in the **CSR reports (33)** of each company and **2017 CDP report**

List of investigated companies

Sector	Company Name	
Electrical (16)	ISU PETASYS	Samsung Electronics (Samsung Elec.)
	KT	Samsung Electro.Mechanics (SEM)
	LG Display	Samsung SDI
	LG Electronics (LG Elec.)	SK Innovation
	LG Innotek	SK Hynix
	LG Uplus	SK Siltron
	LS C&S	SK Telecom (SKT)
	LSIS	STEMCO
Transportation (17)	Asiana Airlines (Asiana)	Hyundai Heavy Industries (HHI)
	CJ Logistics	KIA Motors
	DSME	KORAIL
	GM Korea	Korean Air (KAL)
	Hankook Tire	KUMHO TIRE
	Hyundai Glovis	LG International.Corp.
	Hyundai Mobis	Samsung Heavy Industries (SHI)
	Hyundai Mipo Dockyard (HMD)	STX Offshore & Shipbuliding (STX)
	Hyundai Motor	

Evaluation Indicators

GHG reduction target & performance (11)

1.1. Time spans of targets
- **1.1.1. Long.term vision**
- 1.1.2. Target years

1.2. Range of targets
- 1.2.1. Geographical boundary
- 1.2.2. Perspective of full.scope management

1.3. Climate targets
- 1.3.1. Target GHGs
- **1.3.2. Emissions reduction target by criteria**
- **1.3.3. Energy efficiency target**
- **1.3.4. Renewable energy target**

1.4. Annual GHG reduction rate

1.5. Status of achievement

1.6. Comparison btw performance and actions

Information disclosure (10)

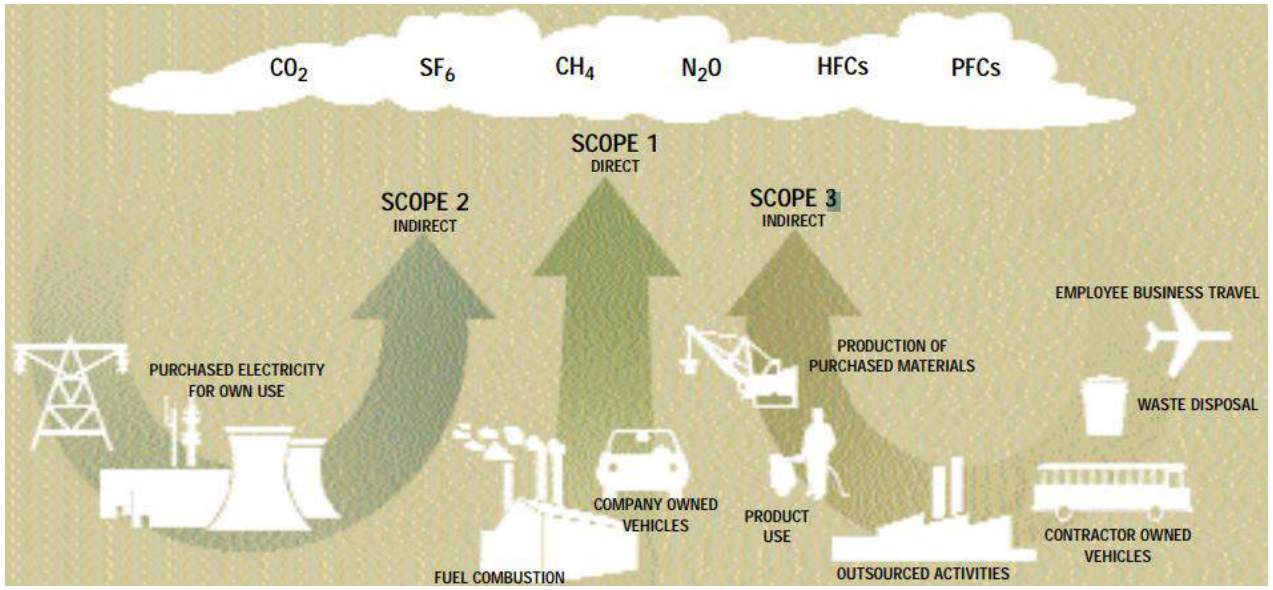
2.1. Credibility of disclosed formation and data
- 2.1.1. Scope 1&2 GHG (CO_2)
  - 2.1.1.1. Absolute and Intensity
  - 2.1.1.2. Time.series data
- 2.1.2. Scope 1&2 energy consumption data
  - 2.1.2.1. Absolute and Intensity
  - 2.1.2.2. Time.series data
- 2.1.3. Amount of renewable energy use
- 2.1.4. Data boundary
- **2.1.5. Measurement & disclosure of full-scope emissions**
- **2.1.6. Third-party evaluation**

2.2. Credibility of target setting
- 2.2.1. Comparison of targets and results
- 2.2.2. Grounds of target setting

※ Bold=key indicator

Assessment Result 1
Targets & Performance

The Concept of Scope



❖ Defining three Scopes:

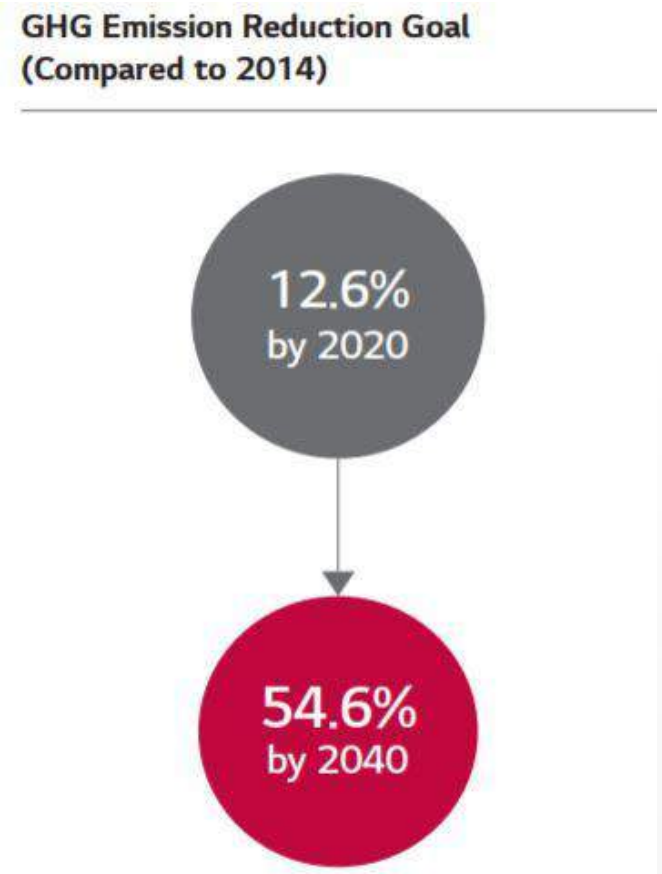
To help delineate direct and indirect emission sources, improve transparency, and provide utility for different types of organizations, climate policies, and business goals.

Scope 1	Scope 2	Scope 3	Avoided Emission
Direct GHG emissions • From combustion in boilers, furnaces, vehicles, etc. • From chemical production in process equipment	Electricity indirect GHG emissions • From the generation of purchased electricity consumed by the company	Other indirect GHG emissions • Consequence of the activities of the company • Extraction and production of purchases materials, transportation of purchased fuels, use of sold products and services	Occurred outside of a product's life cycle or value chain, but as a result of the use of that product • Low-temperature detergents, fuel-saving tires, energy-efficient ball-bearings, teleconferencing services

Source: GHG Protocol

Long-term vision

Example of LG Display



- **Long-term vision**: only 12 out of 33 companies set mid or long-term target. 6 companies have long-term target over 2040, these are all in the electrical equipment sector.
- Examples of major companies:
  - Companies establish environmental strategies and directions: KT 'Carbon Impact 2020', LG Uplus 'Green 2020 environmental vision' etc.
  - Samsung Electronics: Set goals by 2020 in 2008. Preparing to set up **Science Based Target (SBT)** for plan after 2020
  - LG Electronics: Set goals by 2020 in 2008 and planning mid- to long-term goals within 2018

Targets & Performance
Target Years

		Short-Term	Mid-Term		Long-Term	
Target year	Missing or unclear	~ 2020	2021 ~ 2029	2030 ~ 2039	2040 ~ 2049	2050 ~
Number of companies	**10**	**11**	**3**	**3**	**4**	**2**
Company Name	SK Innovation ISU PETASYS Samsung SHI Hyundai HHI Hyundai HMD DSME STX O&S Asiana Airlines KUMHO TIRE LG International – Corp	Samsung Electronics LG Electronics LG Innotek LSIS LS Cable & System SK Siltron STEMCO Hyundai Motor Kia Motors Korean Air GM Korea	KORAIL Hyundai Mobis CJ Logistics	Samsung SDI Hyundai Glovis Hankook Tire	KT LG Uplus LG Display Samsung Electro-Mechanics	SK Hynix SK Telecom

All the companies in Electrical equipment sector

※ The time period follows the Mid-term and Long-term period of the Master Plan for National Energy

Targets & Performance
Perspective of full-scope management

Example of KT

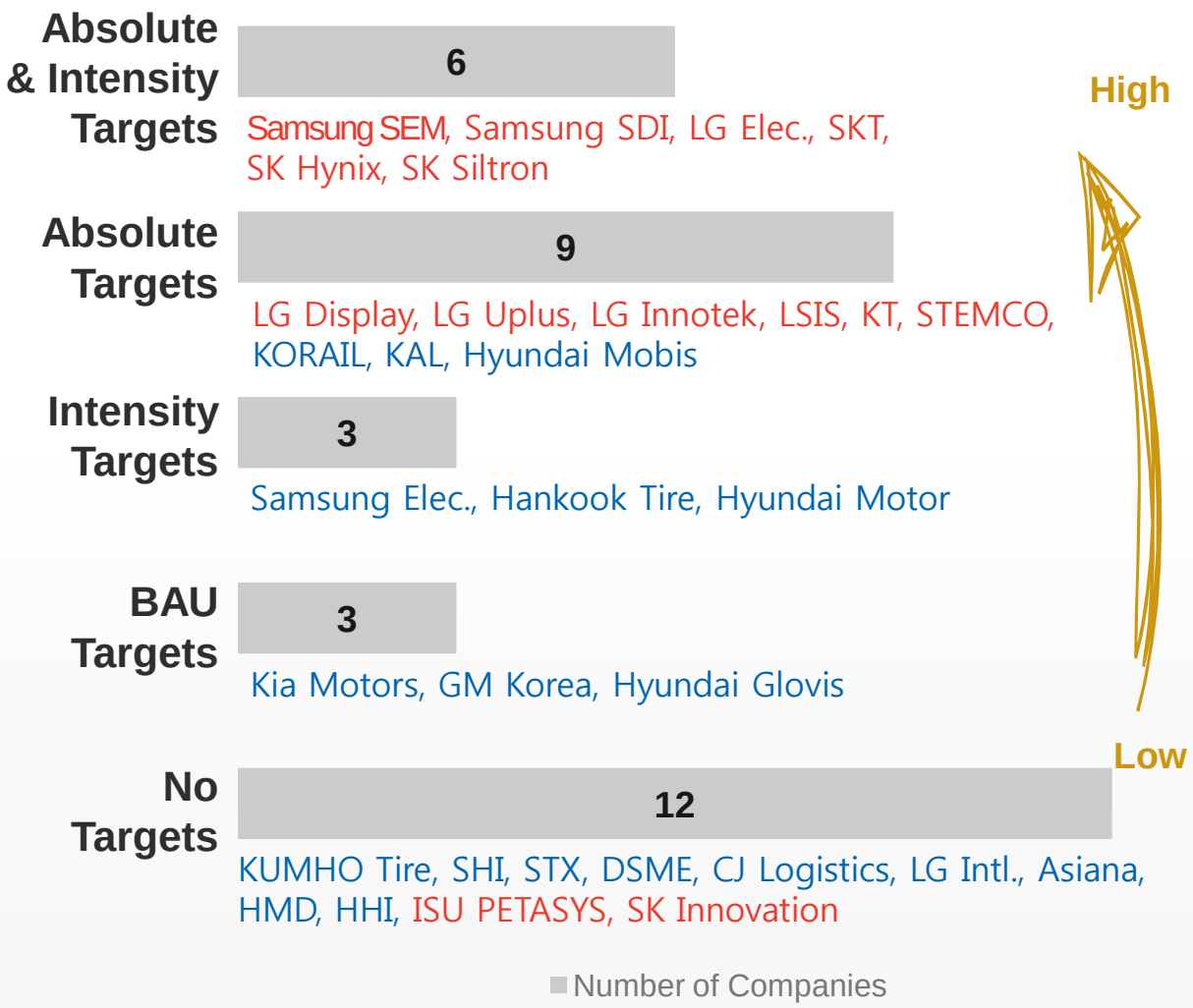
Scope III Emissions Breakdown (Unit: tCO_2eq)

Category			2014	2015	2016
Emissions from the Supply Chain Management (SCM) Stage	Wire Devices		251	106	98
	Wireless Devices		1,472	1,595	1,294
	Communications Service-based Facilities		47,240	30,798	18,411
	Total		48,963	32,499	19,803
Emissions from the Service Use Stage	Home Terminals		35,026	32,883	161,009
	Mobile Terminals		199,790	153,673	19,361
	Internet Terminals		226,692	295,517	111,414
	Total		461,508	482,073	291,784
Other Scope III Emissions	Water Use		932	918	785
	Waste Treatment	Household Waste	357	686	2,854
		Recyclable Waste	650	1,297	830
		Construction Waste	113	847	215
	Business Trips	Within Downtown	296	215	331
		Long Distance	669	714	524
		Overseas	1,677	4,072	3,215
	Commuting	By Bus (Local, Express)	877	747	728
		By Subway	57	59	69
		By Private Vehicles	17,828	22,397	22,622
		By Train	22	24	25
		Mixed (Bus & Subway)	438	464	355
	Total		23,916	32,442	32,553

- 20 companies have at least one target (scope 1 and 2). 9 of those are making efforts in Scope 3 (Hankook Tire, Hyundai Motor, KORAIL, Hyundai Glovis, LG Electronics, Samsung Electro-Mechanics, Samsung Electronics, KT, SK Telecom).
- Companies are mainly focusing on qualitative efforts rather than setting scope 3 emission targets.
- Companies are making efforts to reduce GHG Emissions by operating RES or enhancing energy efficiency of products.
- The highest score: KT, SK Telecom, Samsung Electronics, LG Electronics

Targets & Performance

Emissions reduction target by criteria (Scope 1,2)



- Companies in the electrical equipment sector generally received high scores.
- Most of the companies stated only one of the targets in terms of absolute, intensity and BAU.
- With the exception of those without targets, the reduction targets were set by 5 companies 'from the BAU level' and 12 companies 'from the base year'.
- LG Electronics has an intensity target per revenue in KRW to reduce 40% by 2020 and total amount by 150K tons(10.3%) compared to 2008.
- Samsung Electro Mechanics aims to reduce 7% per revenue in KRW by 2050 compared to 2014, a total reduction of 57% by 2040.

1-3-4 Renewable energy target

Quantitative targets for Scope 1,2 renewable use including green power certificates, etc.

★ ★

Specific indices such as contribution to Scope 3 emission reduction via renewable energy use

★

Samsung Electronics

SK Telecom

Samsung SDI

KORAIL

• Samsung Electronics

Overseas target: 100 renewable in USA, Europe and China by 2020

Domestic target: 20% renewable energy by 2030

▪ KORAIL

Planning to build 3MW solar power generation facility.

1-4 Annual GHG reduction rate of Scope 1&2 absolute target

GHG reduction

rate ≧ 1.5%

LG Display, KT, LG Innotek, LG Uplus,
Samsung Electro-Mechanics, Samsung SDI,
SK Hynix, SK Telecom, STEMCO

1.5 > rate ≧ 0.75%

LG Electronics, LSIS

0.75% > rate

SK Siltron, Hyundai Mobis, KORAIL, Korean Air

1-6 Comparison between targets and performance

Example of Samsung Electronics

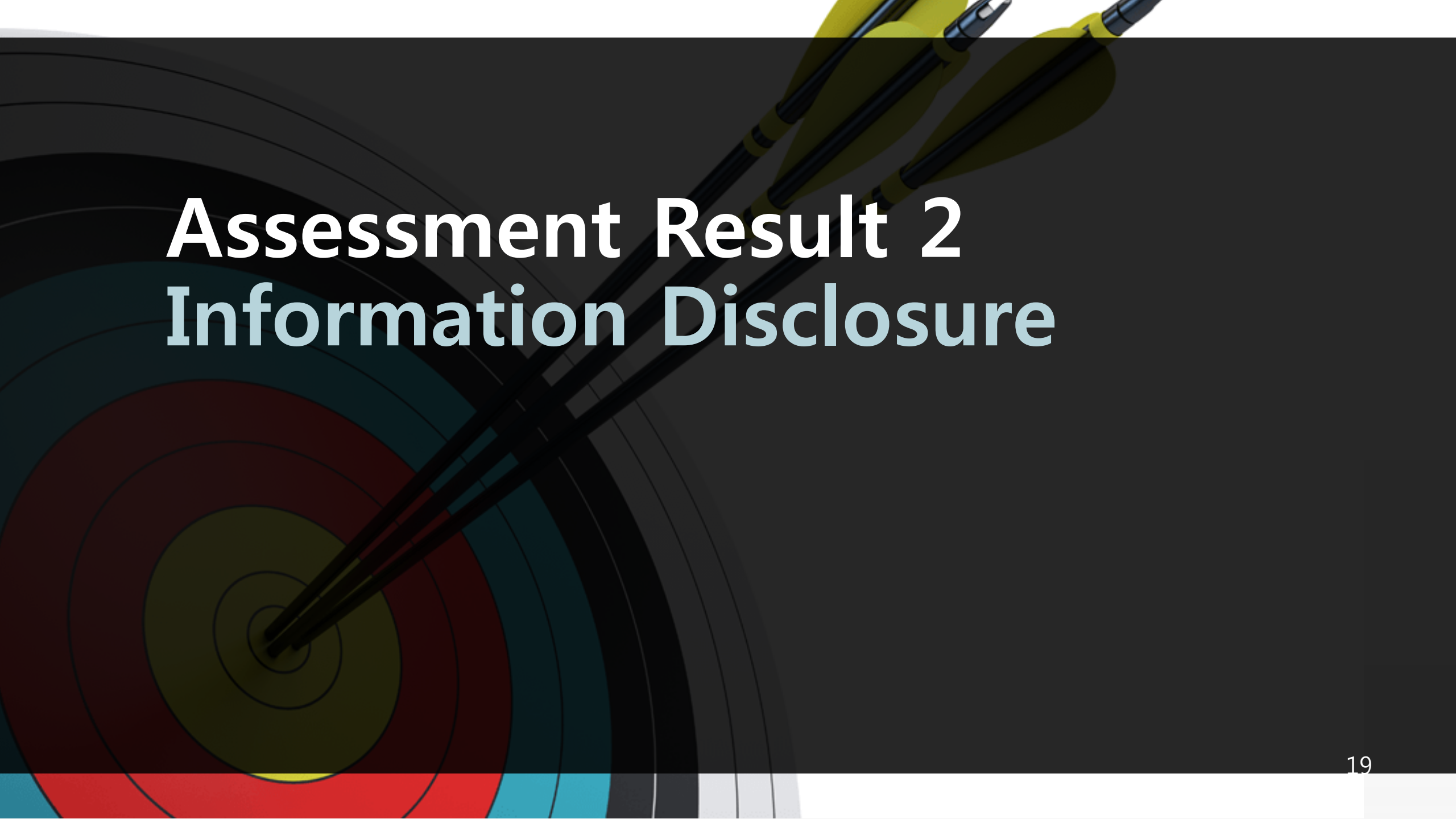
ANALYZE OUTCOMES

GHG Reduction Result and Plan

	Reduce gas used for manufacturing	Increase manufacturing process efficiency	Introduce high energy-efficient facilities	Switch to LED lighting	Increase facility efficiency	Others
GHG Emissions Reduced in 2017	52.1%	32.8%	8.8%	2.0%	1.9%	2.0 %
GHG Emissions Reduction Plan for 2018	80.7%	0.1%	1.1%	0.2%	14.2%	3.7 %

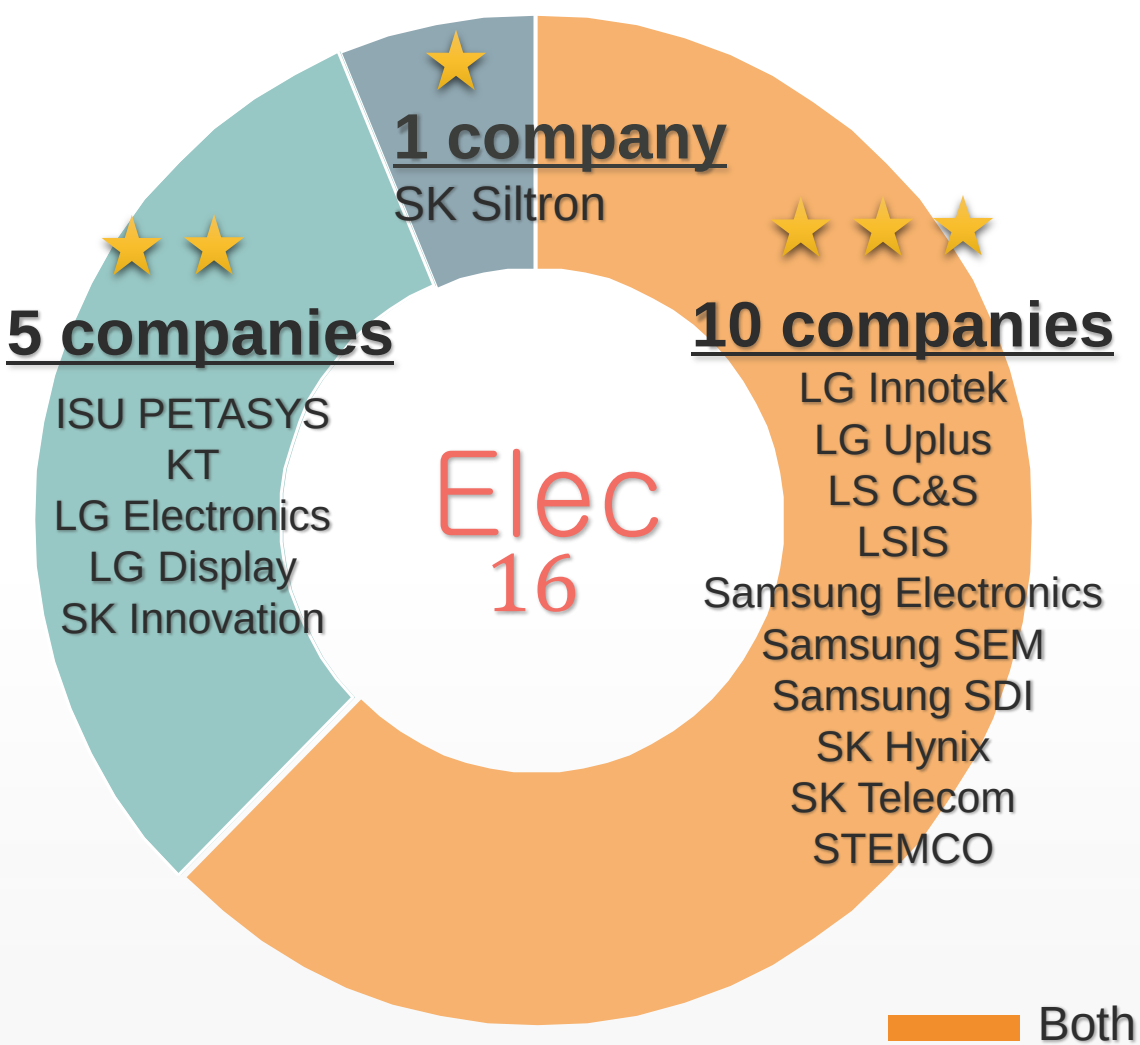
- Only 4 companies stated comparison between targets and performance.

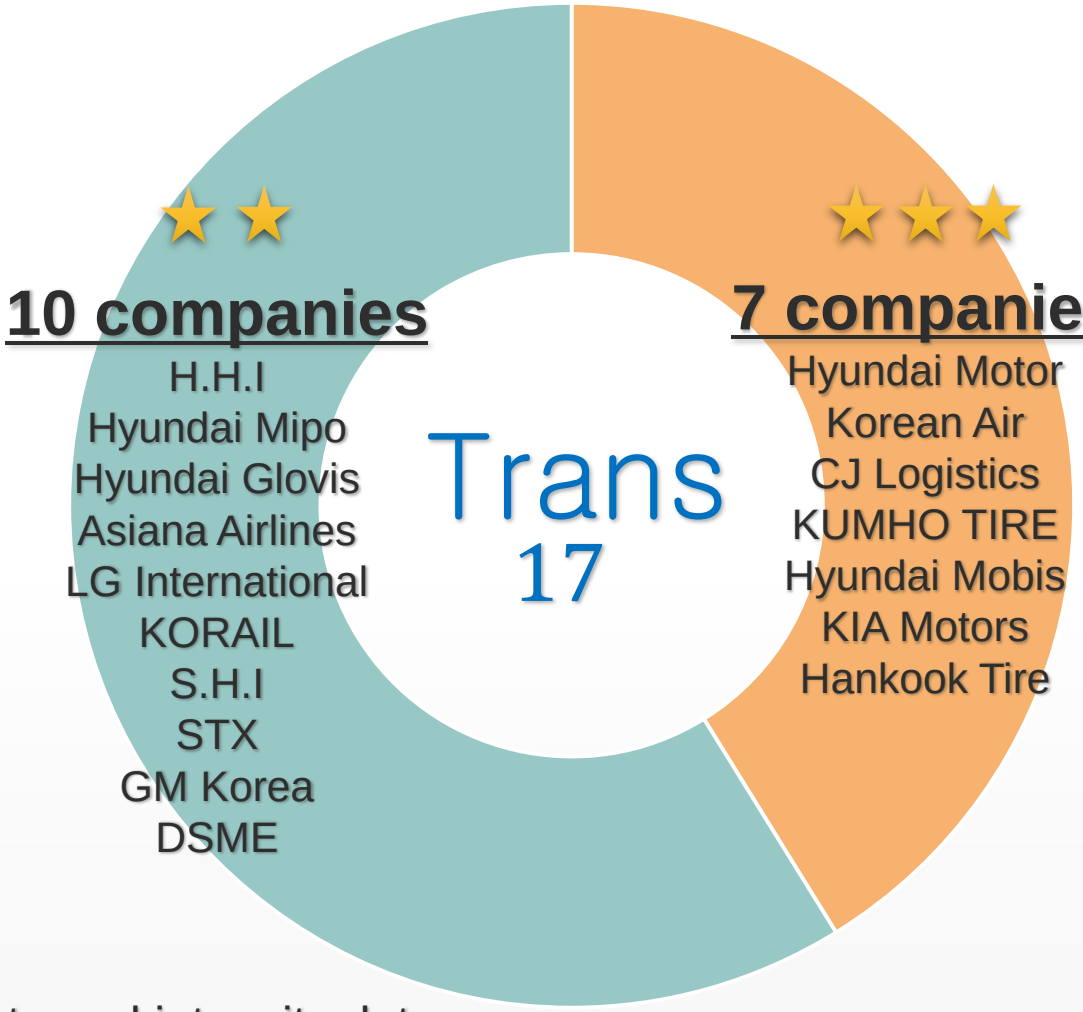
SK hynix SAMSUNG ELECTRONICS LG Electronics HYUNDAI MOBIS



Assessment Result 2
Information Disclosure

Disclosure of scope 1&2 GHG emission data

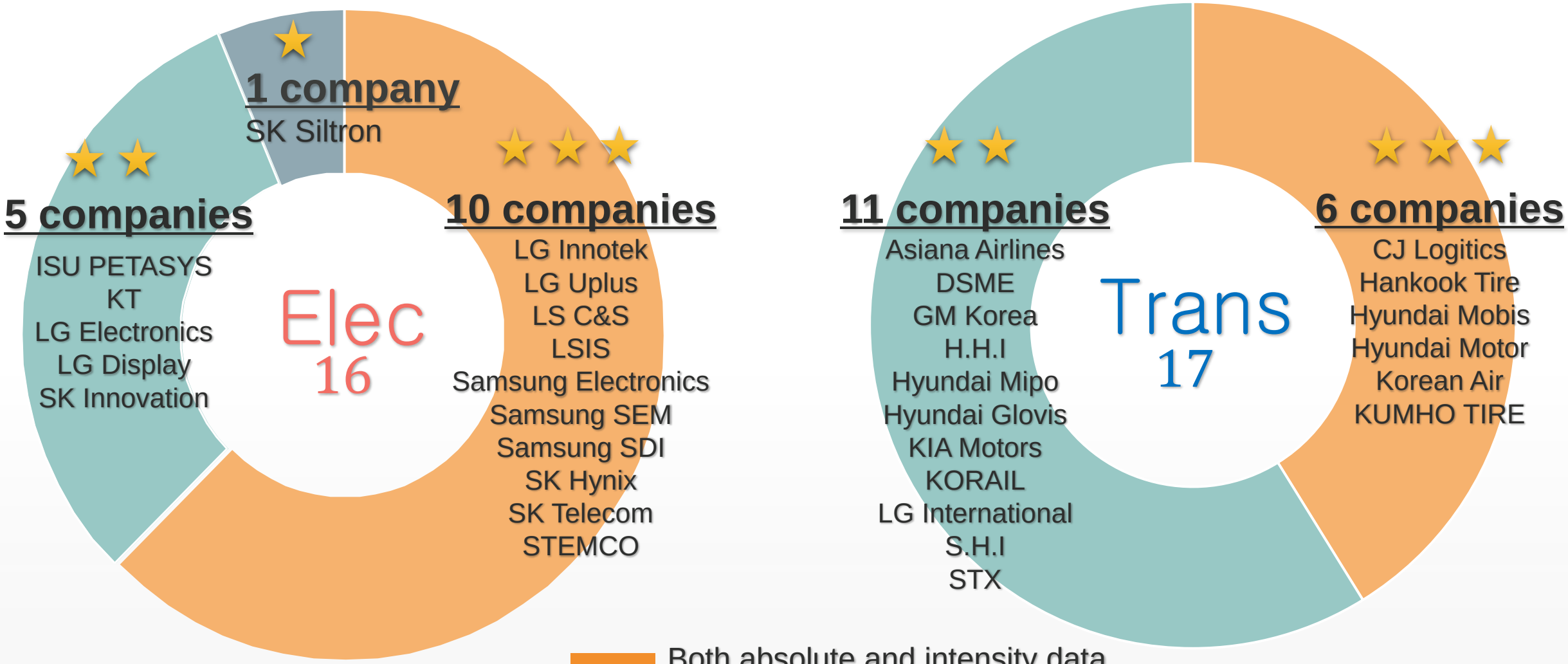




Both absolute and intensity data
Only absolute data
Only intensity data

H.H.I : Hyundai Heavy Industries, SHI : Samsung Heavy Industries

Disclosure of Scope 1&2 energy consumption data



H.H.I : Hyundai Heavy Industries, SHI : Samsung Heavy Industries

2-1-3 Renewable Energy Use

All the quantitative data for renewable use disclosed

★ ★ ★

- LG Electronics
- Samsung Electronics
- KT
- KORAIL
- Kumho Tire
- Hyundai Motors
- GM

Some of the quantitative data for renewable use disclosed

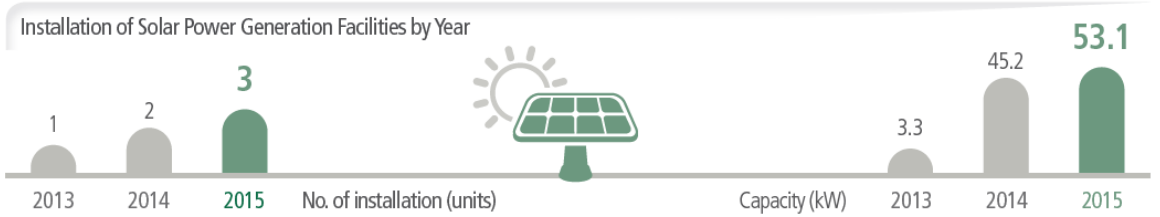
★ ★

- Hyundai Heavy Industries
- Samsung SDI
- SK Telecom
- LG Uplus
- LG Innotek

Using the New and Renewable Energy

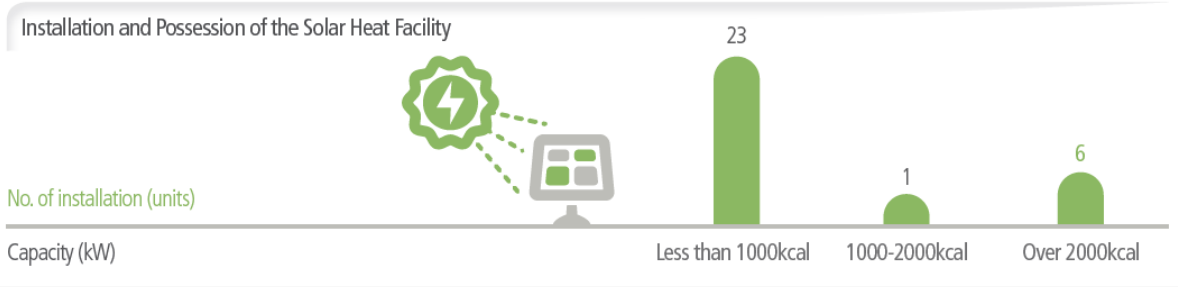
Operating the Solar Power Generation Facility

KORAIL has aggressively installed new and renewable energy equipment to train facilities since 2005. As of 2015, an annual average of 600MWh of electricity is generated from its 21 solar power stations with the total capacity of 544.6kW.



Operating the Solar Heat Facility

KORAIL operates 31 solar power facilities for heating and cooling with the total capacity of 401,619kcal. Such facilities will be further deployed to new buildings and when renovating the existing ones.



Information disclosure about amount of renewable energy use by KORAIL

2-1-5. Measurement & disclosure of full-scope emissions

Disclose emissions data

All of Scope 1, 2 and 3 with each 15 category for Scope 3

★ ★ ★ ★

Samsung SEM
KT

Scope 1, 2 and part of Scope 3 as well as for “avoided emissions”

★ ★ ★

KORAIL
LG Uplus
LSIS
SK Telecom

Scope 1, 2 and part of Scope 3

★ ★

Other 27 companies

Assessment Result 3
Comprehensive Comparison

Performance Level in terms of Evaluation Indicators by Sector

	Electrical Equipment Companies	Transportation Equipment Companies
Excellent	1. Annual GHG reduction rate 1. Target covers all GHGs 2. Emissions & Energy data disclosed 2. Third-party evaluation 2. Data boundary clearly described	
Poor	1. Long-term vision 1. Energy efficiency target 1. Renewable energy target	1. Perspective of full-scope management 1. Target covers all GHGs 1. Unit of emissions reduction target 1. Annual GHG reduction rate 1. Comparison between target and performance 2. Amount of renewable energy use disclosed 2. Comparison of targets and results 2. Grounds of target setting

Excellent: More than 50% Companies with '**Full' score**
Poor: More than 50% Companies with **'0' score**

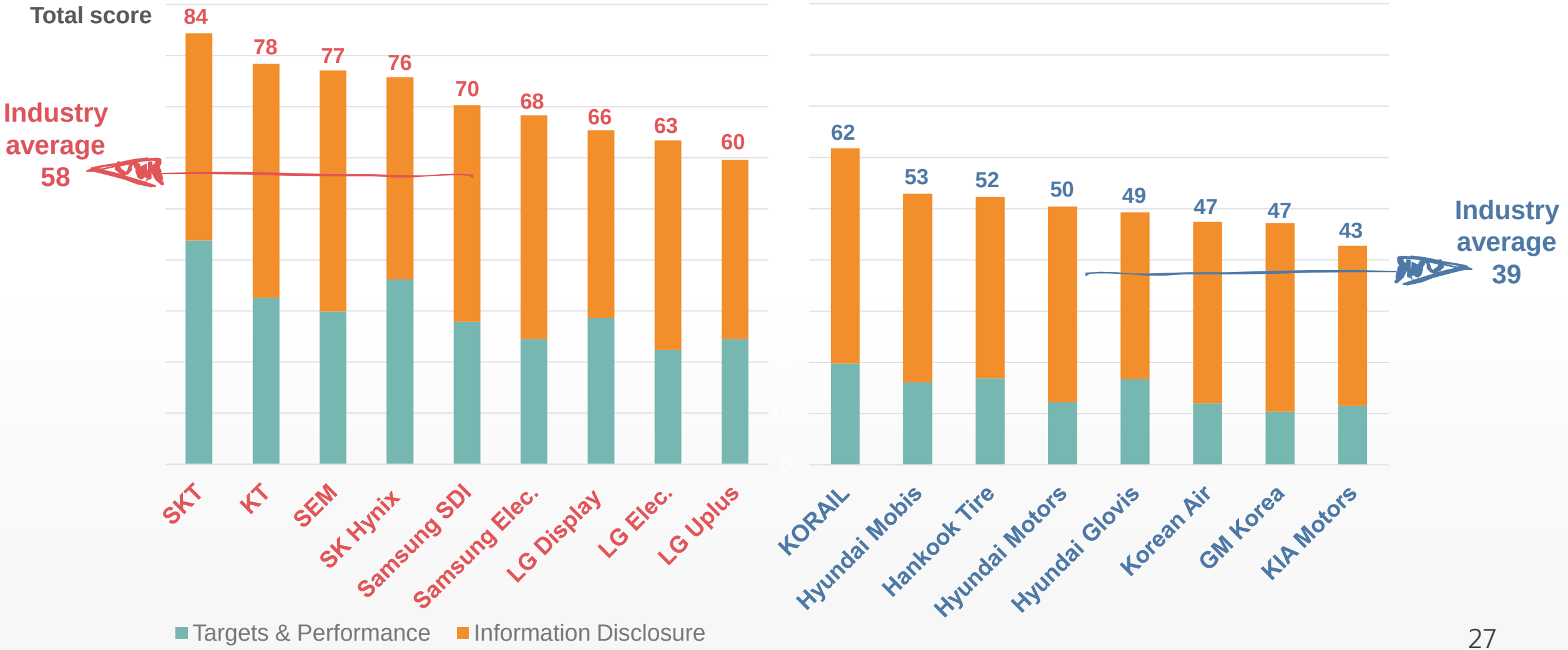
Ranking of investigated companies

	Elec. sector	Overall scores (100)	Targets & Performance (50)	Information disclosure (50)
1	SK Telecom	84.4	43.8	40.6
2	KT	78.4	32.6	45.8
3	Samsung Electro-Mechanics	77.2	29.9	47.2
4	SK Hynix	75.8	36.2	39.6
5	Samsung SDI	70.2	27.9	42.4
6	Samsung Electrons	68.2	24.5	43.8
7	LG Display	65.5	28.6	36.8
8	LG Electrons	63.4	22.4	41.0
9	LG Uplus	59.5	24.5	35.1
	Average	58.2	21.9	36.3

	Trans. sector	Overall scores (100)	Targets & Performance (50)	Information disclosure (50)
1	KORAIL	61.8	19.8	42.0
2	Hyundai Mobis	53.0	16.1	36.8
3	Hankook Tire	52.3	16.9	35.4
4	Hyundai Motors	50.4	12.2	38.2
5	Hyundai Glovis	49.3	16.7	32.6
6	Korean Air	47.4	12.0	35.4
7	GM Korea	47.2	10.4	36.8
8	KIA Motors	42.7	11.5	31.3
	Average	39.0	8.0	31.0

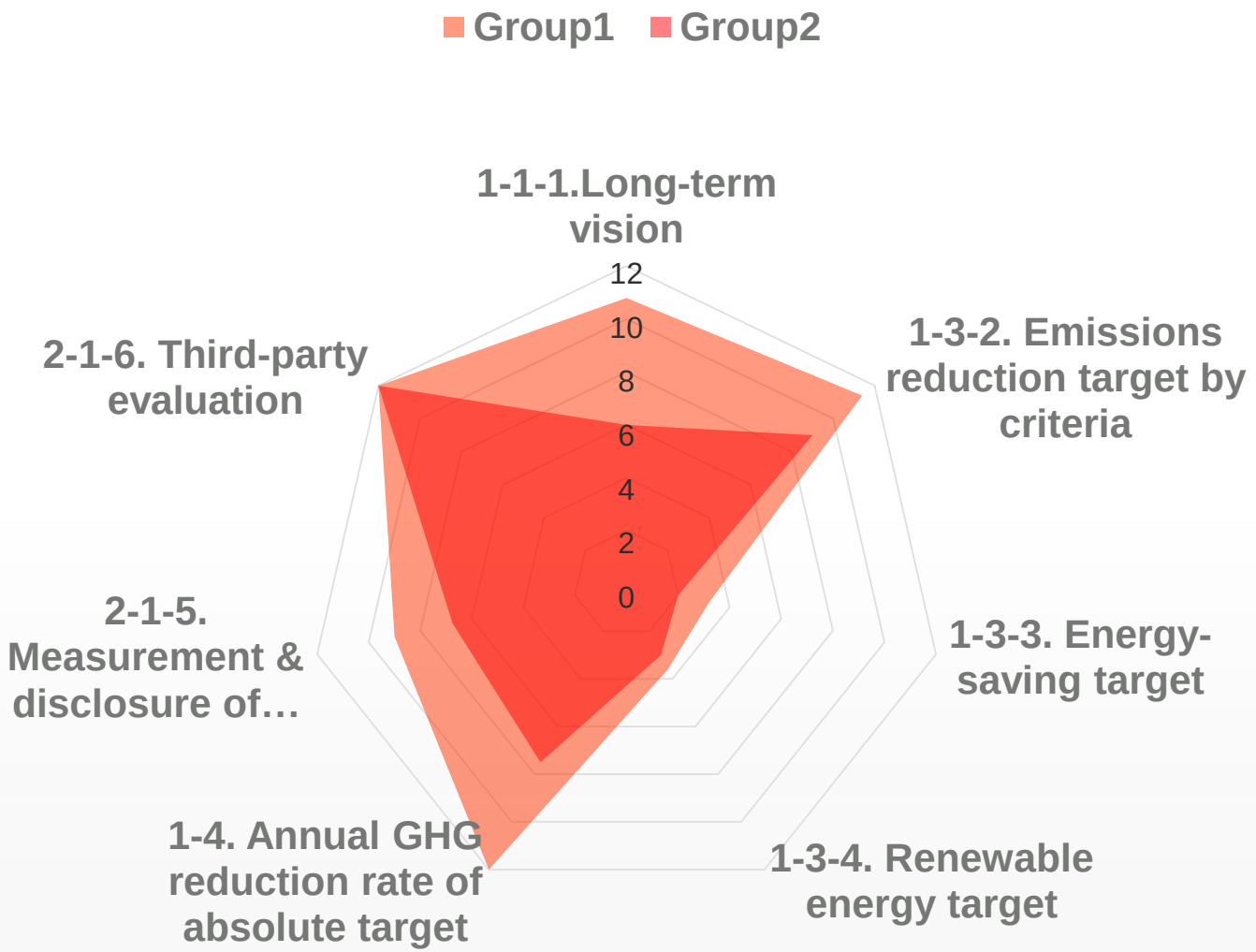
※ Only the companies above average

Ranking of investigated companies



※ Only the companies above average

Comparison of average scores for 7 Key Indicators
Electrical/Electronics/Telecom Industries



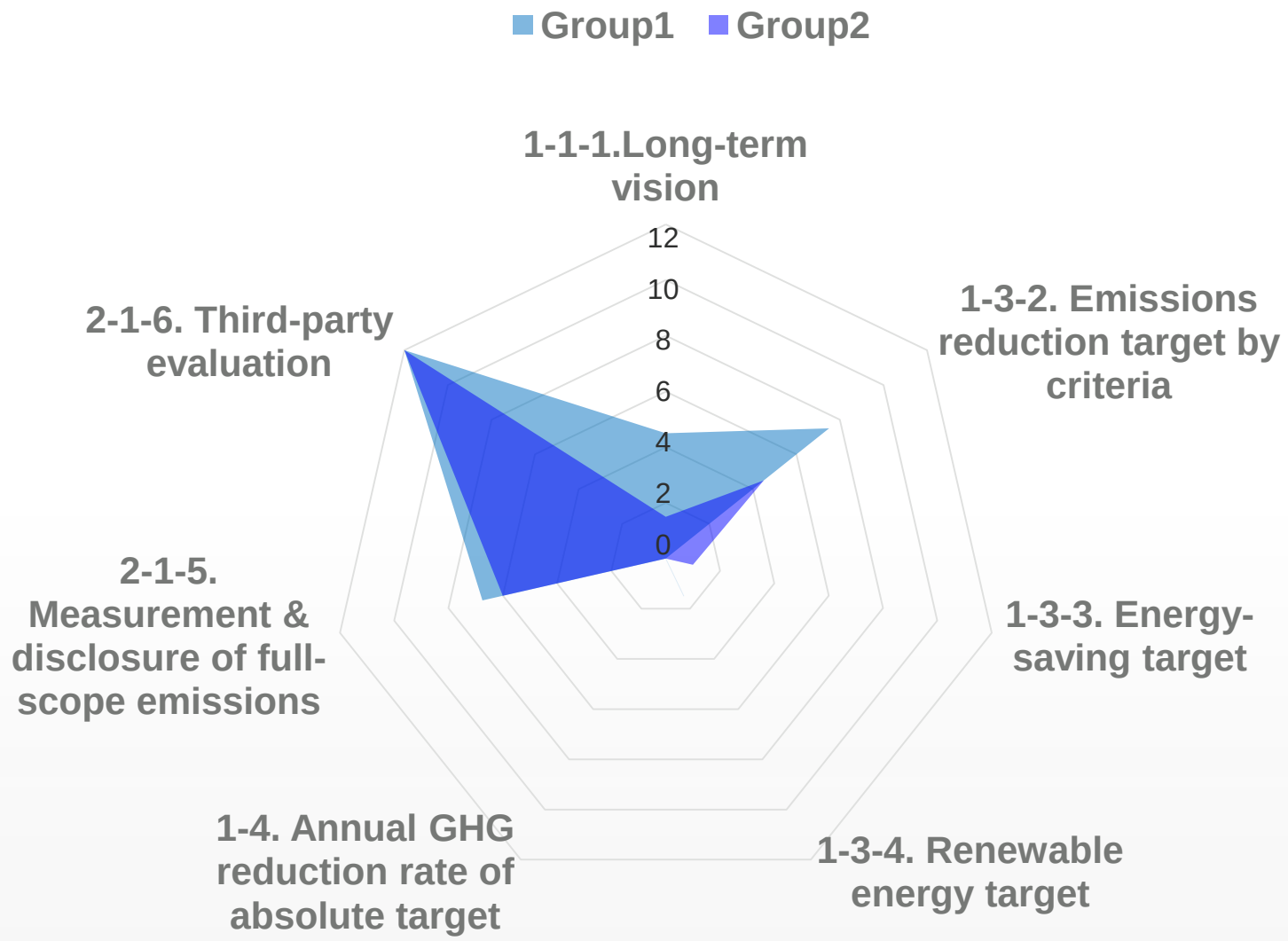
Group 1 : Top 5 companies
(>70 points)

SK Telecom
KT
Samsung Electro-Mechanics
SK Hynix
Samsung SDI

Group 2 : Next top 4 companies
(70 > score >average 58.2)

Samsung Electronics
LG Display
LG Electronics
LG Uplus

Comparison of average scores for 7 Key Indicators
Transportation/Logistics/Automobile Industries



Group 1 : Top 4 companies (>50 points)

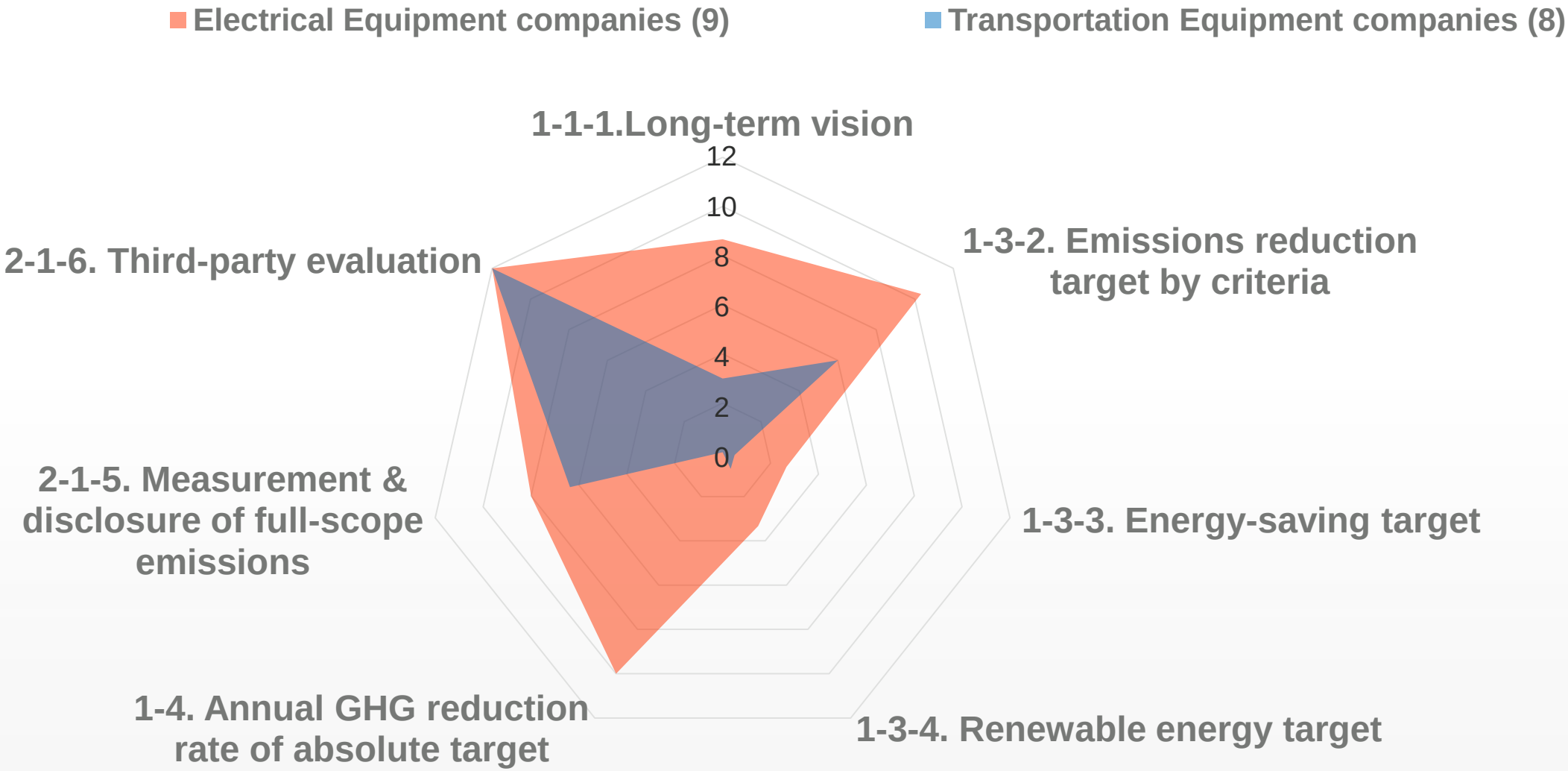
KORAIL
Hyundai Mobis
Hankook Tire
Hyundai Motors

Group 2 : Next top 4 companies (50> score > 40)

Hyundai Glovis
Korean Air
GM Korea
KIA Motors

Comparison of average scores for 7 Key Indicators

Between the Electrical/Electronics/Telecom Industries (9) and the Transportation/Logistics/Automobile Industries (8)



Comparison with Japan

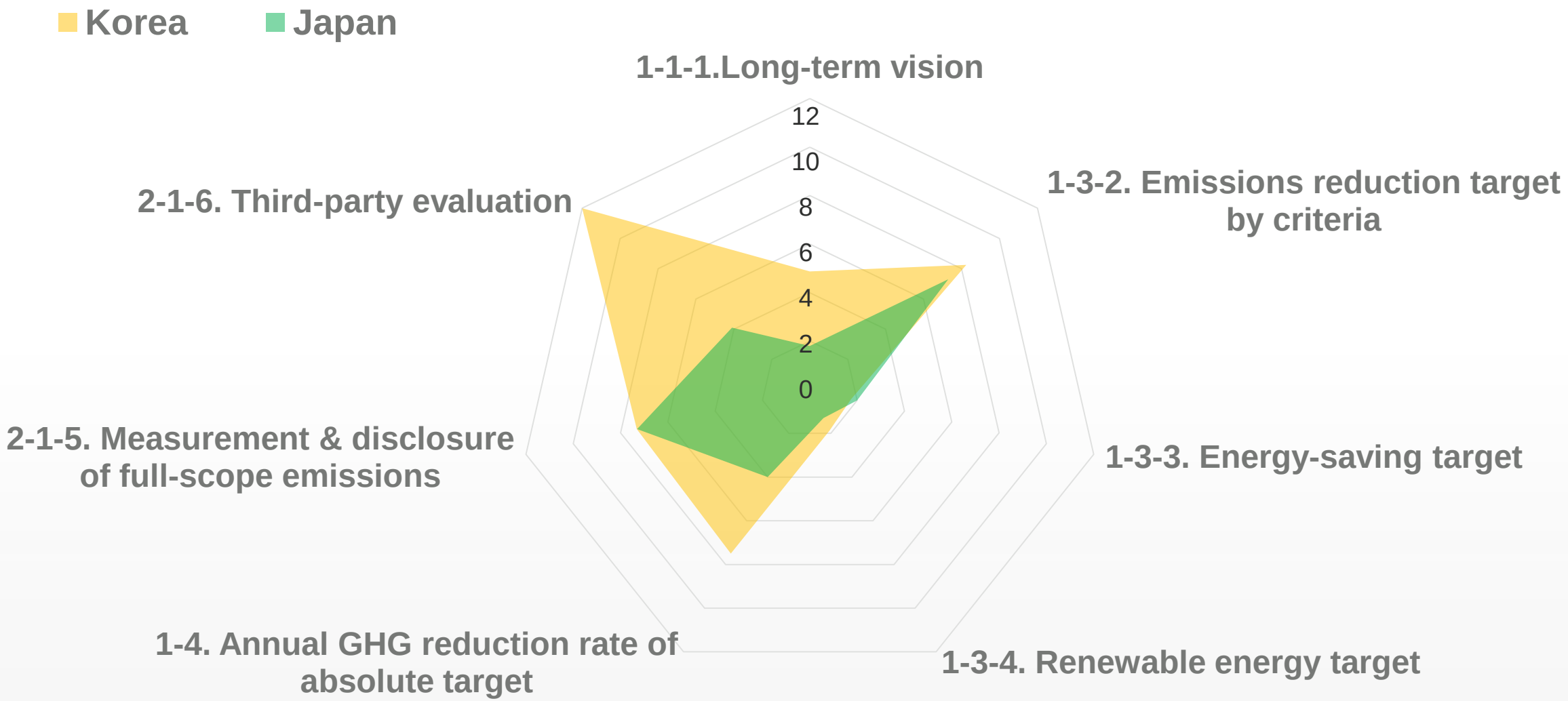
Electrical/Electronics/Telecom Industries

	Korea	Japan
Overall Average	58	49
Highest	84	82
Lowest	29	15
Targets & Performance Average	22	19
Information Disclosure Average	36	29
Evaluated companies	16	47

Transportation/Logistics/Automobile Industries

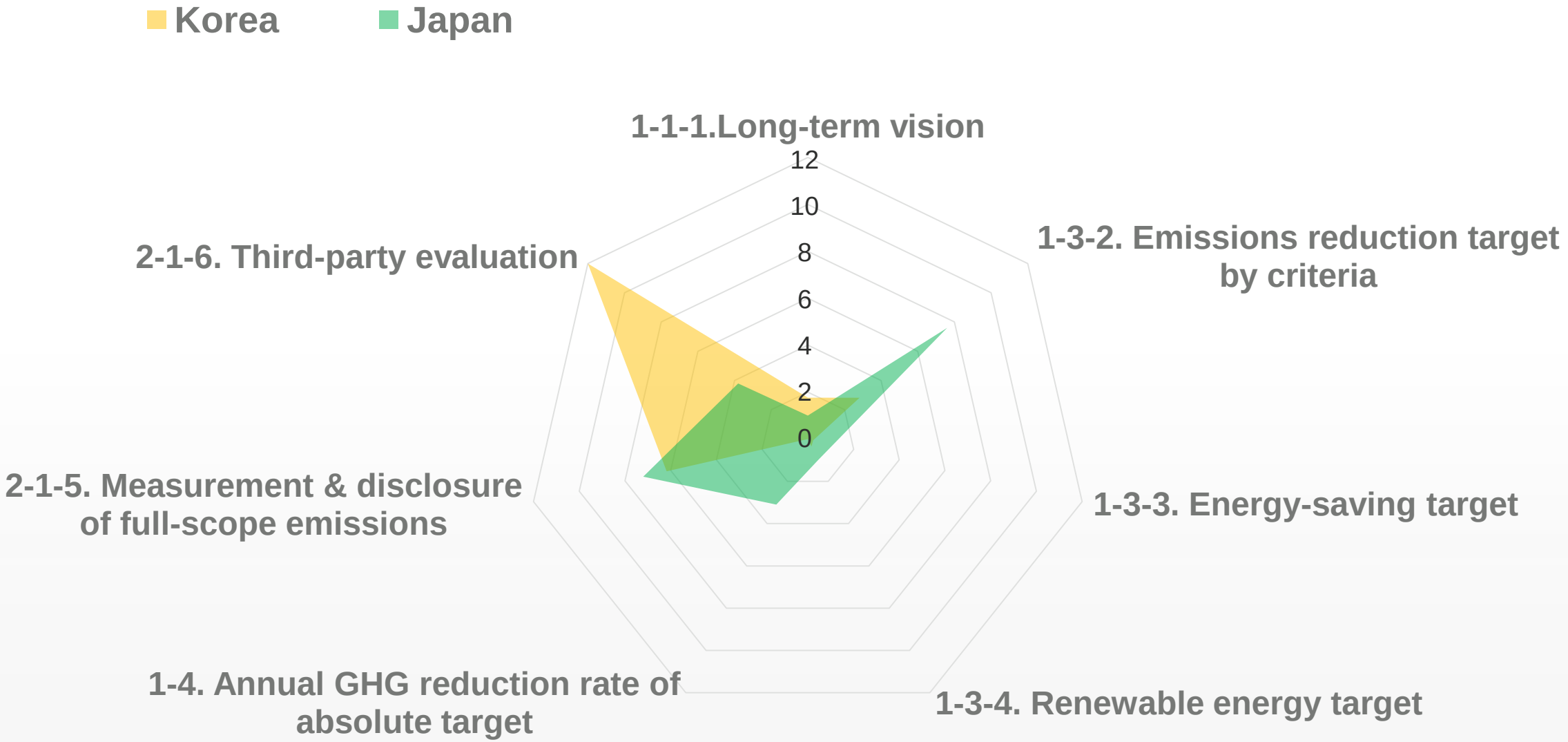
	Korea	Japan
Overall Average	39	47
Highest	62	88
Lowest	20	2
Targets & Performance Average	8	19
Information Disclosure Average	39	28
Evaluated companies	17	25

Comparison of average scores for 7 Key Indicators
Between Korea and Japan (Electrical/Electronics/Telecom Industries)

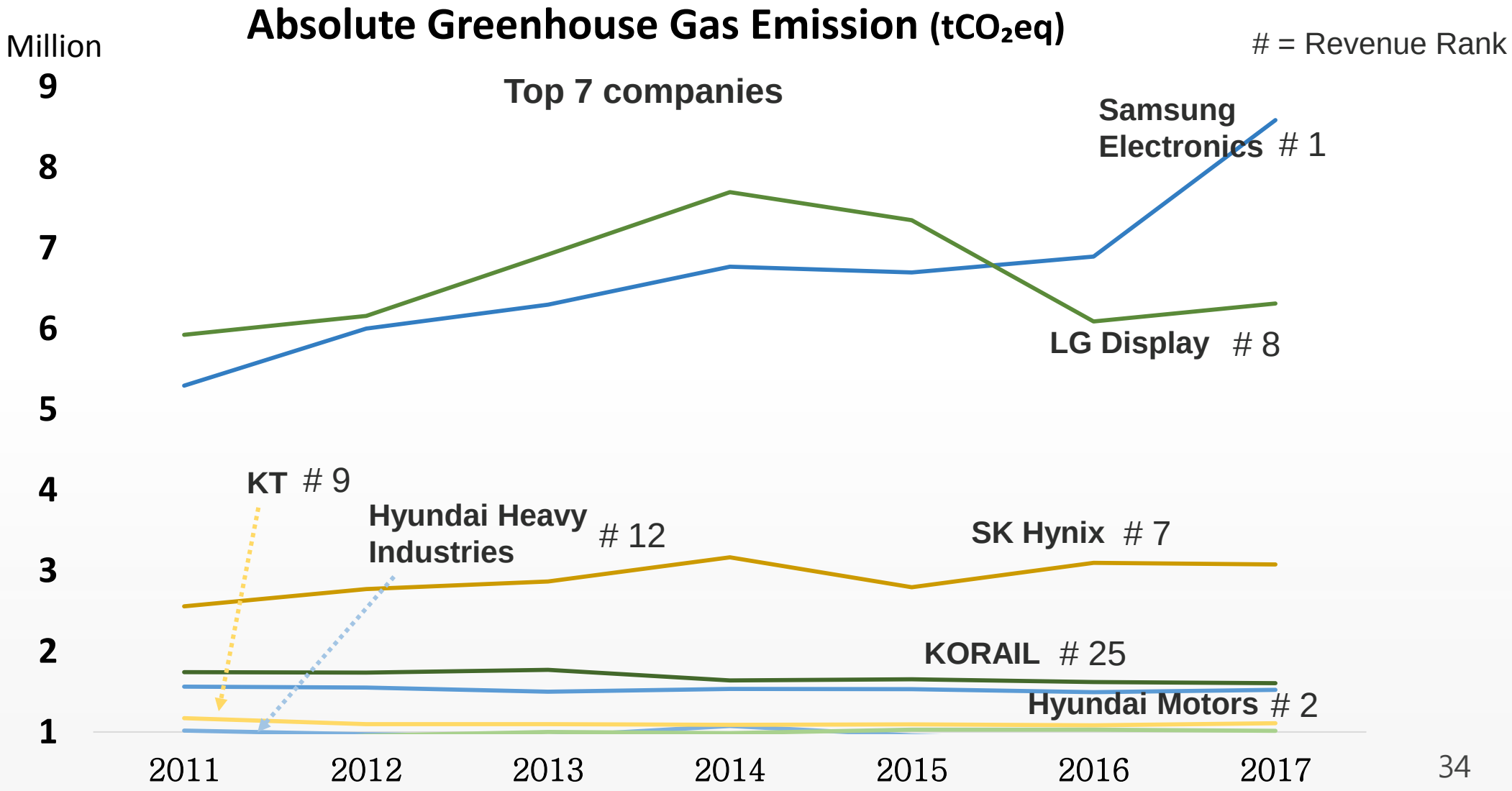


Comparison of average scores for 7 Key Indicators

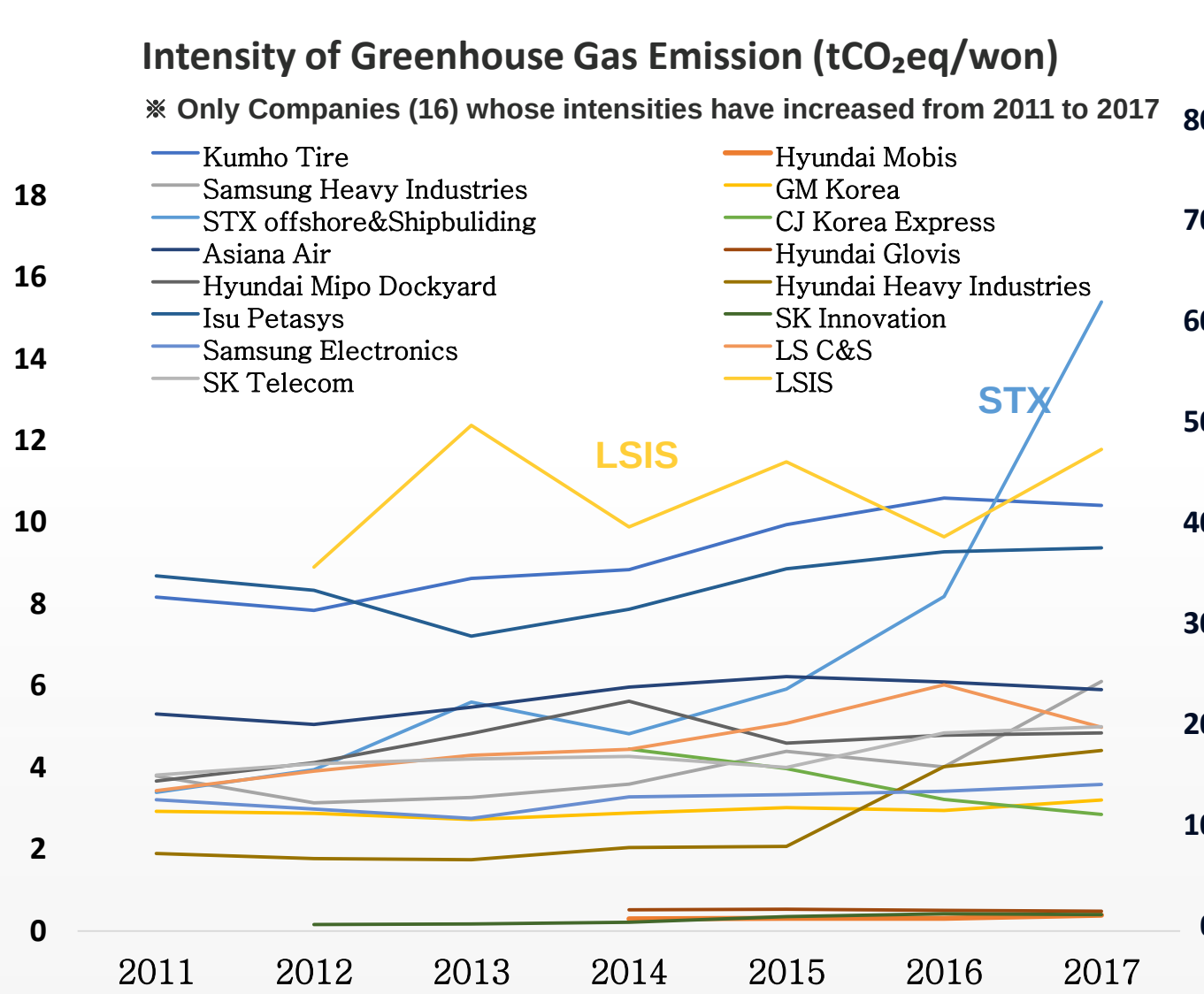
Between Korea and Japan (**Transportation/Logistics/Automobile Industries**)

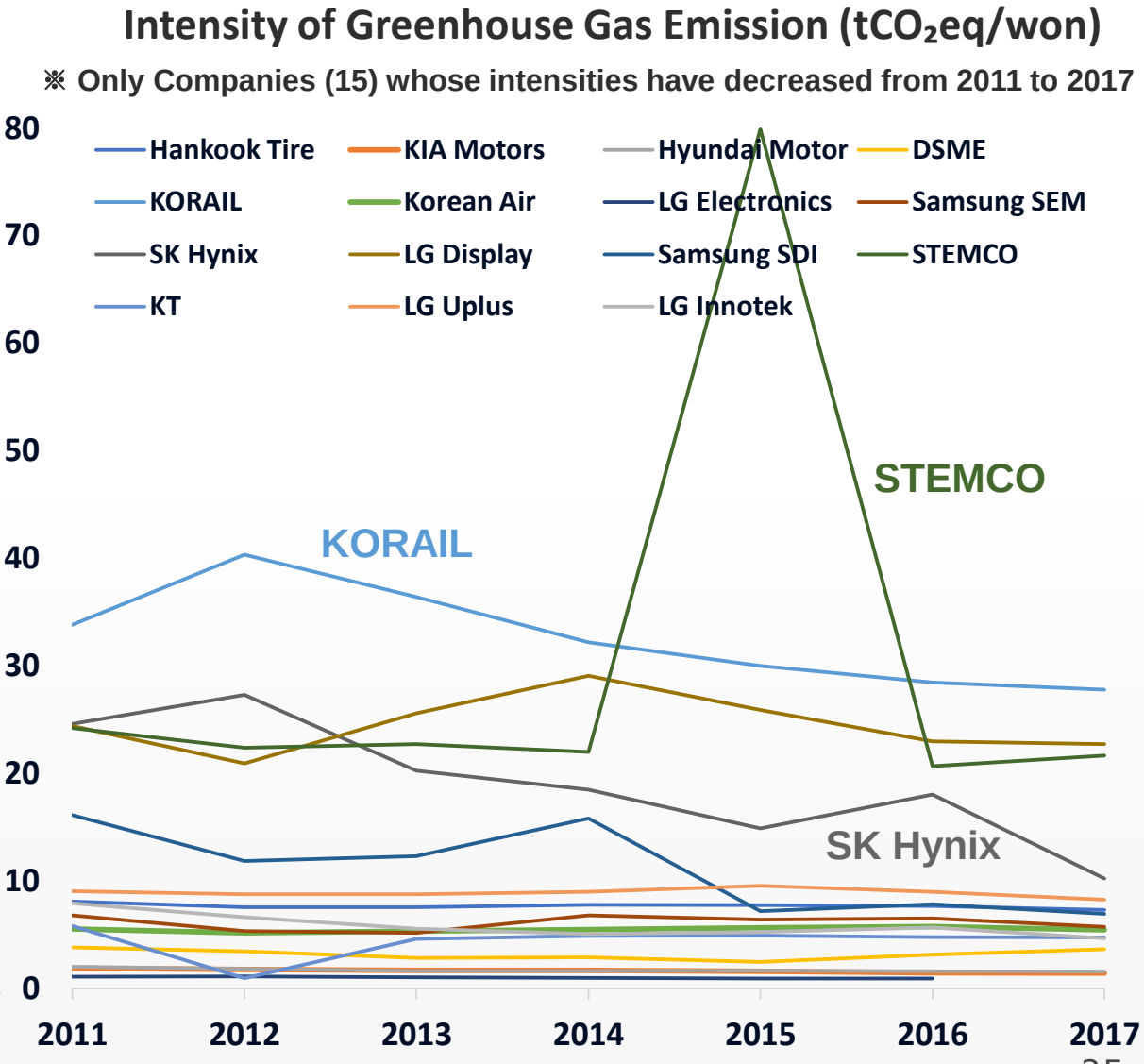


Greenhouse Gas Emission



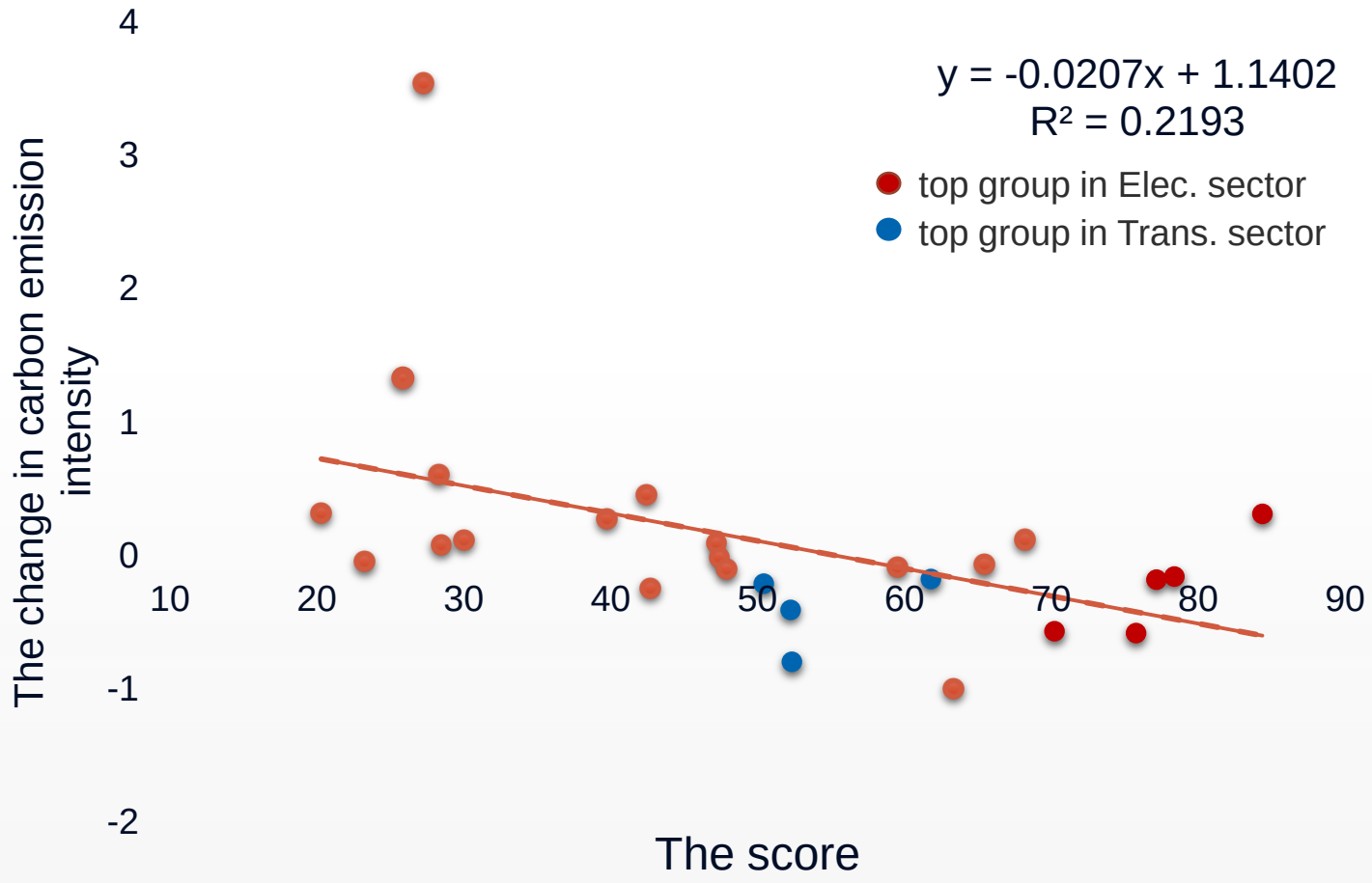
Greenhouse Gas Emission





Relationship b/w Scores & Carbon Intensity Change

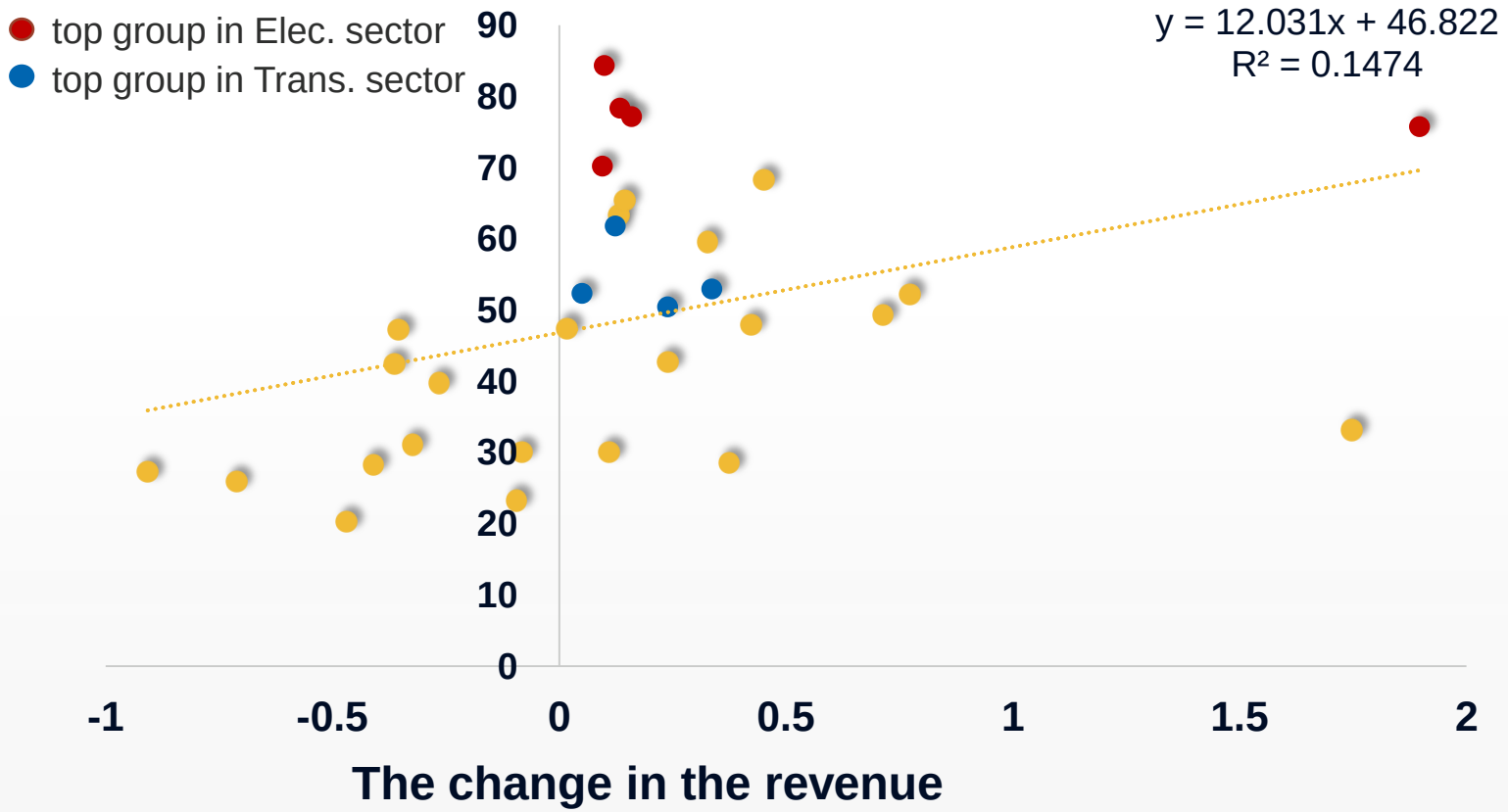
Score vs. the change in carbon emission intensity from 2011 to 2017



- The score and the change is slightly related to each other
- The higher the score, the more the reduction of greenhouse gas emission
- In a long term perspective, the exact targeting and information disclosure could be a key factor to reduce carbon emission

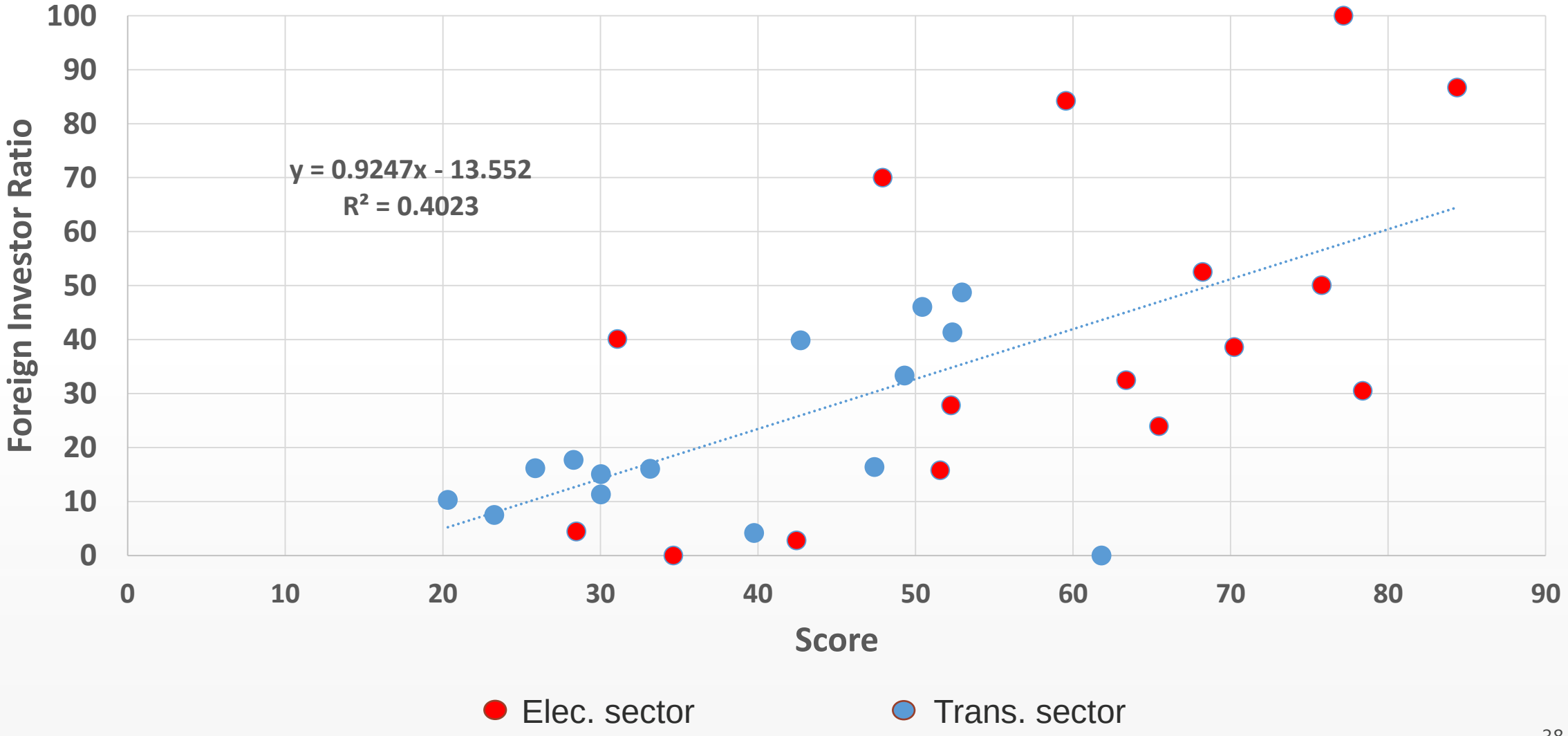
Relationship b/w Scores & Revenue Change

The change in companies' revenue from 2011 to 2017 vs. the score



- The change and the score are slightly related to each other
- The bigger the change, the more the score
- In a long term perspective, the growth potential could be related to the will to reduce carbon emission

Correlation between Foreign Investor Ratio and Score



Conclusion & Implication

Conclusion & Implication

- Only 12 of 33 companies set mid- and long-term vision. Samsung Electronics is preparing to set the target considering SBT, but no one has SBT initiatives yet.
- The companies with mid- to long-term goals tend to get high total scores.
- Almost all companies disclose their GHG emission data but only a few of companies reduced GHG emissions. In general, companies are poor at setting energy-saving targets and renewable energy targets.
- There are several companies using renewable energy, but Samsung Electronics and SK Telecom are the only two companies setting quantitative targets.
- 50% of investigated companies have increased their emissions by 2017 compared to 2011, which contrasts with the global companies that already achieved the carbon-neutral goal.

Conclusion & Implication

- The electrical equipment companies are doing better than the transportation companies especially in ‘the targets and performance’ category. This is partly because of global market pressure.
- All investigated companies were certified for their GHG data by the third parties. This is because Korean government has been implementing ‘GHG and Energy Target Management Scheme’ from 2010 and ‘GHG emission trading system’ from 2015. The result implies the importance of government’s policy.
- Performance of public enterprises such as KT and Korail are noteworthy, implying that government’s policy signal and leading role are important.
- Companies with designated staffs, which have relatively bigger economic capacity, showed better performance.

Conclusion & Implication

- Compared with Japan, Korean electrical equipment sector received a slightly higher score, but Korean transportation sector received significantly lower scores in ‘the target and performance’ category.
- Average scores are positively related with the foreign investors, implying that investors who might be interested in climate change could influence companies’ climate action. The evaluation scores are slightly related to the change in intensities of carbon emission and companies’ revenue, implying that climate actions of those companies contribute to their economic performance improvement.
- International efforts including the Paris Agreement and UN’ SDGs influence companies climate actions.


Thank You

기후행동 컨퍼런스 2018

CLIMATE ACTION CONFERENCE 2018

[Session I]

Aligning climate actions of economic actors with Paris Agreement (1.5℃)

Panel Discussion

Moderator Yong Gun Kim (Chief Research Fellow, Department of Atmospheric and Climate Change Research, Korea Environment Institute)

Panel

Dongjun Ha (Team Leader for Climate & Air Quality Division, Climate & Environment Headquarters Seoul Metropolitan Government)

ChongHa Won (Head of First Choice and GoGreen, DHL Express Korea)

Yoonmee Jeong (Executive Director, Sustainable Finance, Global Markets APAC, BNP Paribas)

주최 WWF citi 후원 산업통상자원부 Ministry of Trade, Industry and Energy 환경부 Ministry of Environment 외교부 Ministry of Foreign Affairs 한국에너지공단 KOREA ENERGY AGENCY

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서울의 기후변화 대응

시민과 함께하는 서울의 약속

2018. 10. 10.

Contents

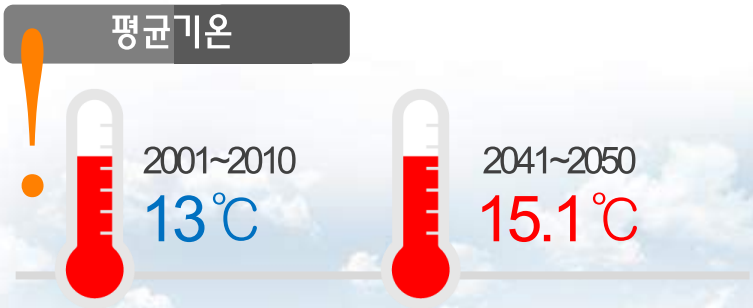
Chapter 01

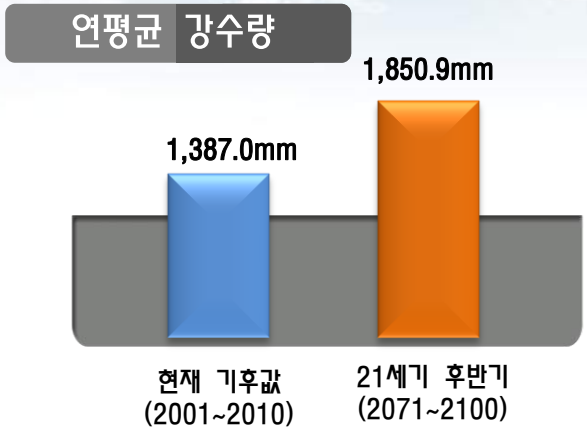
서울의 기후변화 상황은?

매년 계속되고 있는 폭염, 미세먼지

2018년 폭염일수 35일(2016년 24일)

기후변화에 의한 미래 서울 기온, 강수량





Chapter 01

서울의 기후변화 상황은?

도시는 기후변화 대응의 중요한 주체

- 도시는 주요 탄소배출원, 신 기후체제 대비 온실가스 감축 필요
- 국지성 폭우, 도시 열섬에 의한 여름철 폭염심화 등 당면한 기후변화 문제에 대한 적극적인 대응 필요

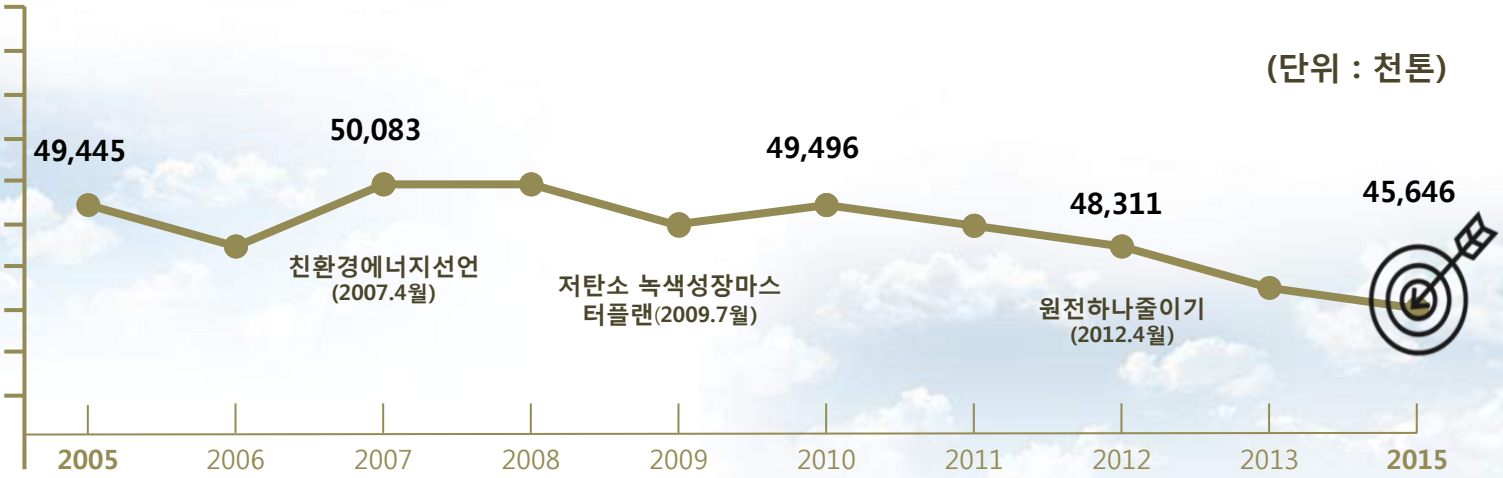
- 지속가능한 행동을 위해서는 **시민과 일상속에서 실천이 중요**
- 시민과 함께 기후문제 대응 적극 추진(2015~)

  : **기후변화대응 종합계획 (서울의 약속)**

Chapter 02

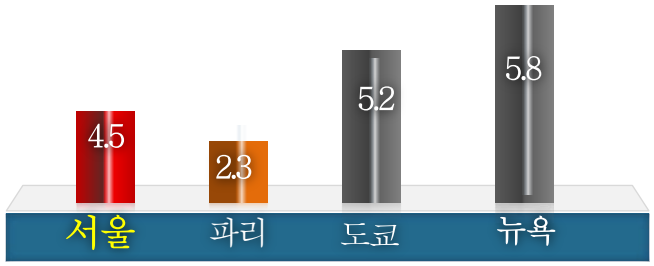
서울의 온실가스 배출추세

< 서울시 온실가스 배출추이 > 2010년부터 다소 감소 추세



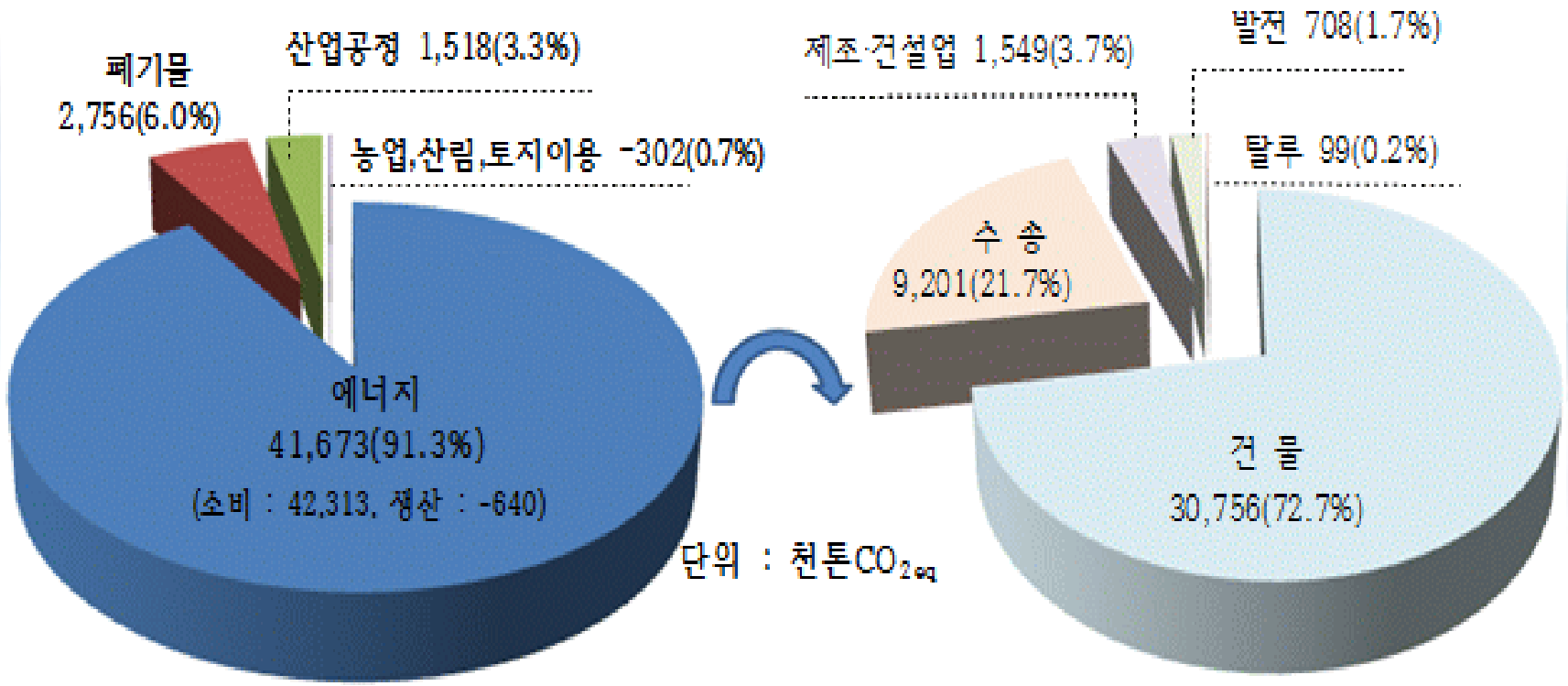
서울시 1인당 온실가스 *배출량*(톤)

해외 주요도시 1인당 온실가스 배출량 비교(톤)



서울의 온실가스 배출추세

(단위 : 천톤)



서울의 기후변화대응 노력

서울의 약속이란?

- 서울의 비전과 시민의 실천의지를 담은 종합적인 대응전략
- 2020년까지 서울의 온실가스 배출목표 달성을 위한 구체적 감축계획
- 시민이 함께 실천하고 추진과정을 평가하는 참여형 정책

2015년 이클레이 서울 총회에서 선포

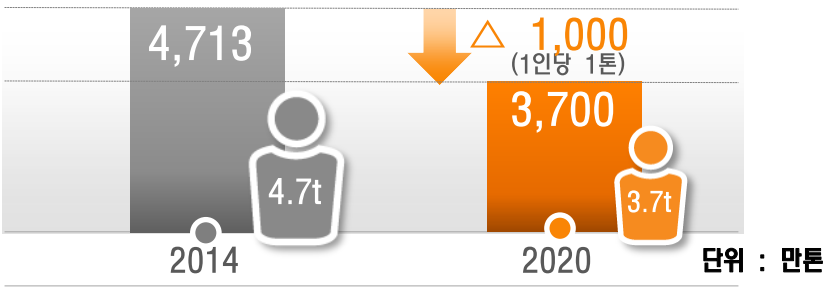
목표 및 추진전략

비 전 지속 가능한 기후환경도시 서울

목 표

완화	2020년까지 2005년 대비 온실가스 배출량 25%감축
적용	기후변화 적응역량을 높여 건강하고 안전한 도시 조성

온실가스 감축 목표



서울의 기후변화 대응 노력

기후변화대응 종합계획(서울의 약속) 구성체계

에너지
36개 사업
- LED, BRP 추진
- 신재생에너지 생산
- 배출권 거래제

대기/교통
31개 사업
- 교통수요 감축
- 친환경차 보급
- 초미세먼지 저감

자원순환/물
25개 사업
- 생활쓰레기 감축
- 수돗물 음용률 향상
- 물 재사용 확대

생태/도시농업
34개 사업
- 녹색공간 확충
- 생물다양성 증대
- 도시농업 실천

보건/안전
34개 사업
- 폭염, 폭우 대처
- 감염 병 신속 대처
- 재난 대응 강화

시민과 함께 이행결과를 평가하고, 개선대책을 찾는다.

- 녹색서울시민위원회 등이 매년 이행결과 평가 및 개선의견 제시
- 평가결과를 서울의 약속 실천계획에 Feed Back
- 온실가스 인벤토리 작성, CDP, CCR 등 국제적 탄소등록부에 매년 배출량 공개

에너지 : 기후 변화에 강한 저탄소 에너지고효율 도시

원전하나줄이기 6년 성과(2012~) : 에너지 470만 TOE

원자력발전소 2.35기, 석탄화력발전소 5기 감축효과

친환경에너지 생산

50만 TOE

에너지이용 효율화

273만 TOE

에너지사용 절약

147만 TOE

분야별 주요 성과

태양의 도시, 서울 프로젝트

' 22년까지 태양광 설비 1GW, 미니발전소 1백만 가구로 확대

구 분	~2017	2018	2019	2020	2021	2022	계
보급용량(MW)	153	76	138	224	196	228	1,007
태양광주택 (천가구)	96	66	122	171	250	299	1,004





분야별 주요 성과

에너지 절약의 시작

eco 마일리지

시민 198만명 가입

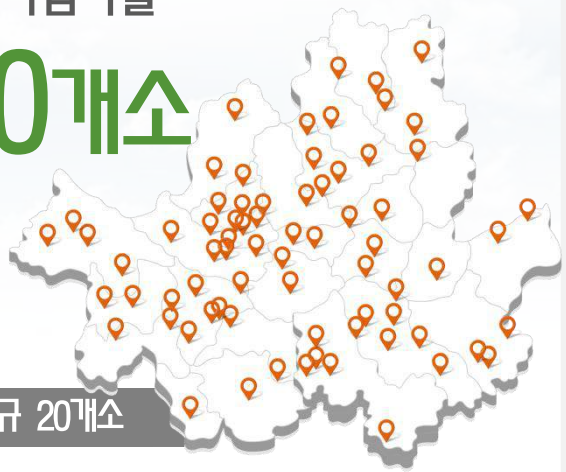
온실가스 135천톤 감축 (2017)

에너지 사용을 줄이면 인센티브를 지급하는 자발적 시민참여 프로그램

에너지정책의 집약지역 에너지 자립마을

에너지 자립마을

100개소



2018년 신규 20개소

분야별 주요 성과

덜 타는 만큼 탄소를 줄인다, 서울 승용차 마일리지

승용차 마일리지란 ? 시민이 자율적으로 자동차 운행거리를 줄여 온실가스와 미세먼지를 감축하는 시민실천운동

2017년 본격추진 **5만대** → 매년 5만대 추가 → 2021년 안정화 **25만대**

1년간 주행거리 감축실적에 따라 최대 7만 마일리지 지급

- ✓ 감축률(%), 감축량(Km)중 시민에게 유리한 조건으로 인센티브 지급
- ✓ 참여 2년차 부터 주행거리를 유지만 하더라도 유지인센티브 1만원 지급

분야별 주요 성과

대기, 교통 : 친환경차 보급 확대, 초미세먼지 저감

전기차, 수소차 보급확대

서울 전기차시대 선언(2017)

2022년까지 전기차 8만대 보급

전기차 : 금년 4,030대 보급
누계 1만대 돌파 예정
충전시설 : 192개소, 320기 추진

친환경등급제, 녹색교통진흥지역 운행제한

친환경 등급제 표지 부착(9월~)

1등급 표지

한양도성 녹색교통진흥지역 하위 등급(5등급 이하) 차량운행 제한 (2019.7월~)

위반시 과태료 25만원

자원순환, 물 : 재활용 및 업사이클 확대, 빗물 순환

국내최대 업사이클 복합공간 서울 새활용플라자 개관

버려지는 물품을 활용해
가치 있는 제품으로 재탄생

2017. 09. 05일 개관

연면적 16,530㎡

새활용 산업육성과
문화/교육/홍보 거점공간

버려지는 빗물 재이용 소형 빗물이용 시설 확충

소형빗물이용 시설 보급현황

	2015	2016	2020
개 소 수	99개소	135개소	677개소
설치용량	120㎥	300㎥	1,550㎥

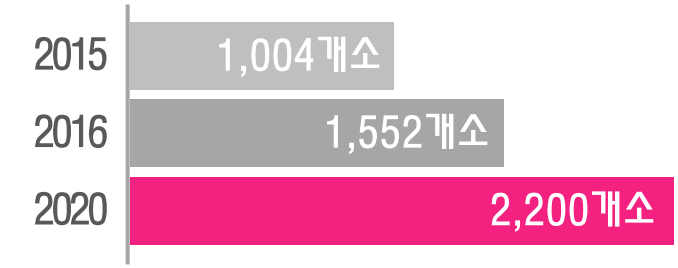
텃밭, 화단의 관수용 사용
마당 청소용 활용

생태, 도시농업 : 이천만그루 나무심기, 도시텃밭 활성화

도심속 작은 숲 정원 조성

도심 속 버려진 공간, 자투리땅 활용
이천만그루 나무심기 조기달성

도심 속 작은 숲 운영현황



서울형 도시 텃밭 조성

내 손으로 직접 가꾸어
건강한 먹거리

도시텃밭 조성 현황 (단위 : 개소)

	2015	2016	2020
옥상텃밭	226	348	677
자투리텃밭	125	168	430
학교텃밭	30	67	257

Chapter 04

마무리

보완사항

건물 부문 에너지 효율화를 위한 제도적 기준 강화 필요

- 시 온실가스 배출원의 70% 차지, 상업부분(신규, 기존건물) 온실가스 감축을 위한 제재 및 지원방안 강구 필요

온실가스 감축 관련 저탄소 시민 참여문화 확산

- 시민참여 확대를 위한 동기유발 및 참여 프로그램에 대한 고민 필요

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감 사 합 니 다.

서울특별시

GOGREEN: MISSION 2050

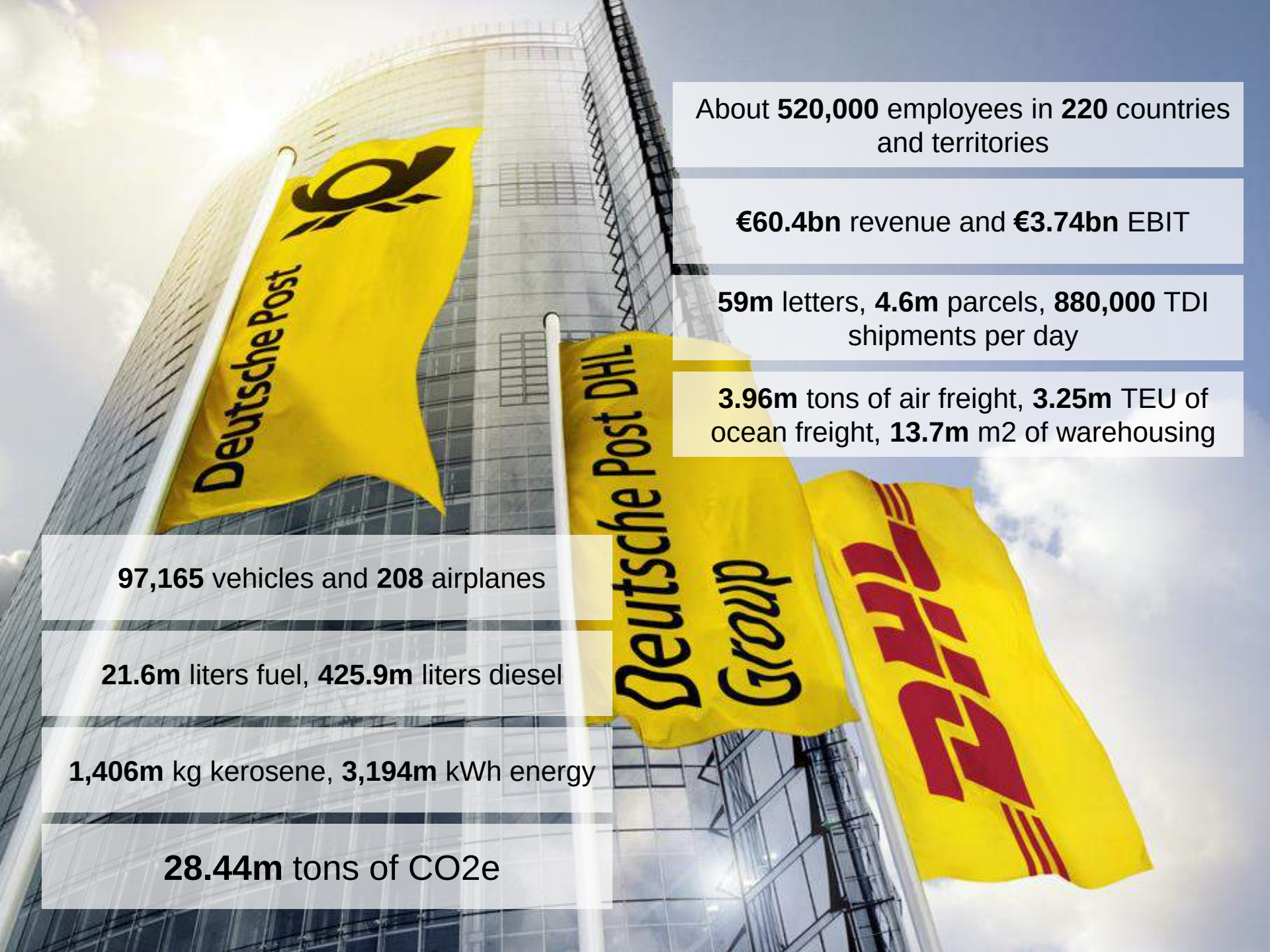
DHL EXPRESS KOREA

ChongHa (C H) Won

CLIMATE ACTION CONFERENCE 2018, Seoul

Oct. 10, 2018

Deutsche Post DHL Group



About **520,000** employees in **220** countries and territories

€60.4bn revenue and **€3.74bn** EBIT

59m letters, **4.6m** parcels, **880,000** TDI shipments per day

3.96m tons of air freight, **3.25m** TEU of ocean freight, **13.7m** m2 of warehousing

97,165 vehicles and **208** airplanes

21.6m liters fuel, **425.9m** liters diesel

1,406m kg kerosene, **3,194m** kWh energy

28.44m tons of CO2e

Our corporate strategy

Provider
of choice

Customers will view DPDHL as the reference for logistics

Investment
of choice

Shareholders will see DPDHL as company that consistently delivers against high aspirations

Employer
of choice

Potential) employees will want to work for DPDHL because it enriches their lives

Successes of our GoGreen program

2008

First global logistics service provider with a quantified CO_2 efficiency target

2012

Adopting the Shared Value approach and a new generation of tailored GoGreen Solutions

2014

Start of large scale rollout of electric mobility for pick-up and delivery services

2016

Achieving 2020 target to improve carbon efficiency by 30%, 4 years early

Influencing factors inspired us to re-think our GoGreen program

Internal inputs

- Senior management interviews
- Expert input from divisions and functions
- Online survey

External inputs

- DPDHL Sustainability Advisory Council
- Stakeholder roundtable
- Desk research
- Competitor analysis
- Customer analysis
- Rankings & ratings

MUST-HAVES

Climate Change

Local air pollution

Economic perspective

Employee engagement

Bold and visionary **umbrella**

EXTERNAL INFLUENCES

The world agrees on the **Paris Agreement**

UN Sustainable Development Goals are decided

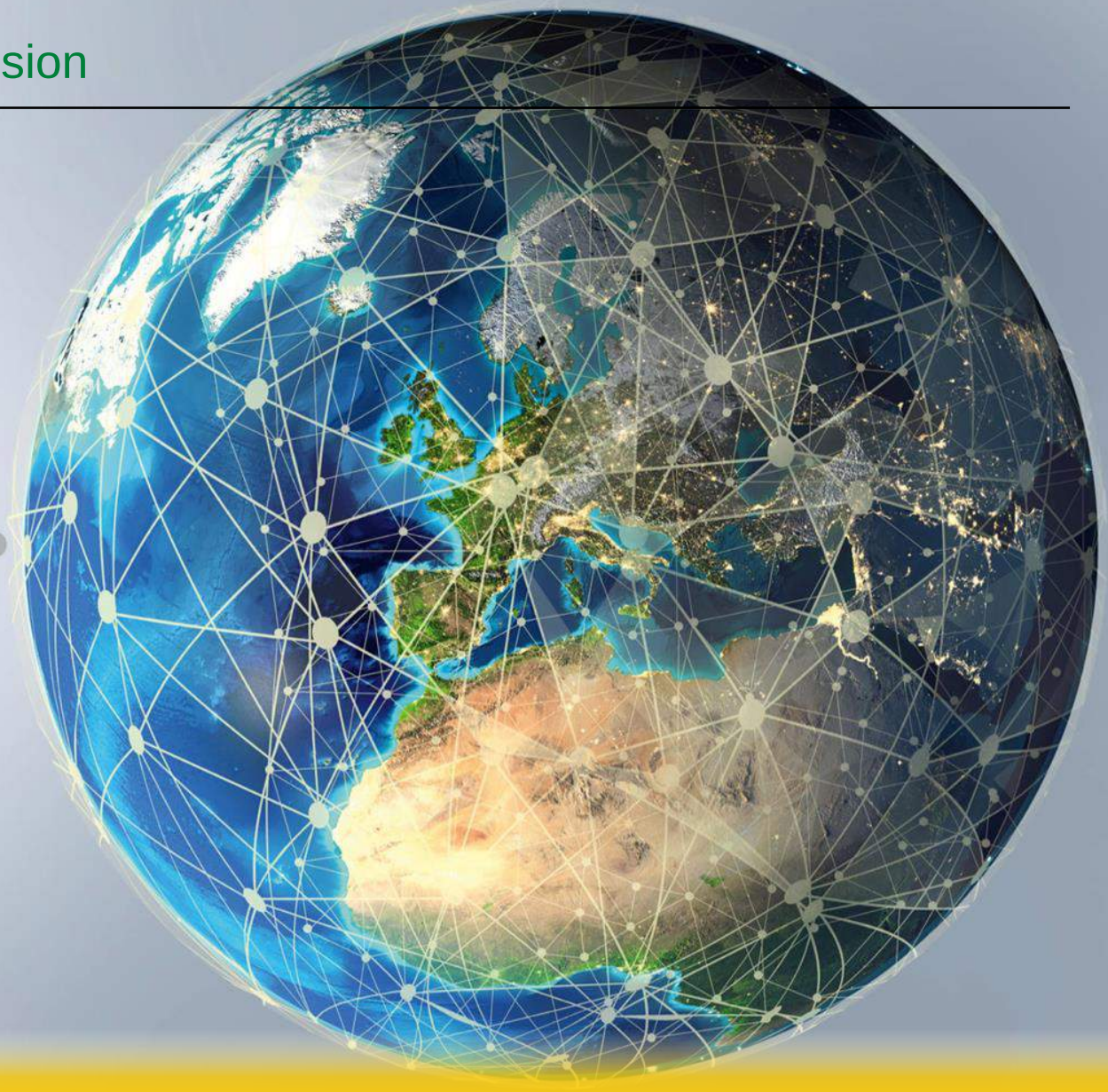
Major customers demand green logistics services

Investors demand action and transparency

Regulatory requirements lean towards decarbonization of transport

Our bold long-term mission

MISSION 2050: ZERO EMISSIONS



Four strategic targets for 2025

Global Target — Increase carbon efficiency by 50%

Local Target — 70% clean last mile solutions

2025 RE-VISIT RE-VISIT RE-VISIT RE-VISIT **2050 ZERO EMISSIONS**

Economic Target — > 50% of sales Green Solutions

People Target — 80% Certified GoGreen Specialists
One million trees planted each year

Basic conditions are changing

(Increasing) **pollution** in cities

Lawsuits in Europe against countries and cities

Potential **diesel bans**

eCommerce requires new approaches

Availability of technology to reduce local pollutants

StreetScooter – An electric vehicle developed in collaboration with delivery staff

Motivation for in-house development

- Fast **achievement** of **target costs**
- Guarantee of **optimal ergonomics**
- Better **visibility** conditions and **robustness**
- **Emotional enthusiasm** of delivery staff
- **Reduction** of CO_2, local emissions and noise

Facts and figures

2011 Decision to **develop own electric vehicles**

2014 **Acquisition** of StreetScooter start-up

- ✓ **6,000** StreetScooter in daily operations
- ✓ Over **6,500** charging points installed
- ✓ More than **25,000,000 km** driven
- ✓ Urban **carbon-free parcel delivery**
- ✓ **External sale** started

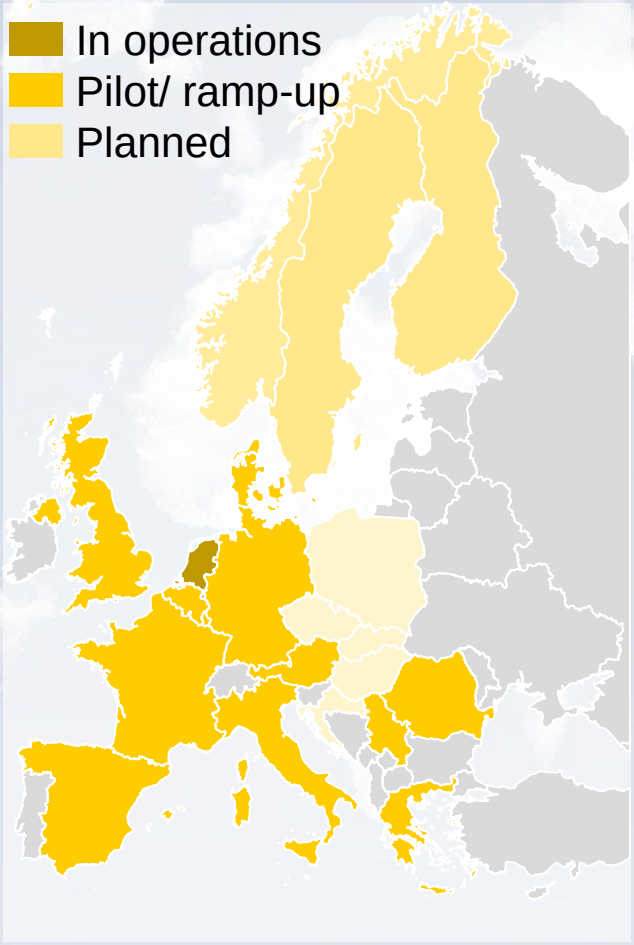
2018 Testing **hydrogen fuel cells**

2018 Pilot **autonomous driving**

Compelling arguments

- **60 % – 80 %** less fuel costs
- **60 % – 80 %** less maintenance and repair costs
- **No** motor vehicle **tax** (Germany)
- Subsidized: up to **€4,000 env. bonus** + local funding
- Positive **reputation** and high **communications value**

Electric cargo bikes replace vans for inner city deliveries



New containerization

Cubicycle

Trailer City-Hub

CubiVan

Hydrogen Trucks

- DHL is part of several collaborative projects to test and use Hydrogen

Teardrop Trailer

- More than 1,200 trailers at DHL
- Up to 9 percent fuel savings

Green solutions for our customers

I am looking for…		
Transparency	**Carbon Reports**	✓ Reports ✓ Analysis ✓ Simulations
Emissions compensation	**Climate Neutral**	✓ Emissions compensation ✓ Climate protection projects
CO_2 reduction in my supply chain	**Green Optimization**	✓ CO_2-efficiency ✓ Circular economy

Tree planting

DHL EXPRESS KOREA

No 1
Market Share
(For 41 years)

1
High ends
Gateway

31,619
Customers

24
Facilities

500
Vehicles

1977
Founded

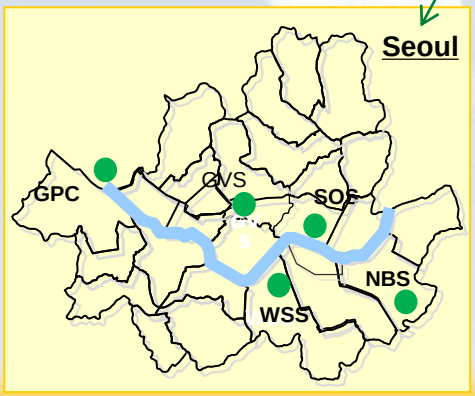
134
Reception places

40
Daily Regular Flights

1
Int'l Express Co.

1,300
Employees

4 Million
Time Definite Shpts Annually



Total 23 facilities in KR

- 1 Gateway
- 22 Service Centers

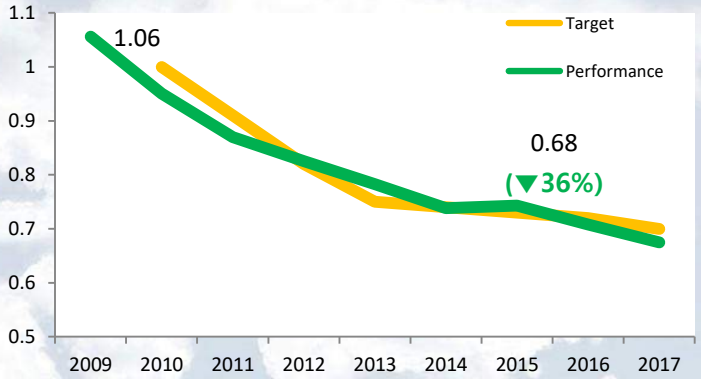
DHL EXPRESS KOREA GoGreen

Improved CO_2 efficiency by 36% from 2009 to 2017 by below :

- vehicle replacements with high technology : Draw-bar trucks, euro 6 engines, air spoilers, electric bikes, telematics, etc.
- eco friendly infrastructures with high efficiency lightings, LED etc.

Measured and monitored by carbon accounting report putting facility target.

Engaged employees by Eco-drive training.



Drive-in Facility

Draw-bar Truck for road linehaul

Euro 6 engine low top truck

Electric bike

CSR activities in Korea

CSR for Environmental protection

Global Volunteer Day (GVD)

	Quarterly & Yearly GVD
Activities	25
Volunteers	900+
Hours	3,000+
* Focus on GOGREEN	

Planting Trees

	Participants	Trees
Q3 ‘17	75	300
Q1 ‘18	105	400
Q2 ‘18	412	1,350
Total	593	**2,050**

EXPRESS KOREA GoGreen recognition

MLIT's Green Logistics Co. Certification since 2013

Korea Green & Climate Awards from Nat'l Assembly 2015

Minister of Environment Green Mgt Awards,2015

GoGreen AP Express CE Awards 2014

2017 Global Standard Mgt Awards for 5 years

2015 DPDHL Group CEO Awards for GoGreen

Thank You

E-mail: ChongHa.WON@dhl.com

기후행동 컨퍼런스 2018

CLIMATE ACTION CONFERENCE 2018

[Session II]

Accelerating energy transition in align with Paris Agreement (1.5℃)

Presentation I

Korea's Energy Transition : Challenges and Opportunities

Jong Ho Hong

(Chairman, Energy Transition Forum of Korea &
Professor, Seoul National University)

주최 WWF citi 후원 산업통상자원부 Ministry of Trade, Industry and Energy 환경부 Ministry of Environment 외교부 Ministry of Foreign Affairs 한국에너지공단 KOREA ENERGY AGENCY

Korea's Energy Transition: Challenges and Opportunities

Climate Action Conference 2018

October 10, 2018

Hong, Jong Ho
Energy Transition Forum of Korea
Seoul National University

에너지전환포럼 출범식 & 기자회견

에너지 전환포럼이 출발합니다

2018.4.5 오전10시
여의도 중소기업중앙회 릴리홀

인고의 시간을 견딘 생명이 완연한 봄기운을 만끽하는 4월,
사단법인 에너지전환포럼이 귀한 분들을 모시고
척박한 땅 한편에 한 그루의 묘목을 심고자 합니다.
포럼 출범을 알리고 향후 활동계획을 소개하는
창립기념식과 기자회견을 갖고자 하오니
꼭 참석하시어 자리를 빛내주십시오.

에너지전환포럼은 에너지생산, 유통, 소비 전 부문에 걸쳐
변화와 혁신이 일어나고 있는 격랑의 한 가운데서
올곧은 중심추 역할을 하고자 합니다.
누구나 참여하고, 모두가 소통하는 에너지전환 논의가
보다 진일보한 담론과 대안으로 이어지도록
열린 플랫폼 역할을 충실히 수행하고자 합니다.
포럼은 에너지전환에 대한 공감대 확산을 통해
더 많은 시민과 국제사회가 지구생명체 일원으로
책임과 의무를 다할 수 있도록 노력하겠습니다.
다음 세대를 위한 나무심기, 에너지전환포럼이 시작합니다.

프로그램 순서

1. 창립경과보고
2. 창립선언문 낭독
3. 축사
4. 발표: 한국의 에너지전환, 현재와 미래
5. 기자회견 Q&A

문의

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사무국 양이원영 010-4288-8402
energytransition.korea@gmail.com

함께하는 사람들

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유상희 동의대 교수
임성진 전주대 교수

고문
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박원순 서울시장
박재묵 대전세종연구원장
박종근 서울대 교수
심상정 정의당 전 대표
우원식 더불어민주당 원내대표
원희룡 제주도지사
유승민 바른미래당 대표
이재명 성남시장
장병완 국회 산업통상자원중소벤처기업위원회 위원장
전의찬 세종대 교수

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양이원영 환경운동연합 처장
유승직 숙명여대 교수
윤순진 서울대 교수
이광석 SK가스 전무
이상복 이투뉴스 부장
이성호 세종대 기후변화센터 연구위원
이유진 녹색전환연구소 이사
이재덕 GS EPS 상무
이창훈 환경정책평가연구원 선임연구위원
이필렬 한국방송통신대 교수
전상훈 이지스커뮤니케이션스 대표
전영환 홍익대 교수
정창수 나라살림연구소 소장
조경두 인천발전연구원 기후환경연구센터장
차문환 한화솔라파워 대표
한병화 유진투자증권 연구위원
홍준희 가천대 교수
황규득 씨에스윈드 이사

감사
김주진 법률사무소 엠프스 변호사
최두원 KB증권 회계사

참여기업
신성이엔지, 씨에스윈드, SK가스, 유니슨, 이건창호, GS EPS, 한화솔라파워

에너지전환포럼 3차 정기포럼

에너지전환과 미세먼지 저감을 위한 에너지세제 개편방안

2018.6.18 pm 2:30~5:00

한국프레스센터 18층 외신기자클럽

미세먼지 저감을 위해서는 석탄발전과 경유자동차 사용을 줄여야 합니다.
유연탄 과세, 경유세 과세가 역할을 할 수 있습니다.
대통령 직속 정책기획위원회 산하에 재정개혁특별위원회가 세제 전반에 대해서 논의 중입니다.
에너지전환포럼에서 에너지전환과 미세먼지 저감을 위한 세제개편방안에 대한 포럼을 엽니다.

좌장. **홍종호** 에너지전환포럼 공동대표

2:30~3:30 **발제**

2:30-3:00 **에너지전환을 위한 석탄과세 개혁방안**
에너지경제연구원 박광수 선임연구위원

3:00-3:30 **미세먼지 저감을 위한 수송연료 세제 개혁방안**
녹색교통운동 송상석 처장

3:30-3:40 **휴식**

3:40~4:30 **패널토론**
이창훈 환경정책평가연구원 선임연구위원
김승래 한림대 교수
홍동곤 환경부 대기환경정책과장

4:30~5:00 **종합토론**

문의 admin@energytransitionkorea.org
양이원영 사무처장 010-4288-8402

홈페이지 www.energytransitionkorea.org

What is ‘Energy Transition’?

- Fossil fuel and nuclear based energy supply system having negative impact on future generation and global environment including climate change
- Reducing energy demand by energy saving and energy efficiency
- Transforming our energy system to renewable energy

Why is Energy Transition important for Korea?

Energy Security

- 8th largest energy consuming country
- 95% energy import dependency

Clean and Safe Energy

- Highest nuclear power plant density
- Lowest % of renewables share in power generation among OECD
- Highest PM2.5 Concentration among OECD

New Growth Engine

- Stagnating potential growth rate
- 4th Industrial Revolution and Energy Innovation

GHG Emission Reduction

- In 2017, coal share of power generation 45.4% (nuclear 30.3%)
- 7th largest emitting country
- NDC: 37% reduction by 2030

Korea is among the highest energy consuming countries

(Unit: Mtoe)

2015	China	US	India	Russia	Japan	Germany	Brazil	Korea	Canada	France
Primary energy supply	2,973	2,188	851	710	430	308	298	273	270	247

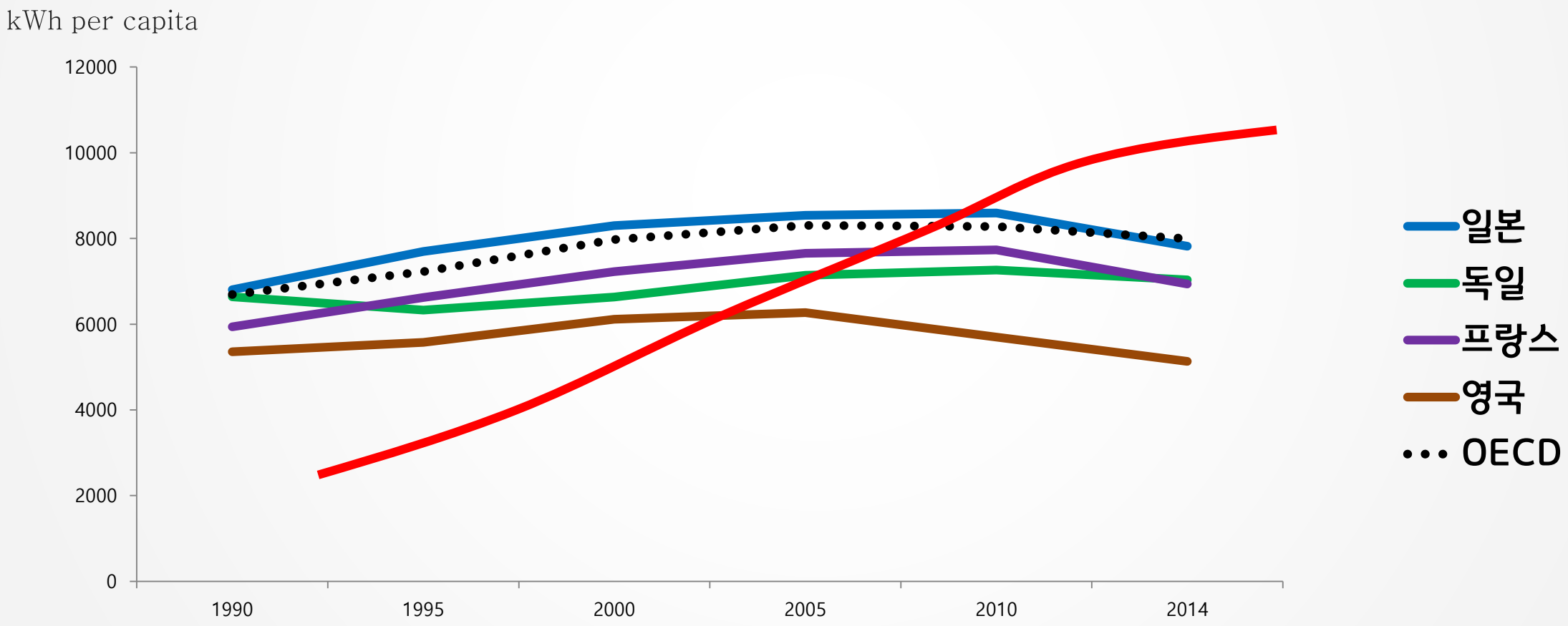
Source: IEA(2017)_Key World Energy Statistics

Energy intensity is among the highest in OECD

	Korea	Japan	Germany	UK	OECD
Energy Intensity (toe/thousand USD)	0.16 (100)	0.10	0.09	0.07	0.08 (50)

Source: Ministry of Strategy and Finance of Korea, 2016

Electricity consumption is rapidly rising



Highest nuclear power plant density

99 plants

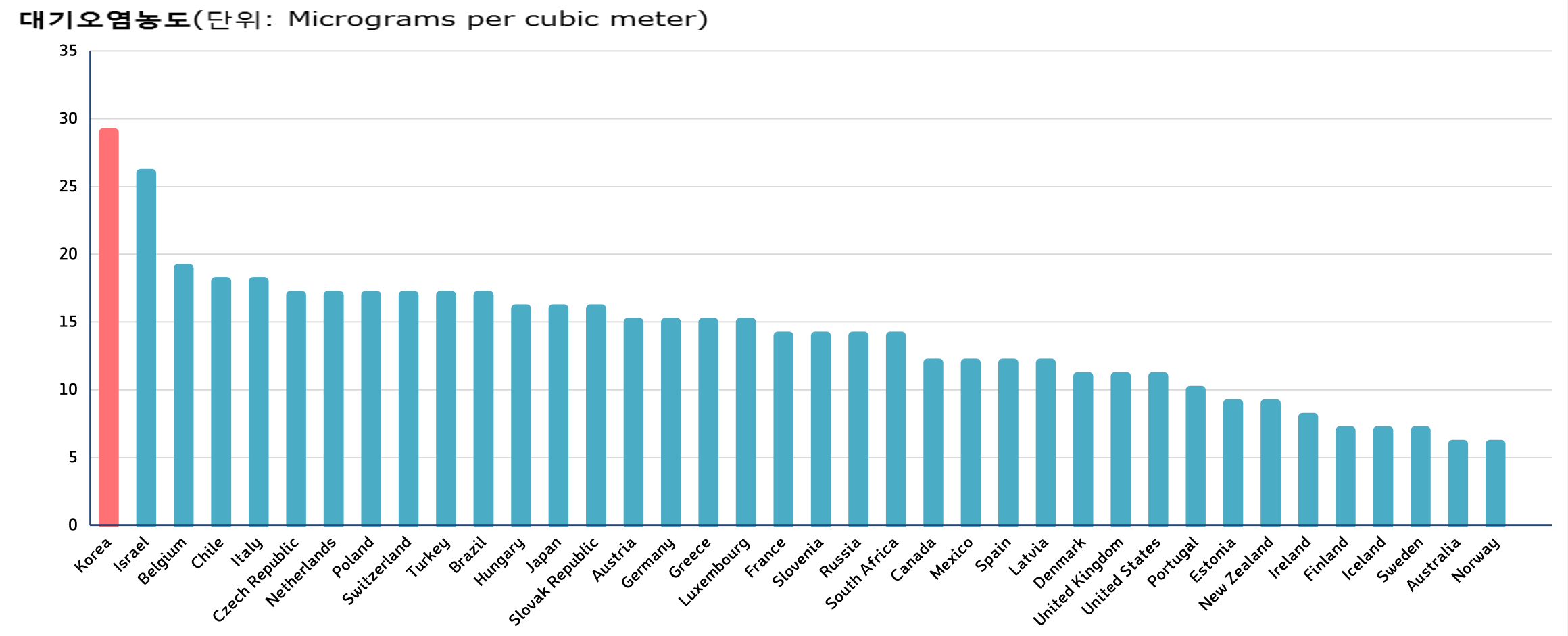
35 plants

24 plants

58 plants

38 plants

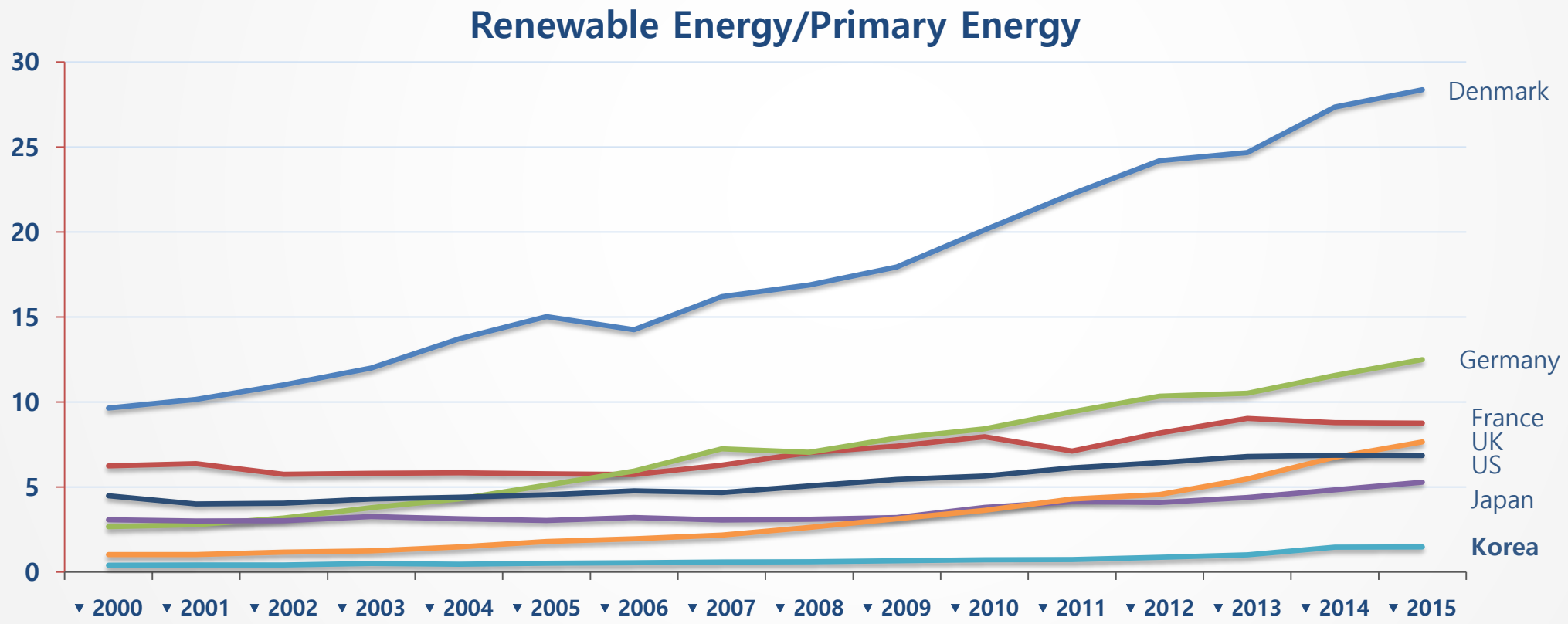
Highest PM 2.5 Concentration among OECD countries



Source: OECD(2016), Better Life Index

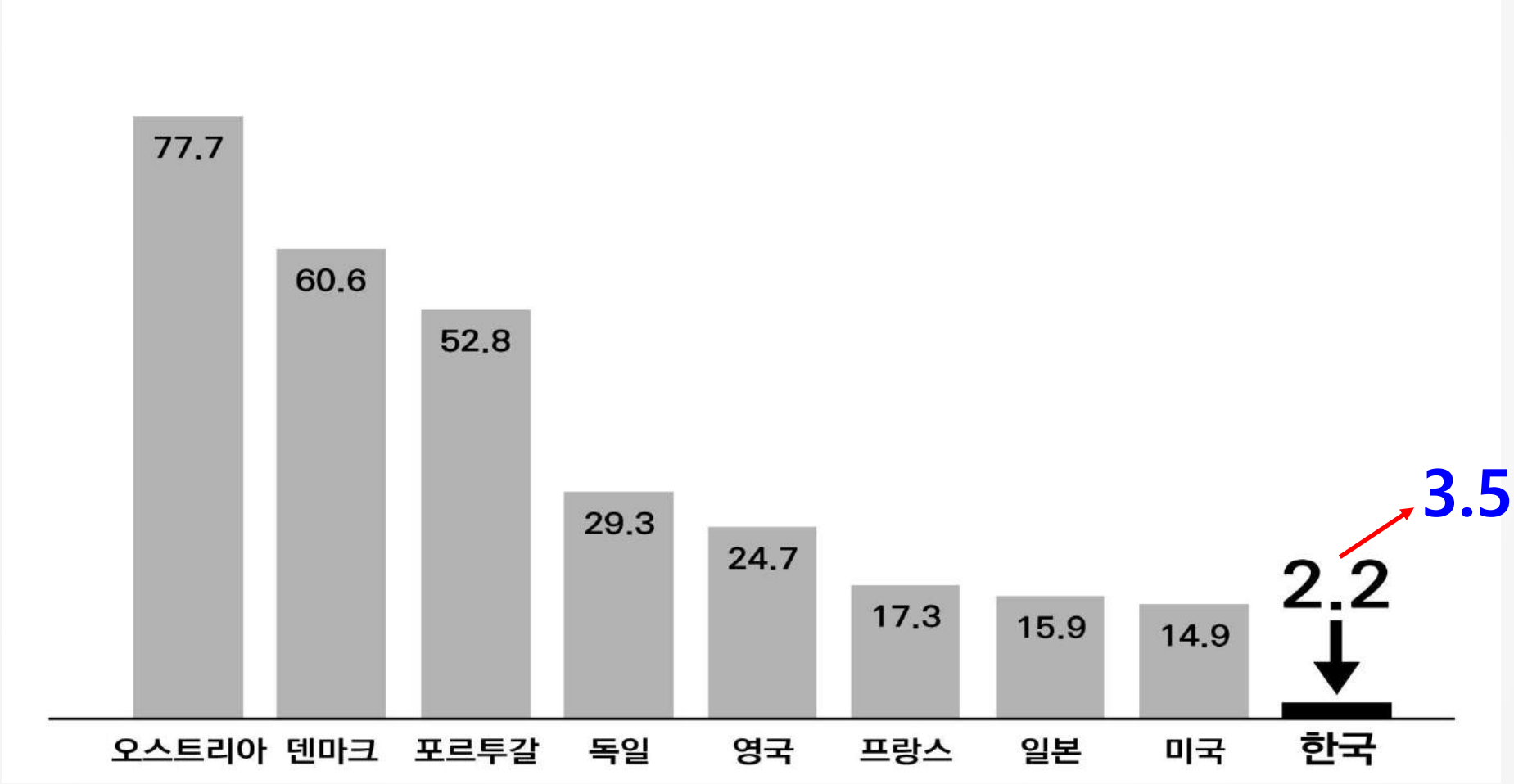
Renewable Energy Supply

Korea is the lowest among OECD countries(1.47%), OECD average is 9.64%



Source : IEA, Renewable Information 2017

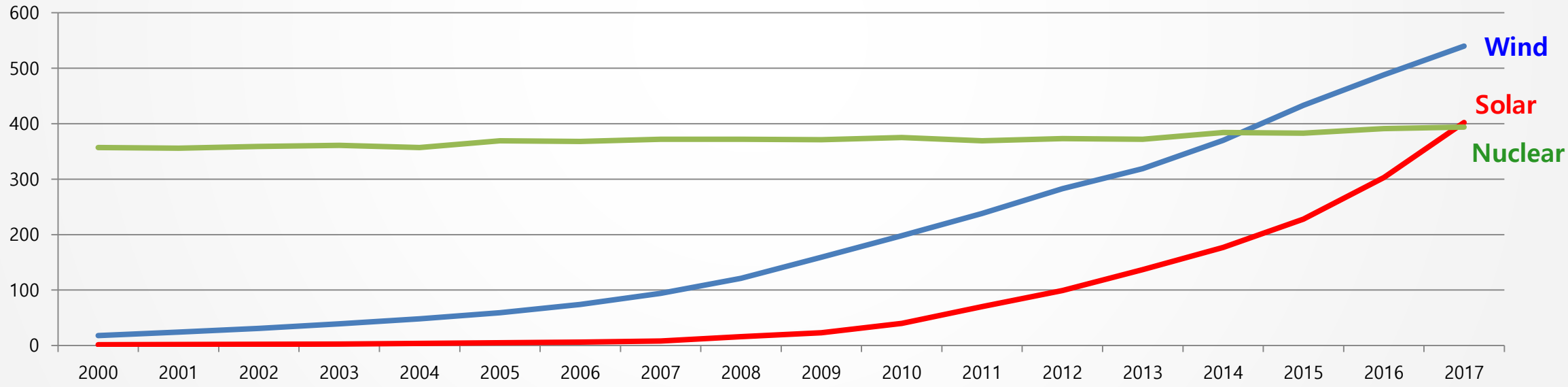
Renewables Share in Electricity Production



Source : IEA, Renewable Information 2017

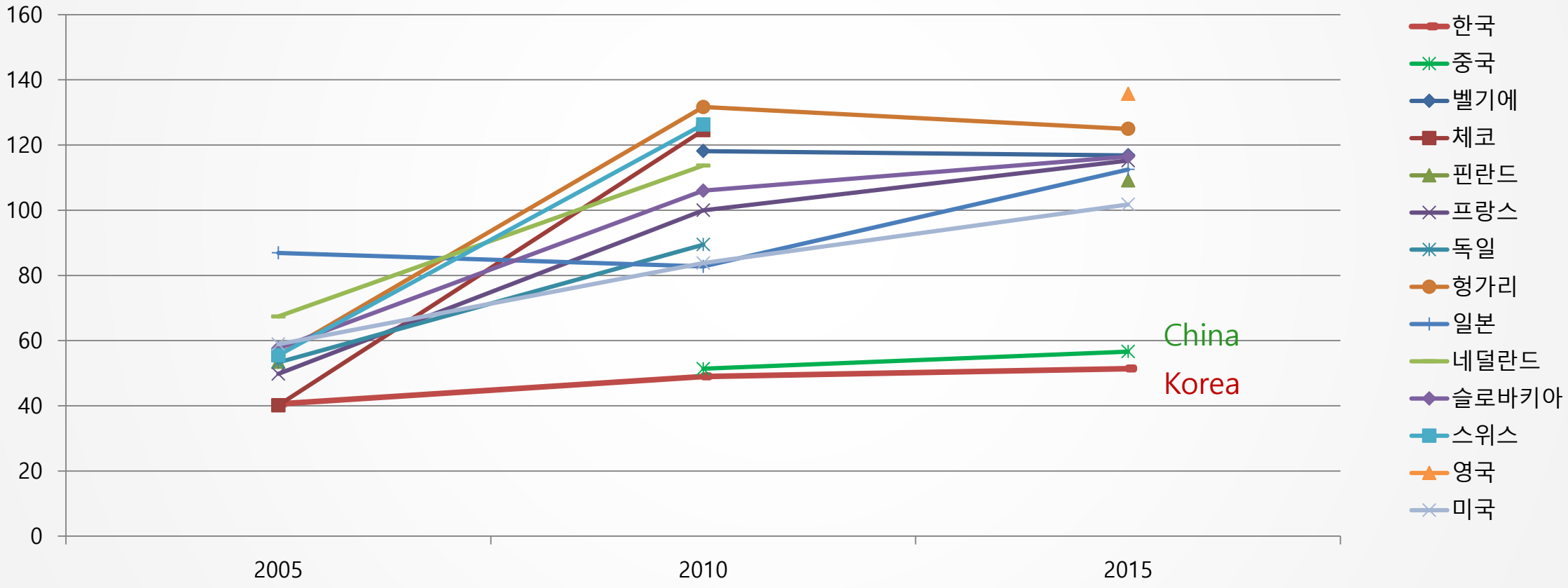
Global Cumulative installed capacity by energy (2000~2017)

- In 2017, $280 billion in global renewables (solar, wind, biomass, etc.) investment, while $103 billion invested in fossil fuel generators, $45 billion in large hydro dams, and $42 billion into new nuclear power plants



Source: Statista, IAEA PRIS database

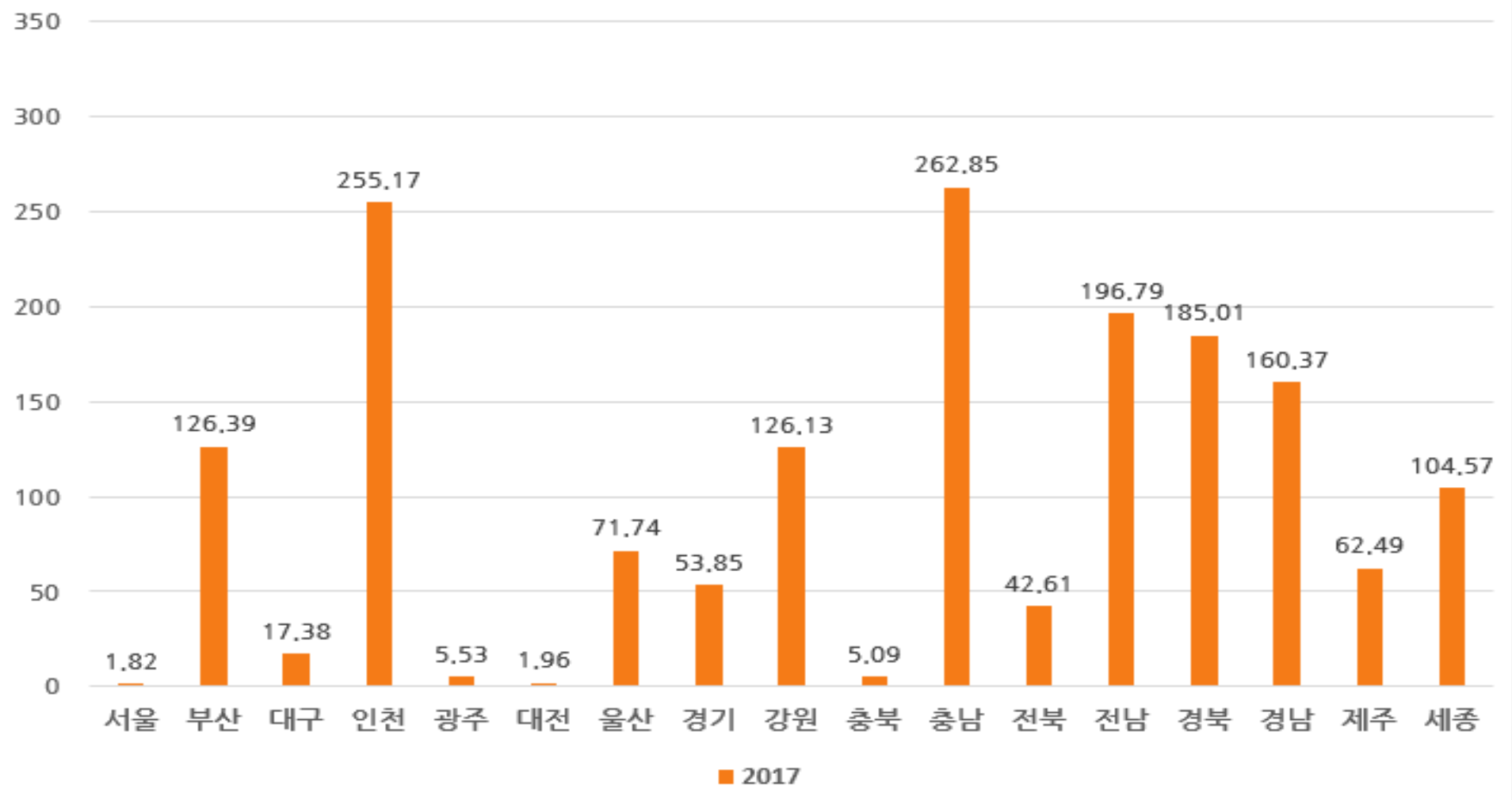
Levelized Cost of Electricity (LCOE), Nuclear Generation



Source: IEA(2015),『Projected Costs of Generating Electricity』

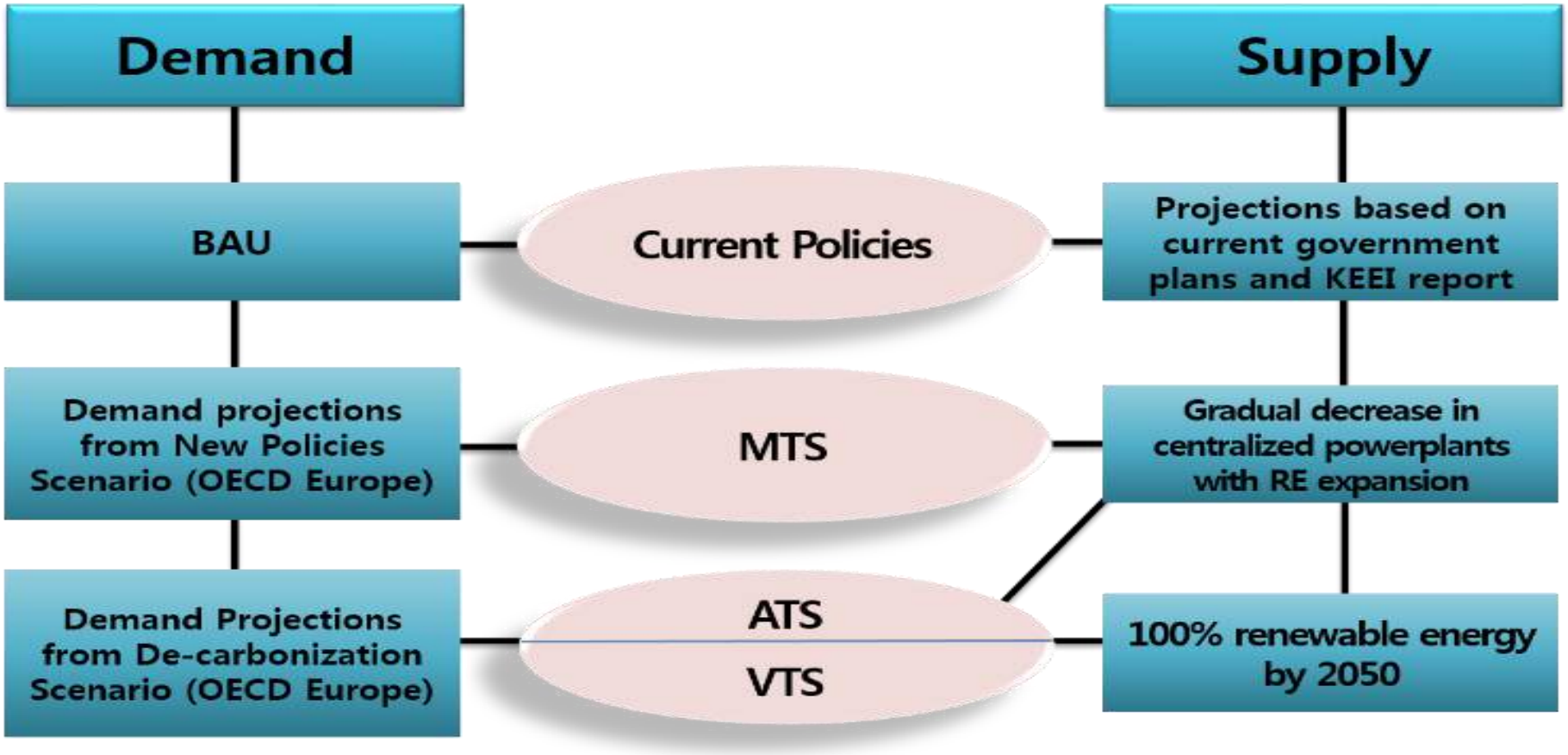
152 RE100 Global companies

Electricity Self Sufficiency Rate by Region



Source : KEPCO, 2018

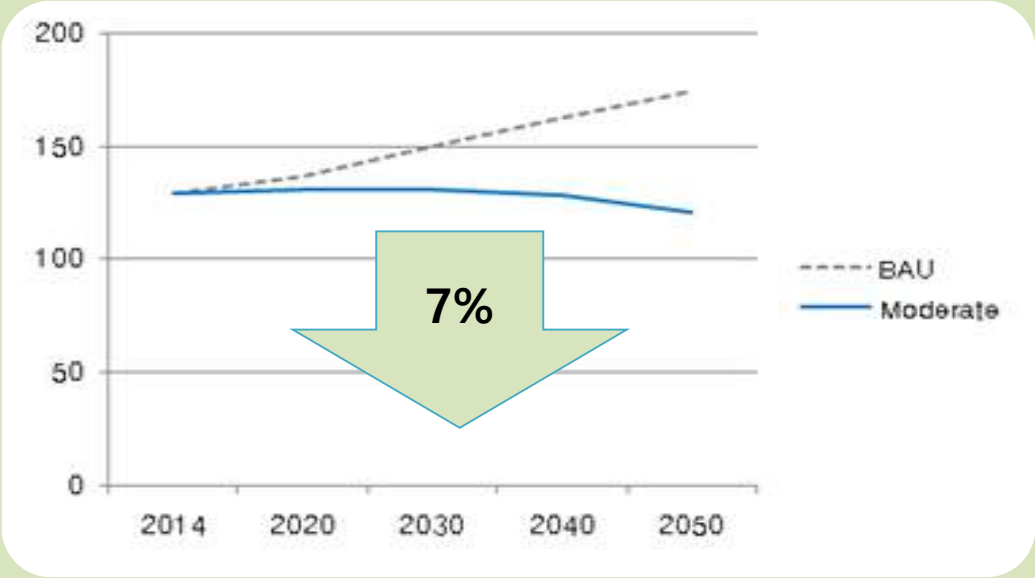
Summary of 2050 Sustainable Energy Scenario of Korea



Demand side transition

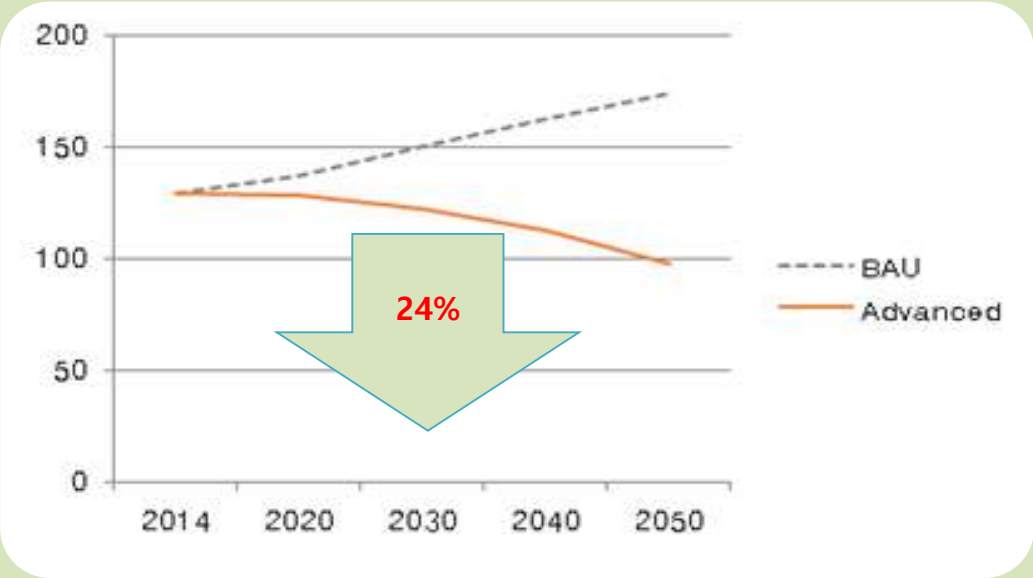
MTS

(Unit: MTOE)

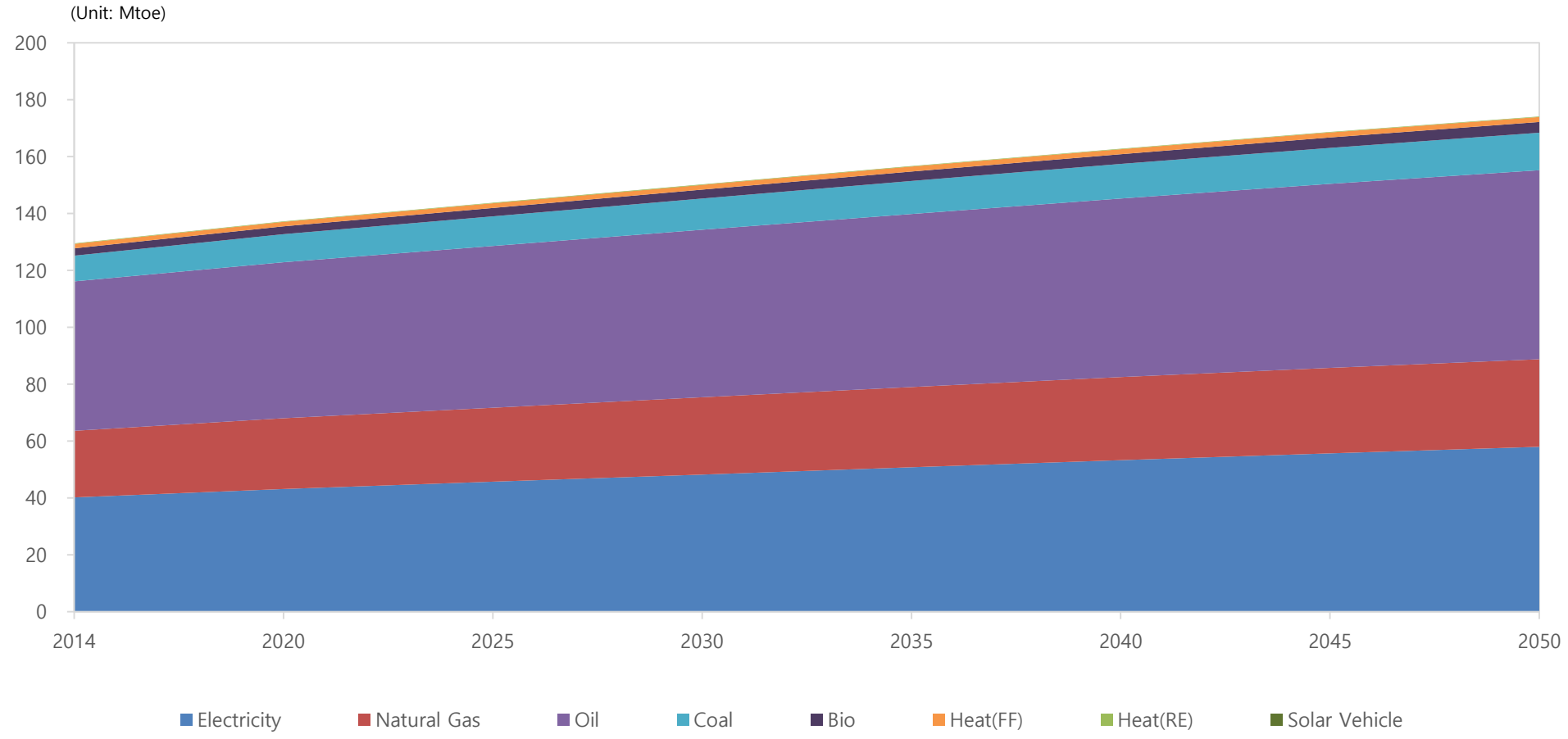


ATS & VTS

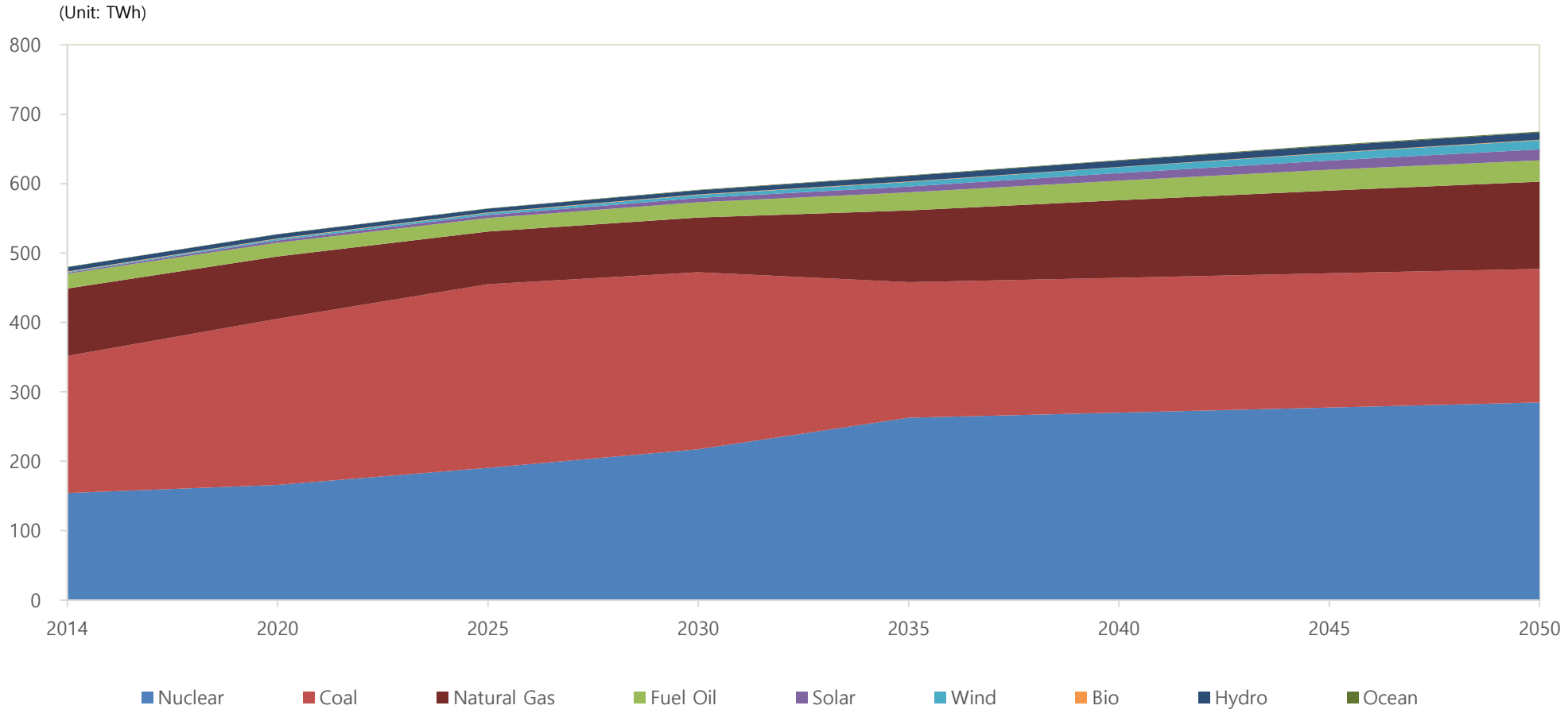
(Unit: MTOE)



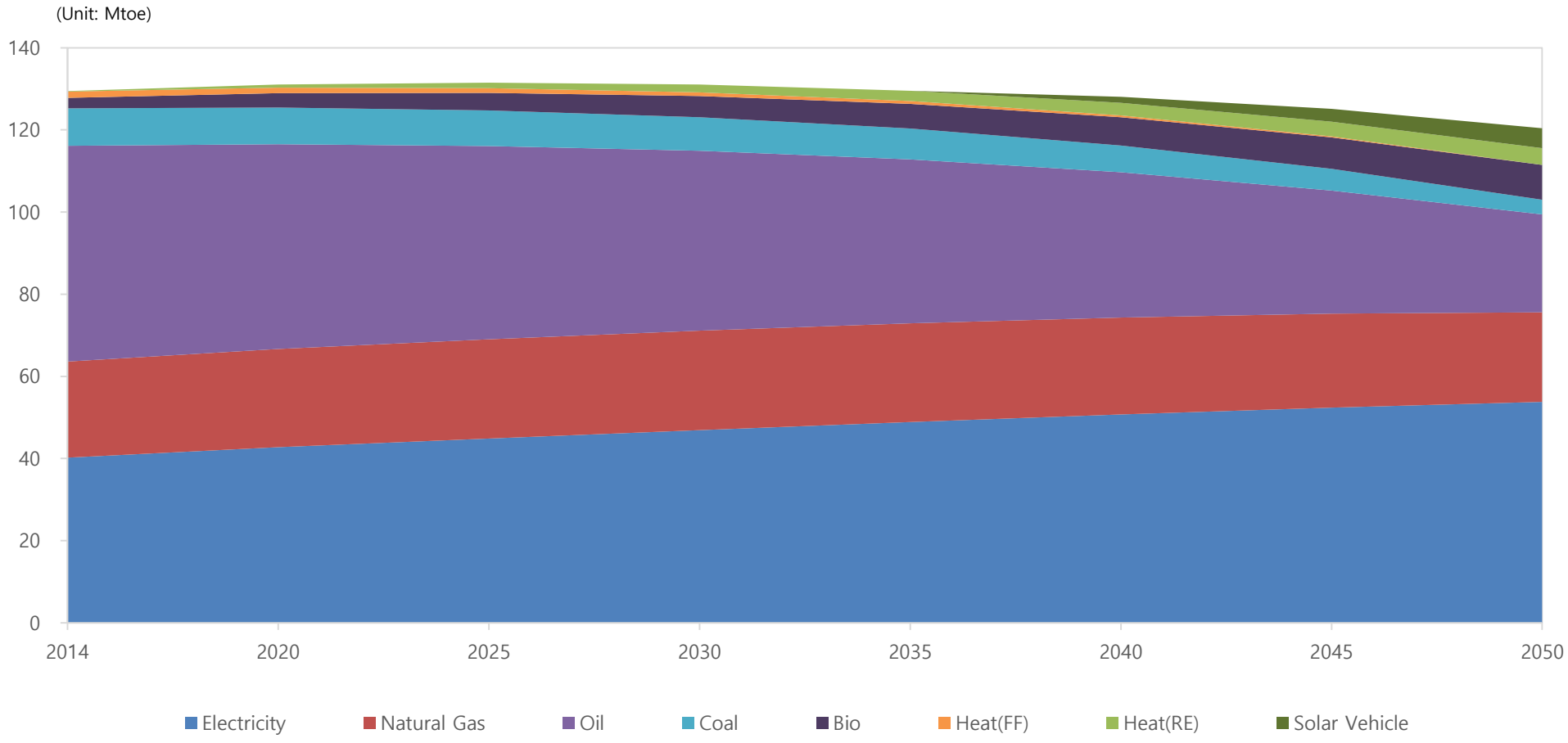
Final energy consumption, BAU Scenario



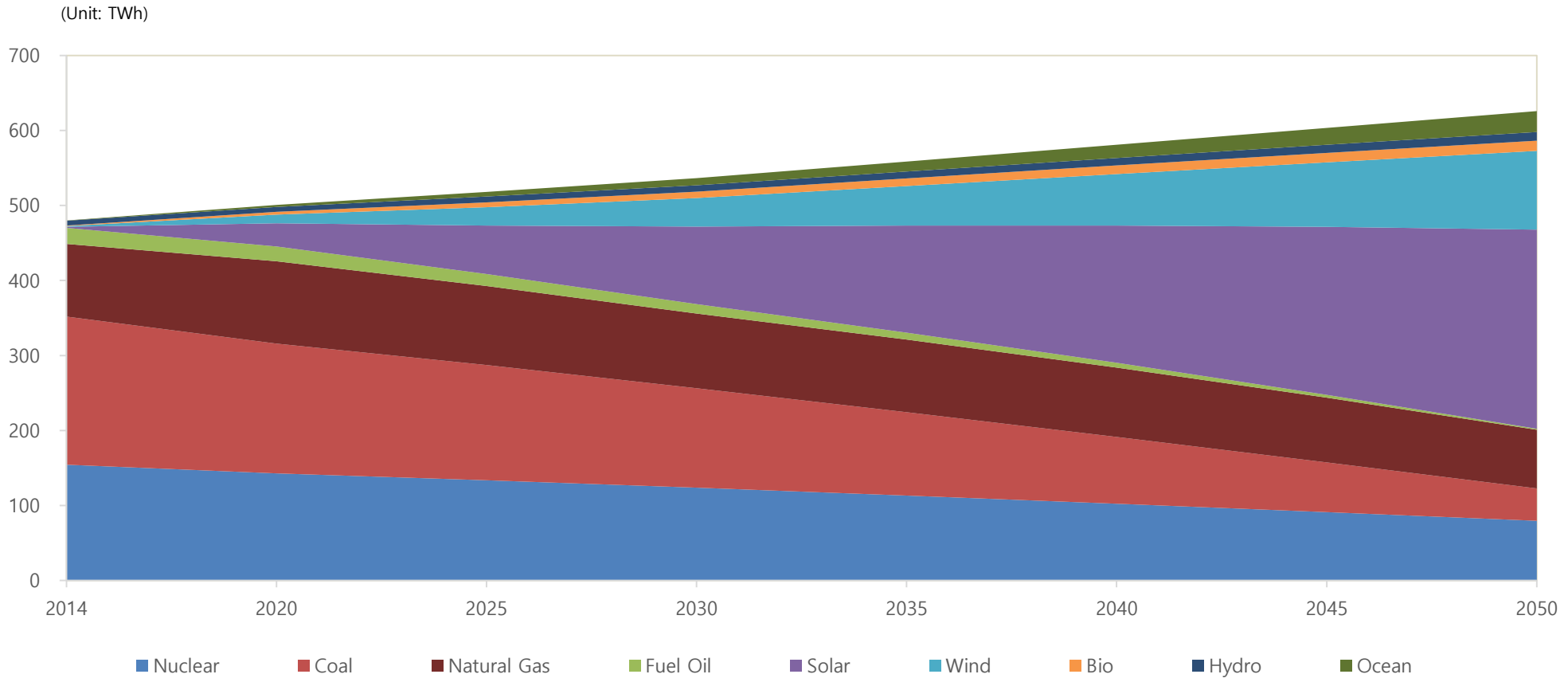
Electricity generation and fuel mix, BAU Scenario



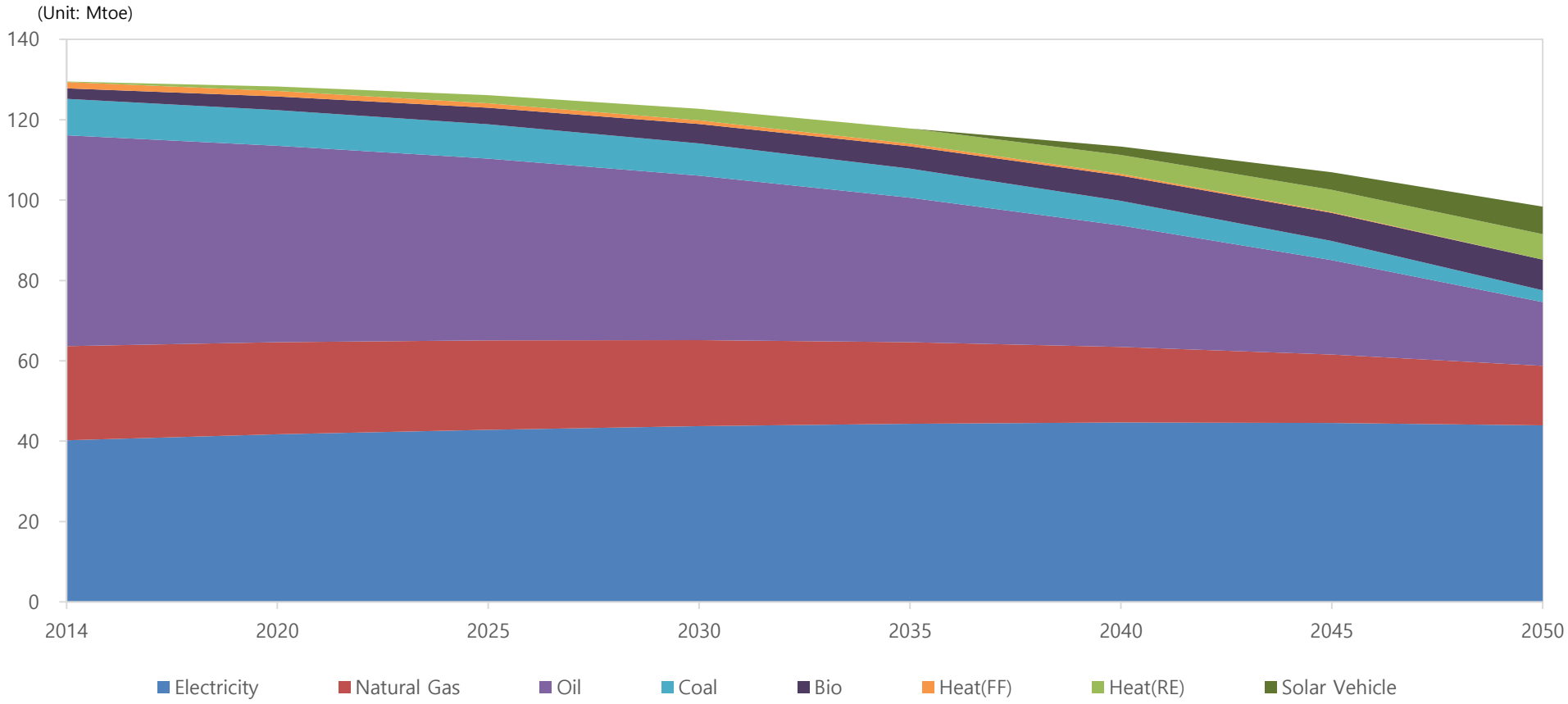
Final energy consumption, Moderate Transition Scenario



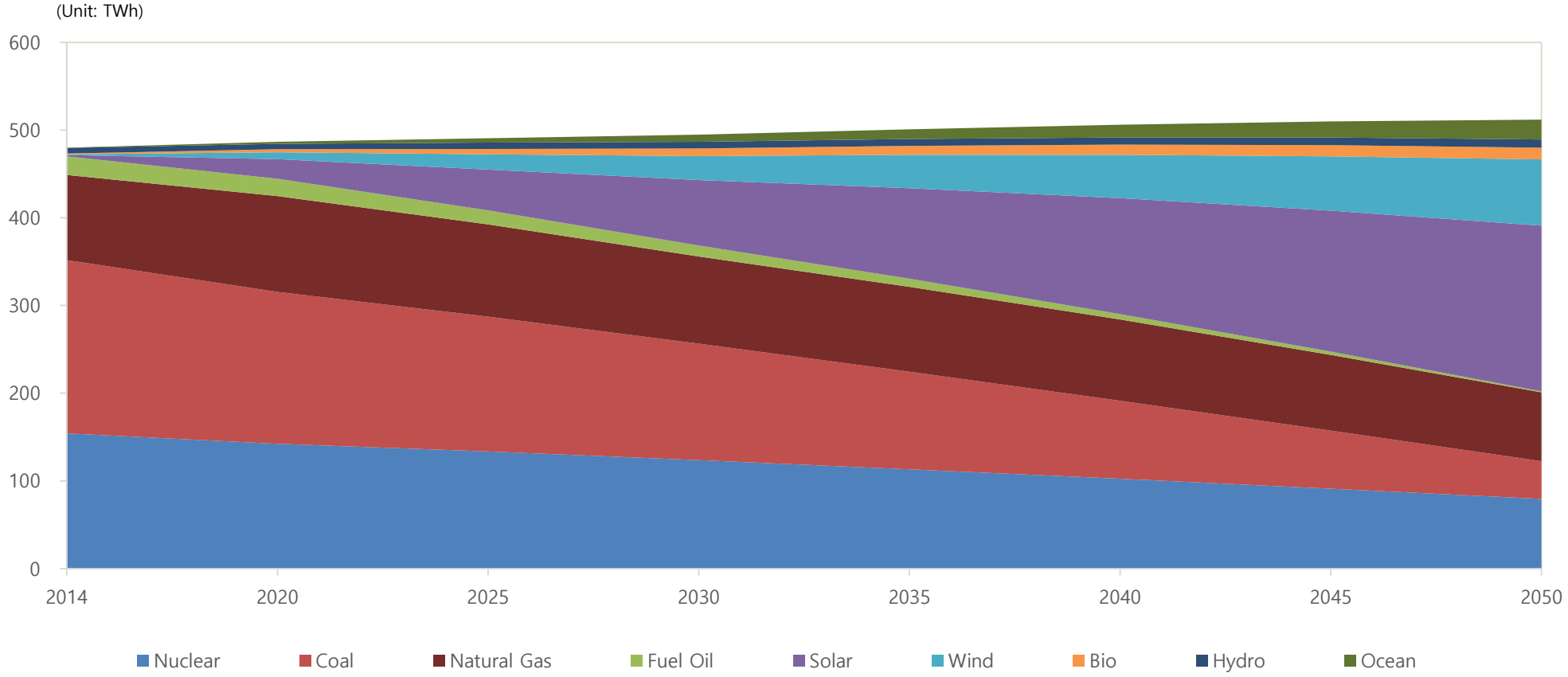
Electricity generation and fuel mix, Moderate Transition Scenario



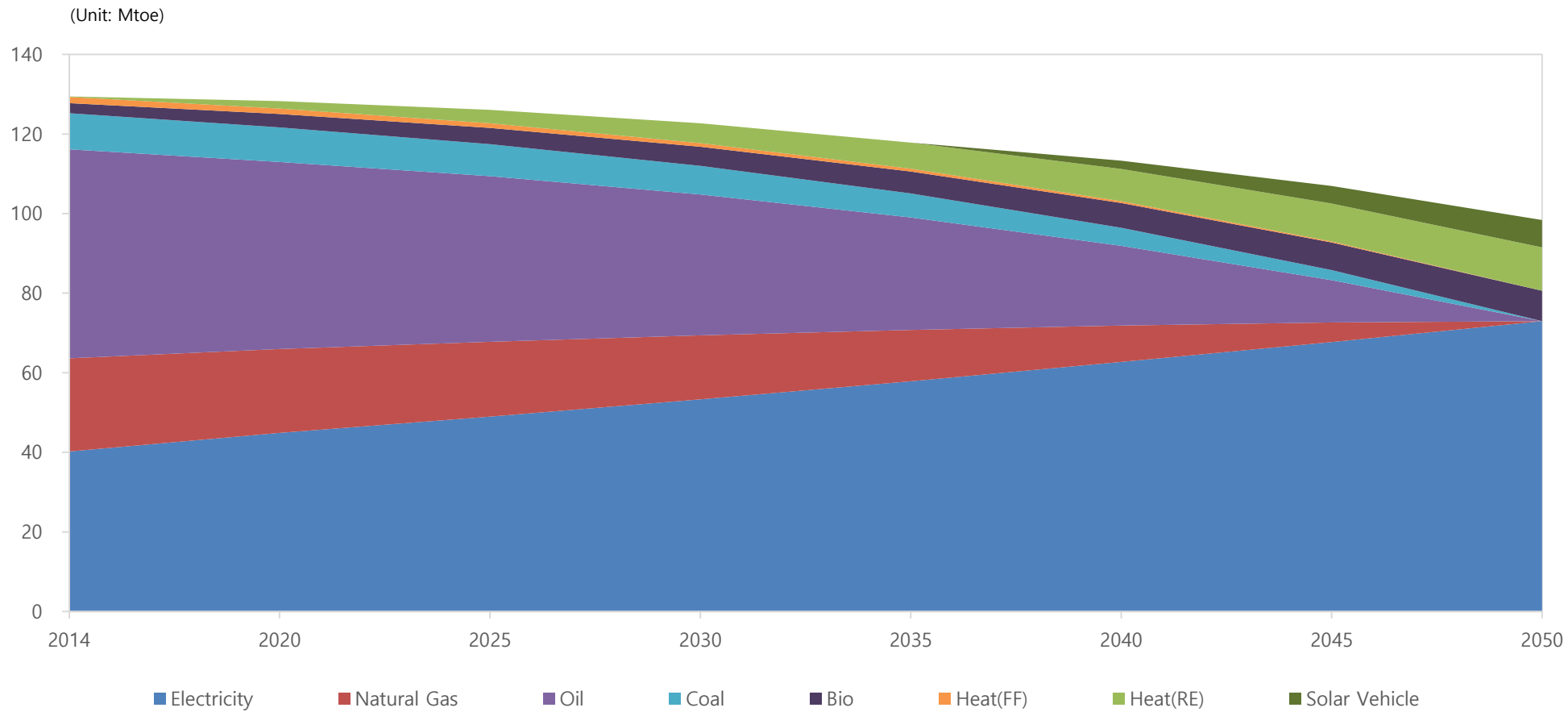
Final energy consumption, Advanced Transition Scenario



Electricity generation and fuel mix, Advanced Transition Scenario

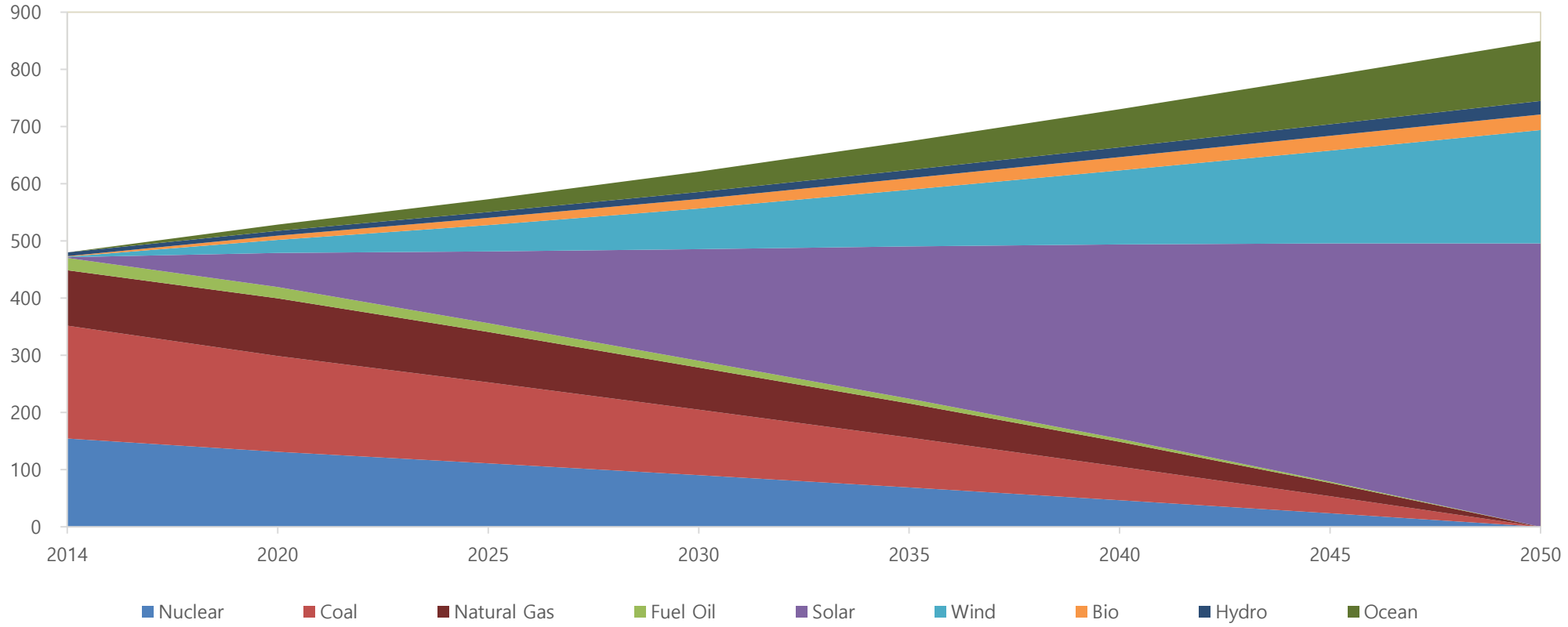


Final energy consumption, Visionary Transition Scenario

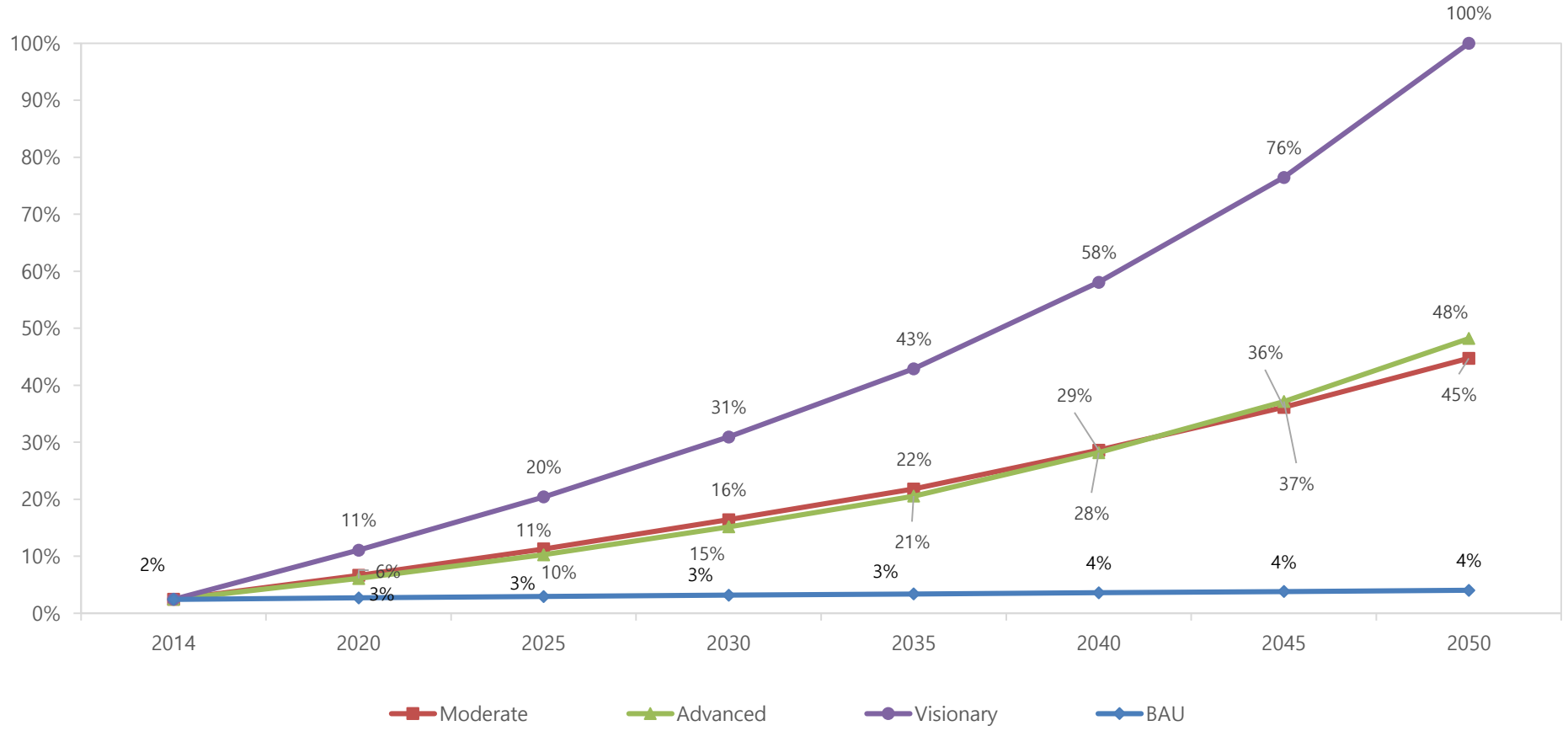


Electricity generation and fuel mix, Visionary Transition Scenario

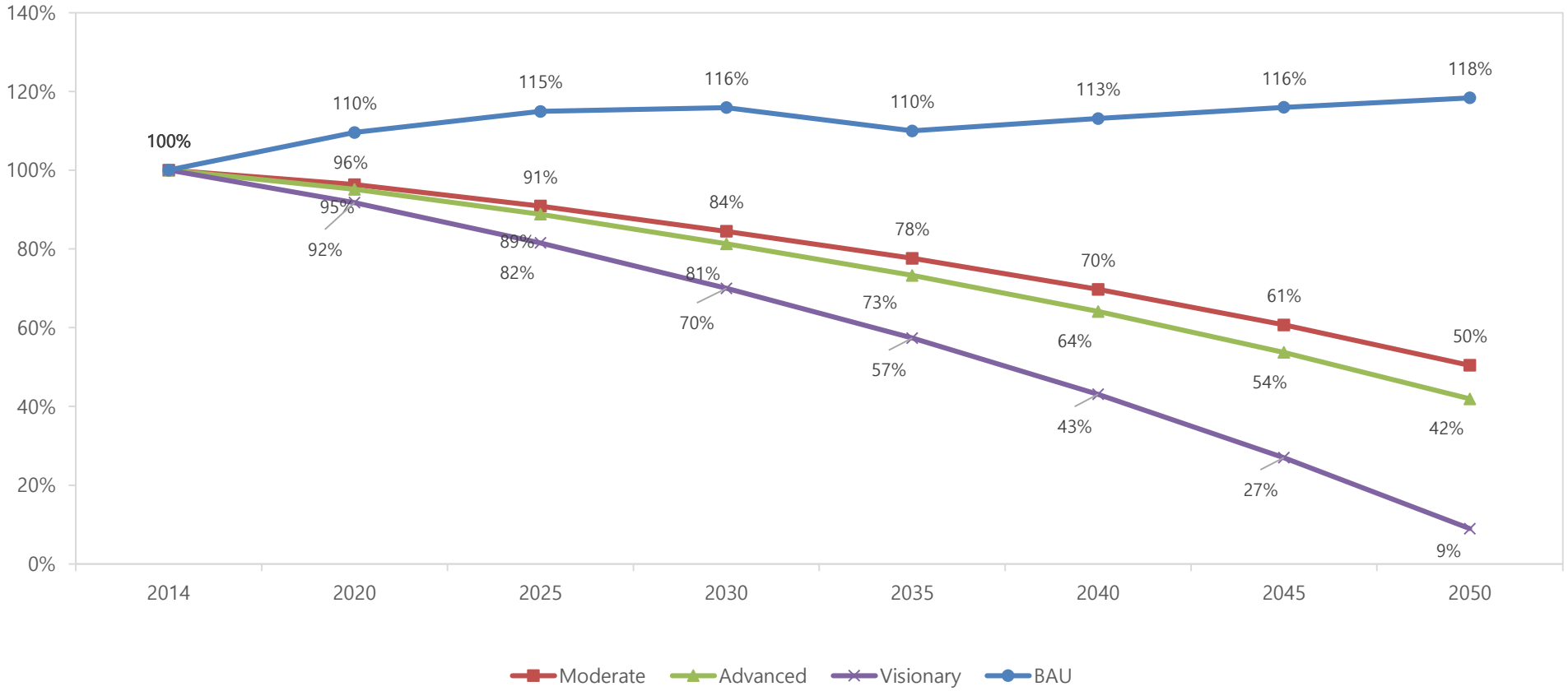
(Unit: TWh)



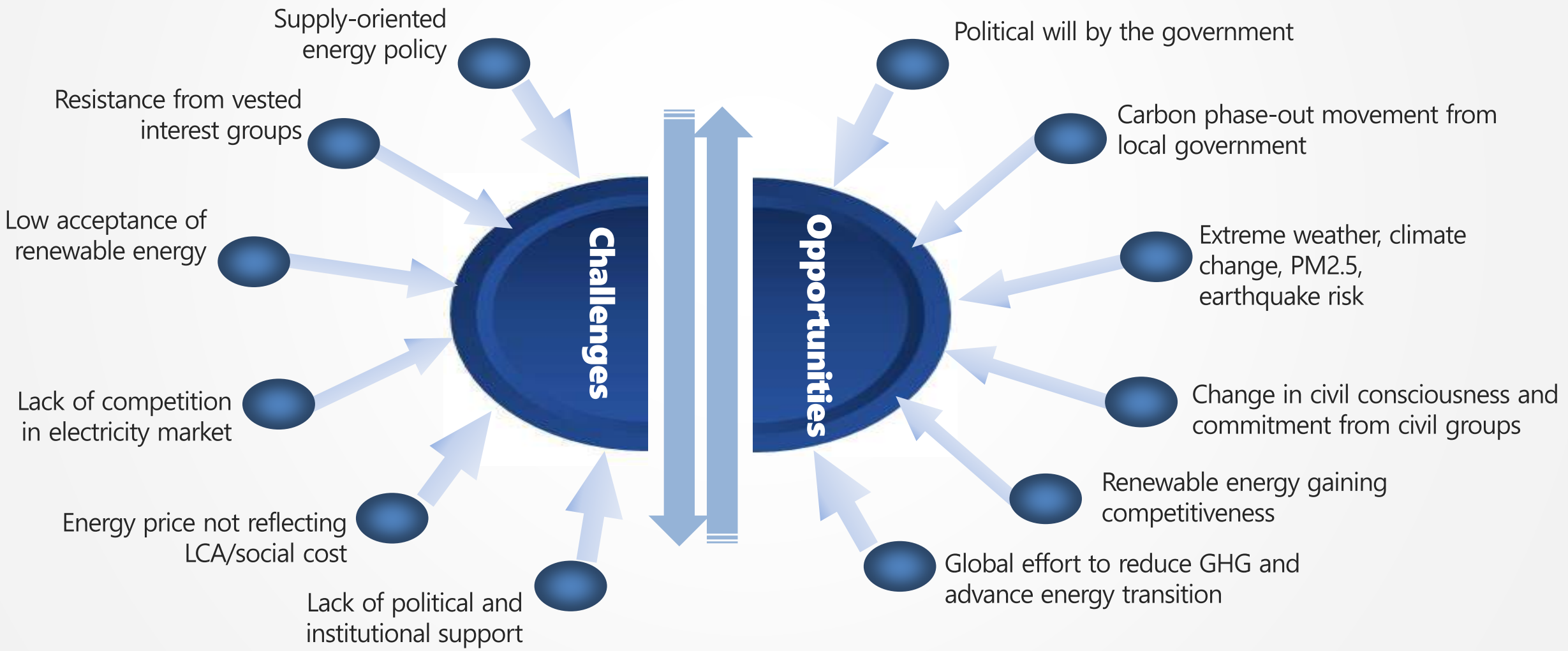
Renewable energy share



GHG emission reduction



Challenges and Opportunities for Energy Transition in Korea



기후행동 컨퍼런스 2018

CLIMATE ACTION CONFERENCE 2018

[Session II]

Accelerating energy transition in align with Paris Agreement (1.5℃)

Presentation II

What does TCFD mean for Korean Companies to be sustainable?

Sungwoo Kim

(Head of Environment & Energy Research Institute, Kim & Jang)

주최 WWF citi 후원 산업통상자원부 Ministry of Trade, Industry and Energy 환경부 Ministry of Environment 외교부 Ministry of Foreign Affairs 한국에너지공단 KOREA ENERGY AGENCY

For WWF & Citi's Climate Action Conf. 2018

What does TCFD mean for Korean Companies?

October 10, 2018

KIM & CHANG

New Demand for Carbon by

Government	NGO	Investor
Carbon Pricing, 58%	RE100	Stranded Assets, $2.2B

New Demand for Carbon by

Government	NGO	Investor
Carbon Pricing, 58%	RE100	**Stranded Assets, $2.2B**

Last month…

ING to assess $600bn loan portfolio based on climate impact

Dutch lender becomes first big bank to adopt policy pressing clients to meet Paris goals

Some observers have linked the recent wild fires in California to climate change © Reuters

Leslie Hook in San Francisco SEPTEMBER 17, 2018 14

ING, the Dutch bank, will start assessing its $600bn lending portfolio based on climate impact, a first step in shifting the entire portfolio to align with the emissions reductions required by the Paris climate agreement.

The policy, the first of its kind for a big bank, will include putting pressure on clients whose businesses do not conform with the climate goals of the agreement.

"We will try to look at the entire portfolio and make sure that over time it aligns with Paris," Isabel Fernandez, head of wholesale banking, said.

Source: Financial Times, Sep 17, 2018

joins

≡ 중앙일보 **경제**

경제일반 세테크 증권 부동산 IT/과학 경제칼럼

공무원연금공단, 국내 연기금 최초 탄소정보공개 프로젝트 가입

GEPS, First Korean Pension Funds to Join CDP

【서울=뉴시스】 김정호 기자 = 공무원연금공단은 국내 연기금 최초로 탄소정보공개 프로젝트(CDP·Carbon Disclosure Project)에 가입했다고 17일 밝혔다.

* CDP runs the global disclosure system for investors to manage their environmental impacts.

Source: Joongang Daily, Sep 17, 2018

CONTENTS

I. TCFD?

Background & Mission

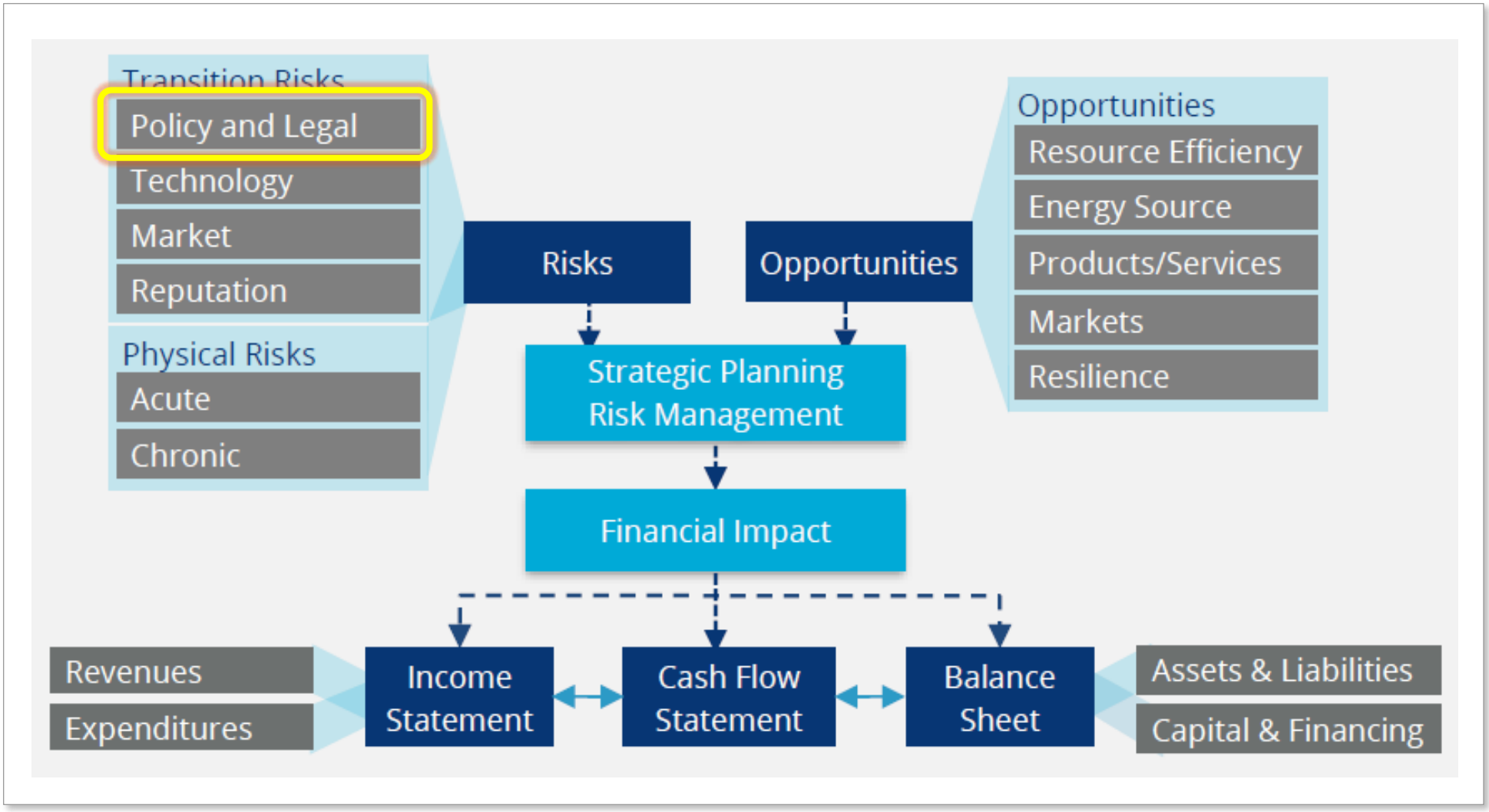
Following a request from G20 Finance Ministers and Central Bank Governors, in **December 2015**, the Financial Stability Board established the Task Force on Climate-related Financial Disclosures ("**TCFD**") to

- Promote more informed investment, credit, and insurance underwriting decisions; and
- Enable stakeholders to understand better the concentrations of carbon-related assets in the financial sector and the financial system's exposures to climate-related risks.

> *"Increasing transparency makes markets more efficient, and economics more stable and resilient."*
>
> *– Michael R. Bloomberg, Chair*

❖ Recognizing impacts of climate change on finance, the **Bank of Korea** published an article on June 28, 2018, which analyzed physical and transition risks associated with climate change.

Focus on Financial Impacts



Disclosure Recommendations

Governance

The organization's governance around climate-related risks and opportunities (e.g., **whether the Board of Directors is directly involved**)

Strategy

The actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning (e.g., **how this assessment is incorporated into existing business strategies**)

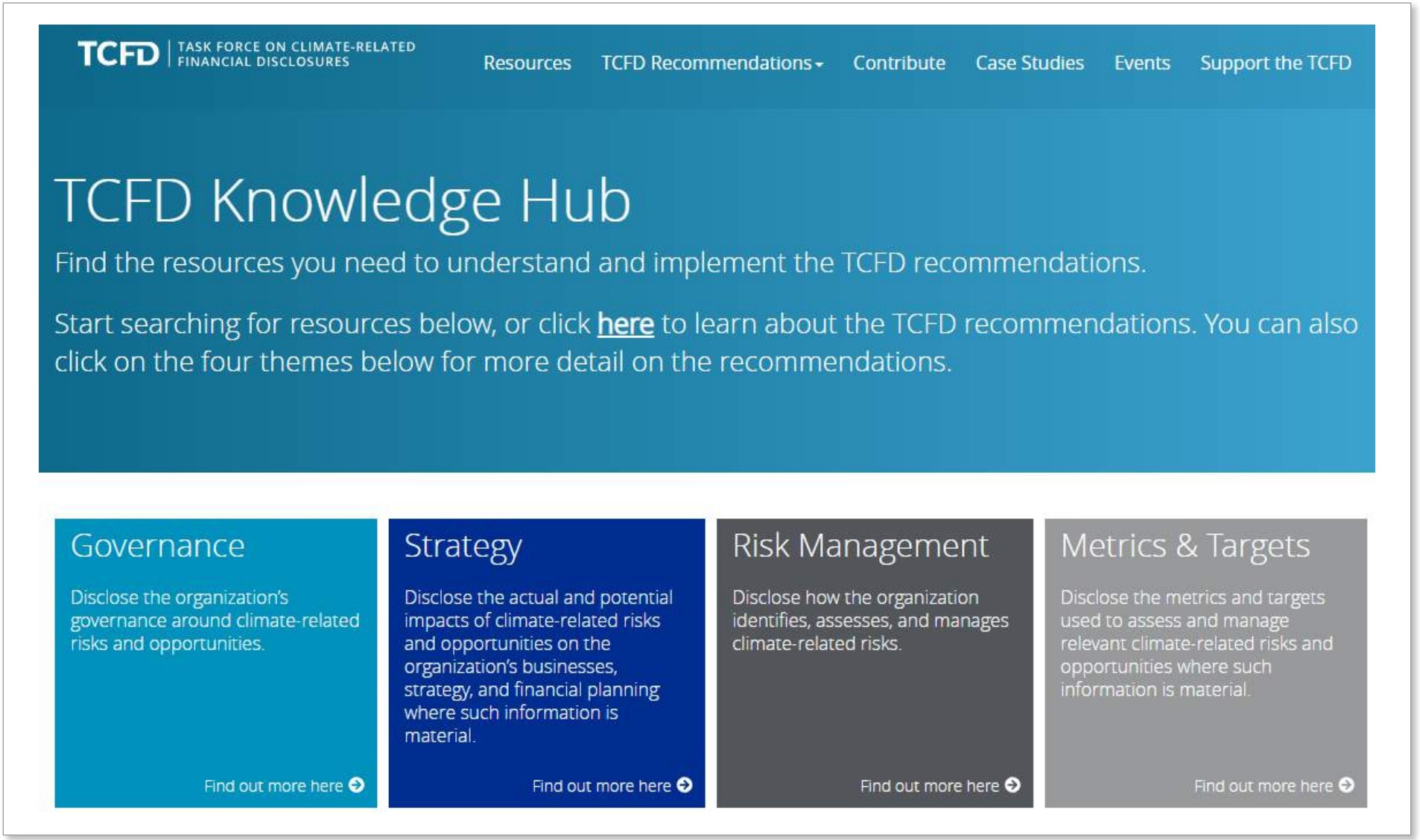
Risk Management

The processes used by the organization to identify, assess, and manage climate-related risks (e.g., **whether proper processes are established**)

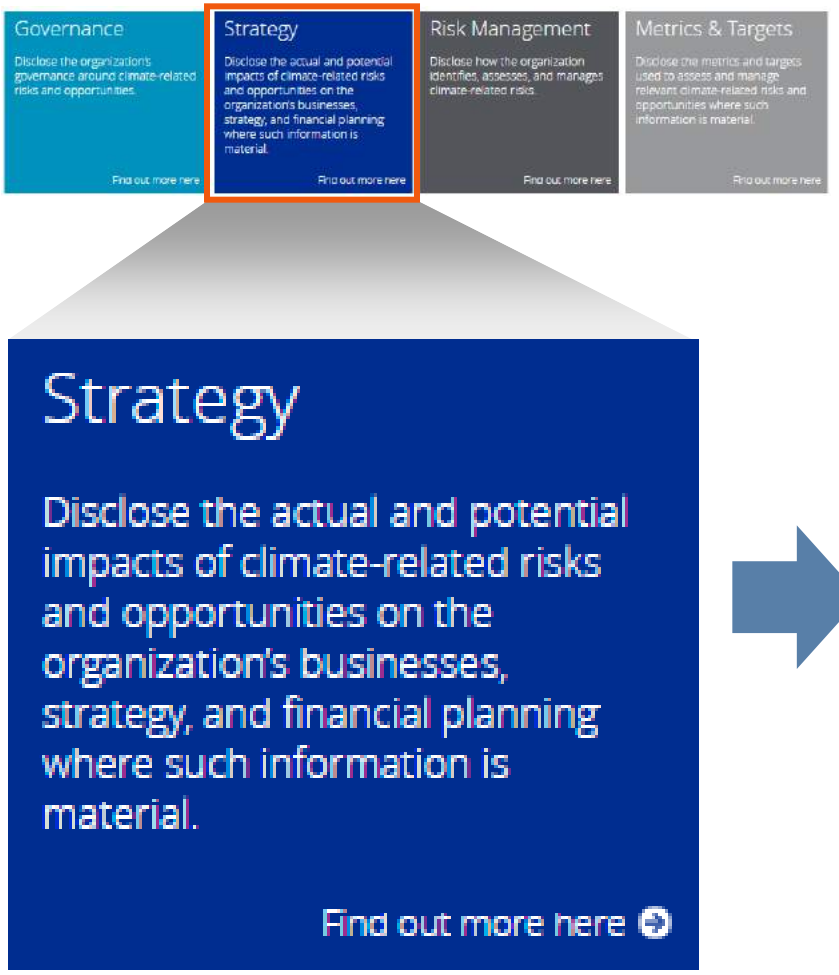
Metrics and Targets

The metrics and targets used to assess and manage relevant climate-related risks and opportunities (e.g., **whether such metrics and targets are influential**)

Knowledge Hub (https://www.tcfdhub.org)



Knowledge Hub (for all sectors)



A) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.

B) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.

C) Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.

Guidance for All Sectors

Organizations should provide the following information:

- a description of what they consider to be the relevant short-, medium-, and long-term time horizons, taking into consideration the useful life of the organization's assets or infrastructure and the fact that climate-related issues often manifest themselves over the medium and longer terms,
- a description of the specific climate-related issues for each time horizon (short, medium, and long term) that could have a material financial impact on the organization, and
- a description of the process(es) used to determine which risks and opportunities could have a material financial impact on the organization.

Organizations should consider providing a description of their risks and opportunities by sector and/or geography, as appropriate. In describing climate-related issues, organizations should refer to Tables 1 and 2.

Building on recommended disclosure (a), organizations should discuss how identified climate-related issues have affected their businesses, strategy, and financial planning.

Organizations should consider including the impact on their businesses and strategy in the following areas:

- Products and services
- Supply chain and/or value chain
- Adaptation and mitigation activities
- Investment in research and development
- Operations (including types of operations and location of facilities)

Organizations should describe how climate-related issues serve as an input to their financial planning process, the time period(s) used, and how these risks and opportunities are prioritized. Organizations' disclosures should reflect a holistic picture of the interdependencies among the factors that affect their ability to create value over time. Organizations should also consider including in their disclosures the impact on financial planning in the following areas:

- Operating costs and revenues
- Capital expenditures and capital allocation
- Acquisitions or divestments
- Access to capital

If climate-related scenarios were used to inform the organization's strategy and financial planning, such scenarios should be described.

Organizations should describe how resilient their strategies are to climate-related risks and opportunities, taking into consideration a transition to a lower-carbon economy consistent with a 2°C or lower scenario and, where relevant to the organization, scenarios consistent with increased physical climate-related risks.

Organizations should consider discussing:

- where they believe their strategies may be affected by climate-related risks and opportunities;
- how their strategies might change to address such potential risks and opportunities; and
- the climate-related scenarios and associated time horizon(s) considered.

Refer to Section D of the Final Report for information on applying scenarios to forward-looking analysis.

Knowledge Hub (for a sector)

For Banks

Banks should describe significant concentrations of credit exposure to carbon-related assets. Additionally, banks should consider disclosing their climate-related risks (transition and physical) in their lending and other financial intermediary business activities.

For Non-Financial Groups

Organizations should consider discussing how climate-related risks and opportunities are integrated into their (1) current decision making and (2) strategy formulation, including planning assumptions and objectives around climate change mitigation, adaptation, or opportunities

TCFD Knowledge Hub (Archive)

Search the database

Recommendation

Resource Type

- Legislation / Regulation
- Framework / Standard
- Guidance / Tool
- Research / Insights
- Webinar (recording)

Country

Industry Groups

- Financial
- Non-Financial

Article name & author

A4S Essential Guide to Enhanci
Author: The Prince's Accounting for
Industry Group: All Industry Groups
Read more

A4S Essential Guide to Managi
Author: The Prince's Accounting for
Industry Group: All Industry Groups
Read more

A4S Essential Guide to Strategi
Author: The Prince's Accounting for
Industry Group: All Industry Groups
Read more

ACSI Governance Guidelines: A
Australian companies
Author: Australian Council of Super
Industry Group: All Industry Groups
Read more

Case Studies

Search through the case studies to learn more about how organizations are using the TCFD recommendations.

- AP2's climate report based on TCFD's recommendations – The Second Swedish National Pension Fund (G, S, R, M)
- Collaborating and communicating climate risk – Landsec (S)
- Reporting on 2 and 4 degree scenarios analysis – Unilever (S, R)

A4S ESSENTIAL GUIDE SERIES: ENHANCING INVESTOR ENGAGEMENT

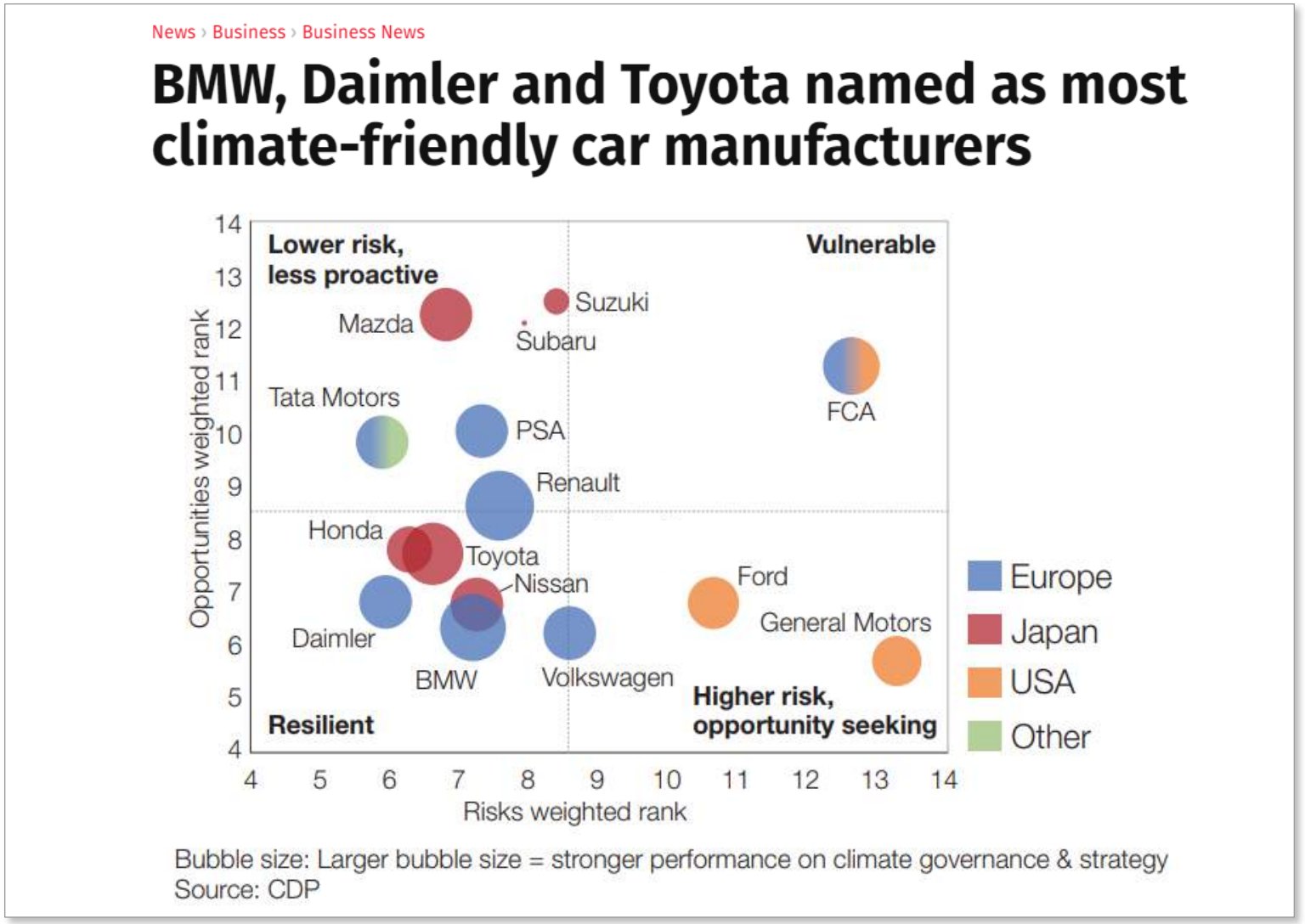
Acceptability + Implementability

While climate change affects nearly all economic sectors, the level of exposure and the impact of climate-related risks differ by **sector**, **industry**, **geography**, and **organization**.

Furthermore, the financial impacts of climate-related issues on each business are not always clear because of

- Limited knowledge of climate-related issues within business;
- Tendency to focus mainly on short-term risks without paying adequate attention to risks that may arise in a long term; and
- Difficulties in quantifying climate-related risks.
  - ✓ In Korea, all climate-related tasks are generally done by a designated team within company. Also, the issues are rarely reflected to corporate strategy.

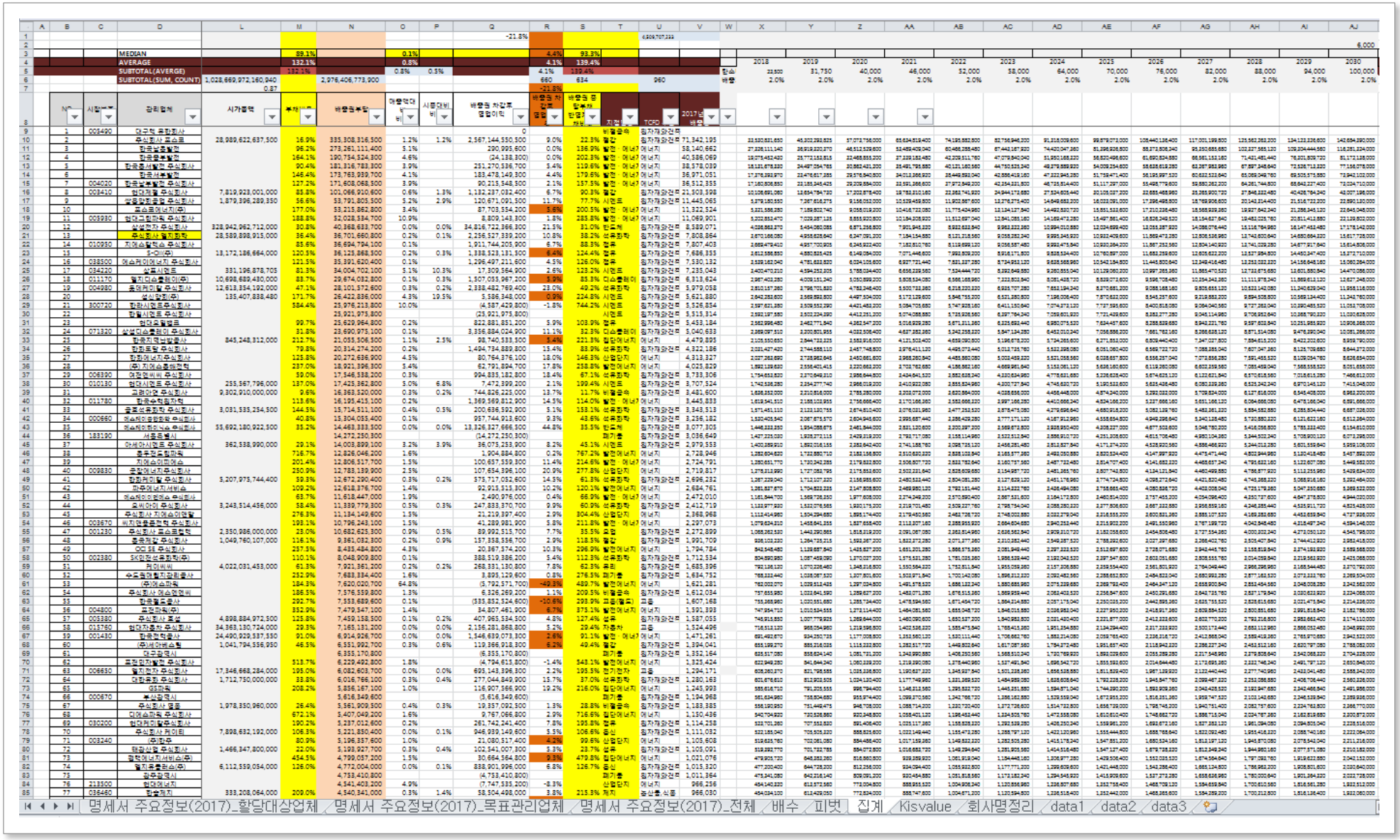
Actual Application - Auto



Source: Independent, 2018

II. Financial Impact

Simulation Illustrative

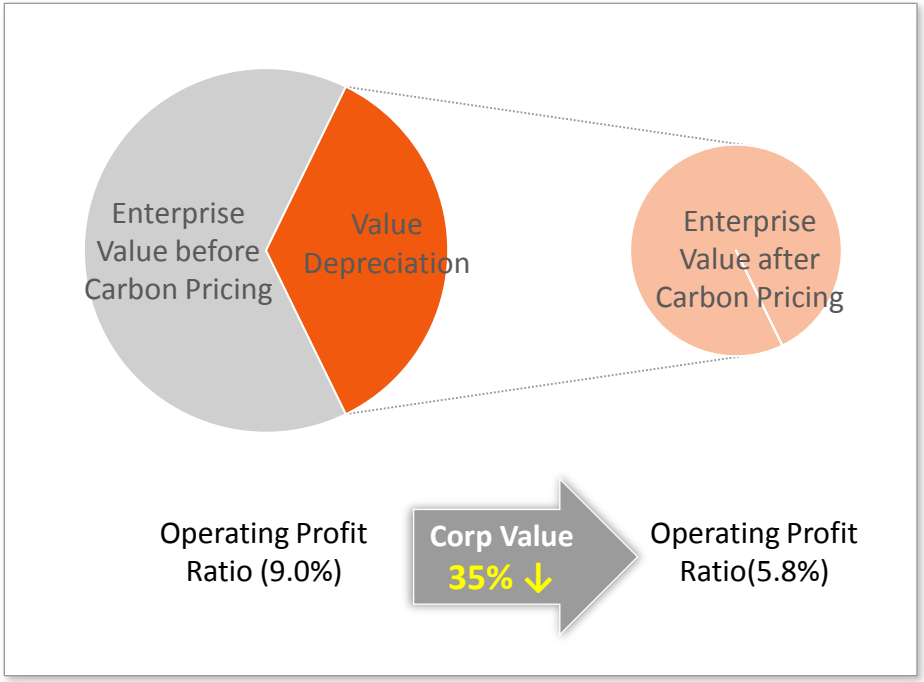


Financial Impact by TCFD's sector criteria

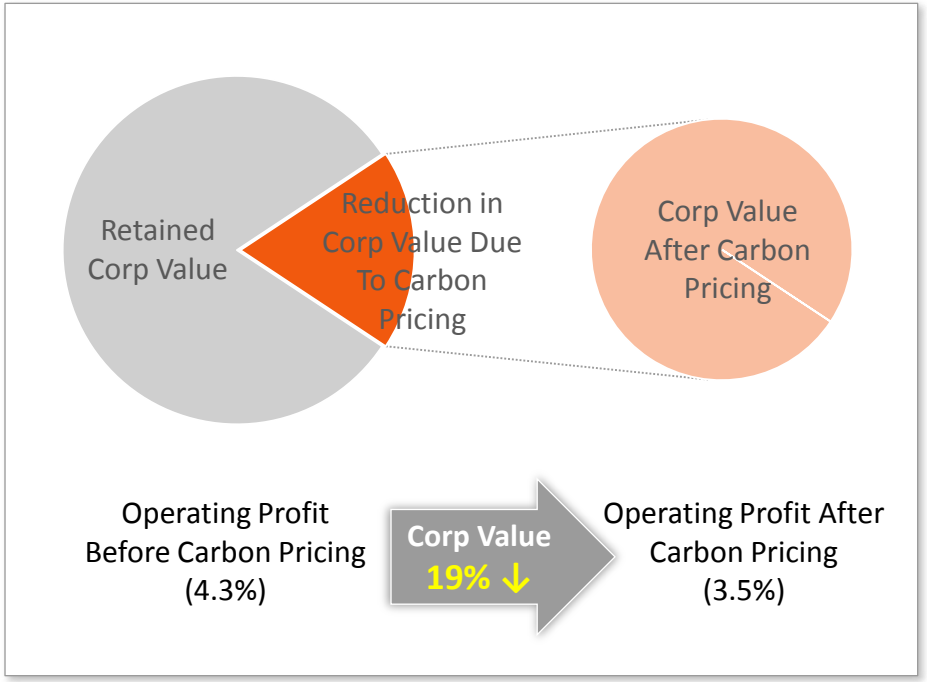
Sector	Energy	Transportation	Materials & Buildings	Agriculture, Food & Forest Products
Industries	• Oil & gas • Coal • Electric utilities	• Air freight • Passenger air transportation • Maritime transportation • Rail transportation • Trucking services • Automobiles & components	• Metals & mining • Chemicals • Construction materials • Capital goods • Real estate management & development	• Beverages • Agriculture • Packaged foods & meats • Paper & forest products
No. of affected companies/businesses (whose financial information is available via search system)	**53**	**162**	**344**	**74**
Total cost of emissions reduction (20%)*	**KRW 1,354.3 billion**	**KRW 97.8 billion**	**KRW 1,308.2 billion**	**KRW 50.3 billion**
Ratio of emissions reduction cost to sales	**3.2%**	**0.1%**	**0.8%**	**0.3%**
Average cost of emissions reduction by company	**KRW 25.6 billion**	**KRW 0.6 billion**	**KRW 3.8 billion**	**KRW 0.7 billion**
Expected reduction in corporate value per company	**KRW 120-260 billion**	**KRW 10 billion or less**	**KRW 19-39 billion**	**KRW 10 billion or less**
Effect on operating margin (reduction rate)	**9.0% → 5.8%** **(-35.3%)**	**4.6% → 4.5%** **(-2.7%)**	**4.3% → 3.5%** **(-19.4%)**	**4.8% → 4.4%** **(-6.8%)**

Impact on Profit and Corporate Value

Energy Sector



Materials & Buildings Sector



Reduction in permitted carbon emissions is expected to greatly affect the energy sector and materials & buildings sector

Disclosure Regulations

Category	Enforcement Procedures for the Regulations on Public Disclosure on the Securities Market	Regulations on the Issuance and Disclosure of Securities, etc.	Environmental Technology and Industry Support Act	Framework Act on Low Carbon, Green Growth
Whether compulsory	Voluntary disclosure	Compulsory	Compulsory	Compulsory
Companies subject to disclosure	Companies listed on the securities market	Among companies required to submit annual business reports, companies subject to management under the Framework Act on Low Carbon, Green Growth, companies certified for green technology/industry and green companies under the Environmental Technology and Industry Support Act	Green companies under the Environmental Technology and Industry Support Act, public institutions prescribed by Presidential Decree and companies having significant environmental effects	Companies subject to management under the Framework Act on Low Carbon, Green Growth
Matters to be disclosed	Matter related to information on green management	Matters regarding designation and removal of companies subject to management, matters regarding GHG emissions and energy use, certified matters regarding green technology/industry, and matters regarding designation of green companies	1. Goals and major action plans for environment protection, resource saving, pollutant emissions reduction, etc. 2. Matters regarding development and utilization of products/services for environmental management 3. Matters regarding results of environmental management 4. Matters regarding green management under Article 2(7) of the Framework Act on Low Carbon, Green Growth	GHG emissions status, energy use, etc.
Disclosure via	DART, securities information terminal and securities market magazines	Annual business report (DART)	Environmental information disclosure and verification system	Website of relevant authority for each sector or the central integrated GHG information management system
Limits	**Only few cases of disclosure as disclosure is voluntary; not applicable to unlisted companies**	**Difficult to estimate risks for companies simply based on GHG emissions information.**	**Disclosure media are not well known to general users of disclosed financial information (shareholders, creditors, regulatory authorities, etc.). Difficult to convert into monetary value**	

Gap analysis - TCFD Recommendation vs. the Best

GSRM	TCFD Recommendations	Best Case in Korea		Considerations
		Company A	Company B	
Governance	• a. Describe the board's oversight	-	-	• The board's responsibilities should be specified • Internal reporting lines must be established.
	• b. Describe management's role in assessing and managing risks and opportunities.	• Company-wide energy committee	• Environmental management committee	
Strategy	• a. Describe risks and opportunities identified over the short, medium, and long term.	• Review of short-term financial/product manufacture risks and expand business portfolio through medium/long term R&D		• Need medium-long term strategic approach • Need to establish detailed scenarios and review financial modeling methods, etc
	• b. Describe the impacts on the businesses, strategy, and financial planning.	• Establishment of counterstrategies in relation to carbon credits	• Energy & environment business office established management counterstrategies against climate change.	
	• c. Describe the organization's resilience	-	-	
Risk Management	• a. Describe processes for identifying and assessing climate-related risks.	• Operation of internal systems such as continuous monitoring		• Need risk management system reflecting climate change in the medium/long term • Need to review modifying the organization's structure
	• b. Describe processes for managing climate-related risks.	• Explanation of the organization's process by dividing it into visions, goals, missions, key challenges and relevant fields	• Identify risks and opportunities : report to environmental and company-wide management committees	
	• c. Describe how above processes are integrated into the overall risk management.	-	-	
Metrics & Targets	• Disclose the metrics used to assess climate-related risks and opportunities	• Establish target of reducing GHG by 23% from BAU by 2020	• Continuously manage CO2 emissions per ton of products	• Need to secure in advance expertise to assess feasibility and appropriateness of the metrics • Need for a new compensation system for assessment of climate-related performance
	• b. Disclose Scope 1, Scope 2 (and Scope 3 GHG emissions) and related risks.	• Disclose		
	• C. Describe the targets used and performance against targets.	• Establish target of reducing GHG by 23% from BAU by 2020	• Establish target of reducing GHG per ton generated from factories by 9% compared to 2007-2009 average by 2020	

III. Suggestions

Takeaways (1/2)

- **As the demand** for financial institutions and companies to disclose their counterstrategies against climate change is becoming **more specific and urgent**, financial institutions and companies need to **set priorities differently from the past**.
- While the recommendations from the global gurus of **TCFD under G20 must be used** as a foundation for financial institutions and companies to establish countermeasures, they **must be customized depending on country/industry/organization**.
- Korea is the second country to introduce the **emission trading scheme**, and it is expected **to cause decrease in operating profit and corporate value** of all covered Korean companies in a greater or less degree.
- **As environment-related disclosures in Korea are mostly voluntary**, neither the disclosed **information nor the number of companies making disclosure is sufficient**. Information disclosed in sustainability reports is **not standardized** and therefore does not serve as an objective standard to assess risks and opportunities.
- In Korean financial institutions or companies, countermeasures against climate change are either **only handled by a single department or neglected by the board** even though they should be an organization-wide issue.

Takeaways (2/2)

Therefore, each organization needs to take following measures:

- **Establish governance, strategies, risk management and targets** not limited to one-time projects but **covering a longer term** based on the recommendations/methods of TCFD
- Establish an internal countermeasure process **engaging the entire organization** rather than a single department
- Improve discussions by **specifying R&R of the board and management**, and divide R&R by internal working-level department
- Secure a continuous management system by **connecting achievements to a proper compensation** system
- Provide **consistent training to employers/employees** to improve their awareness of climate change including changes in external environments/demands of interested parties
- **Disclose relevant achievements** through sustainability reports and other various global initiatives **as part of shareholder engagement**
- Implement the foregoing after **customizing them based on the organization's own statusg**

Thank you

KIM & CHANG

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기후행동 컨퍼런스 2018

CLIMATE ACTION CONFERENCE 2018

[Session II]

Accelerating energy transition in align with Paris Agreement (1.5℃)

Panel Discussion

Moderator Byung-Wook Lee (Professor, Graduate school of Public Policy, Sejong University)

Panel Jung Mee Lee (Senior Director, Conservation & Partnership WWF-Korea)

Jee-Young Kim (Senior Professional, Environment, Health & Safety Center, Samsung Electronics)

Joojin Kim (Managing Director, Solutions For Our Climate)

주최 WWF citi 후원 산업통상자원부 Ministry of Trade, Industry and Energy 환경부 Ministry of Environment 외교부 Ministry of Foreign Affairs 한국에너지공단 KOREA ENERGY AGENCY

Renewable Energy Buyers Alliance

- Improving Access to Renewable Energy around the world & Increasing the Impact of Renewable Energy Sourcing -

JungMee Lee

Senior Director
Conservation & Partnership
WWF Korea

REBA
Renewable Energy Buyers Alliance

We power the corporate movement toward renewable energy.

October 10th, 2018

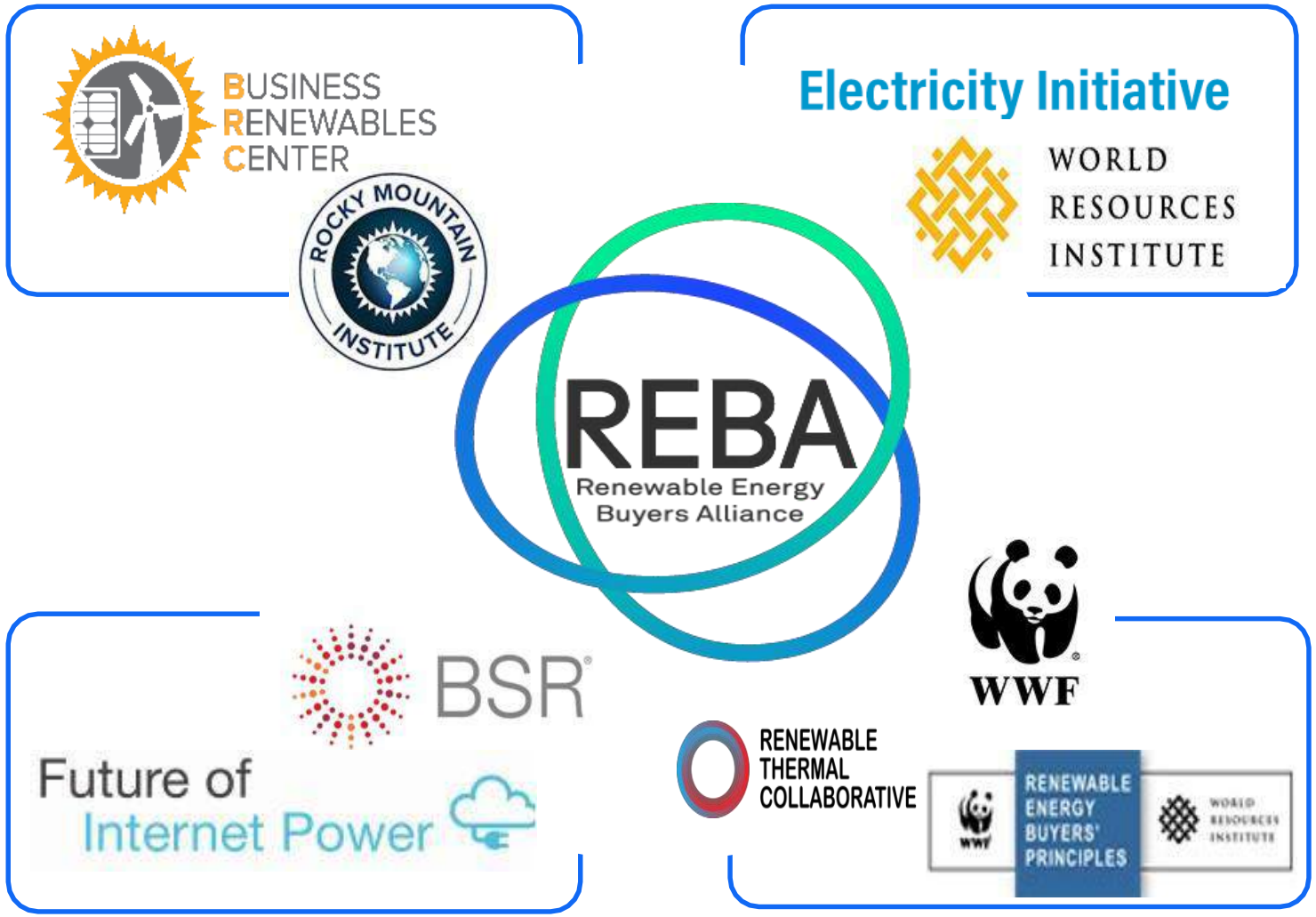
Renewable Energy Buyers Alliance

Goal to deploy 60 GW from voluntary buyers by 2025

REBA : coalition of NGOs that grows large buyer demand for clean energy

The four REBA initiatives :

- WWF's **Renewable Energy Buyers' Principles**
- Business for Social Responsibility's **Future of Internet Power**
- the Rocky Mountain Institute's **Business Renewables Center**
- World Resources Institute's **Electricity Initiative**



Renewable Energy Buyers Principle

Buyers' Principles on facilitation of WWF and WRI :
1) spur progress on RE and 2) add perspective to the future of the U.S. energy and electricity system

The Principles launched in July 2014 with 12 signatories, 8.4 million MWh of RE by 2020
As of June 2018, 75 companies have signed on, over 69 million MWh annually by 2020

1. Greater choice in procurement options,
2. More access to cost competitive options,
3. Longer- and variable-term contracts,
4. Access to new projects that reduce emissions beyond BAU,
5. Increased access to third-party financing vehicles as well as standardized and simplified processes, contracts and financing for renewable energy projects
6. Opportunities to work with utilities and regulators to expand our choices for buying renewable energy

CORPORATE RENEWABLE ENERGY BUYERS' PRINCIPLES:
INCREASING ACCESS TO RENEWABLE ENERGY

74 COMPANIES

67 MILLION MWH OF DEMAND FOR RENEWABLE ENERGY

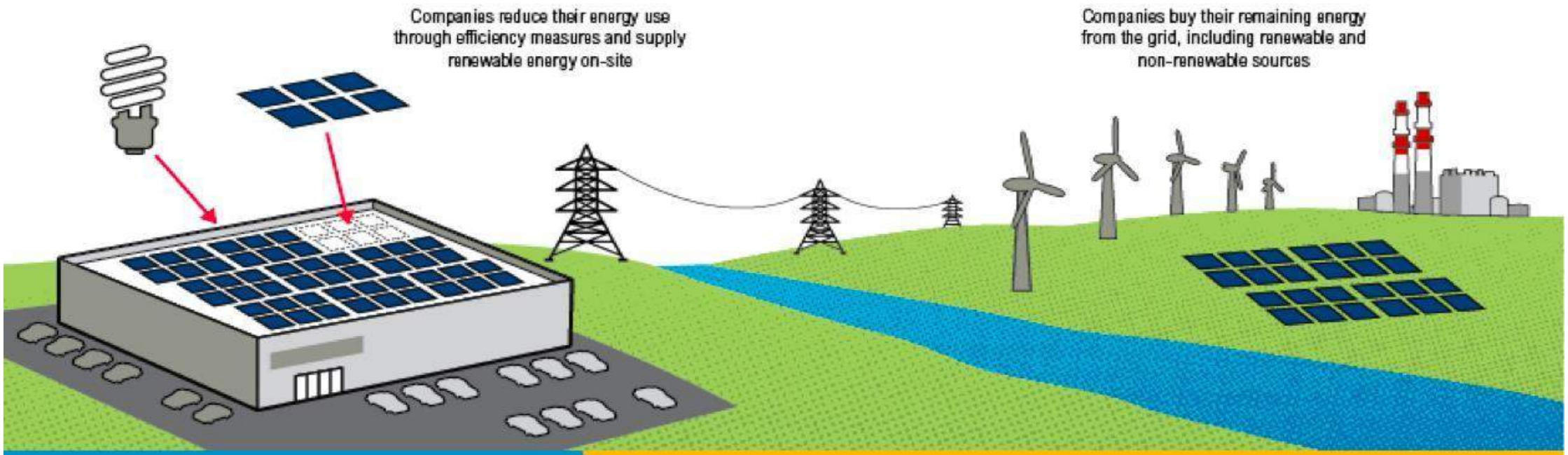
$7 TRILLION IN MARKET CAP

Bloomberg · BD · Sprint · ebay · VOLVO · Etsy · Microsoft · Berry · AMD · HILTON WORLDWIDE · 3M · TD · vf · ARUP · Hewlett Packard Enterprise · P&G · Gap Inc. · EQUINIX · vmware · VISA · Nestlé Good Food, Good Life · novo nordisk · Adobe · DIGITAL REALTY · STAPLES · adidas GROUP · Walmart · Akamai FASTER FORWARD · AT&T · workday · LOCKHEED MARTIN · MARS · REI · Johnson & Johnson · DELL · salesforce · YAHOO! · DUPONT · amazon · starwood Hotels and Resorts · IKEA · KAISER PERMANENTE · AUTODESK · Kellogg's · Genentech A Member of the Roche Group · Sealed Air Re-imagine · Kimberly-Clark · io · McCORMICK · CISCO · intel · AVERY DENNISON · TARGET · GM · LinkedIn · PEPSICO · Unilever · H&M · IRON MOUNTAIN · COX ENTERPRISES · Marriott INTERNATIONAL · Symantec · SPROUTS FARMERS MARKET · ORACLE · Saunders Hotel Group · Google · switch · ADITYA BIRLA NOVELIS · intuit · PCC COMMUNITY MARKETS · hp

RENEWABLE ENERGY BUYERS' PRINCIPLES

www.buyersprinciples.org

Why Utilities?



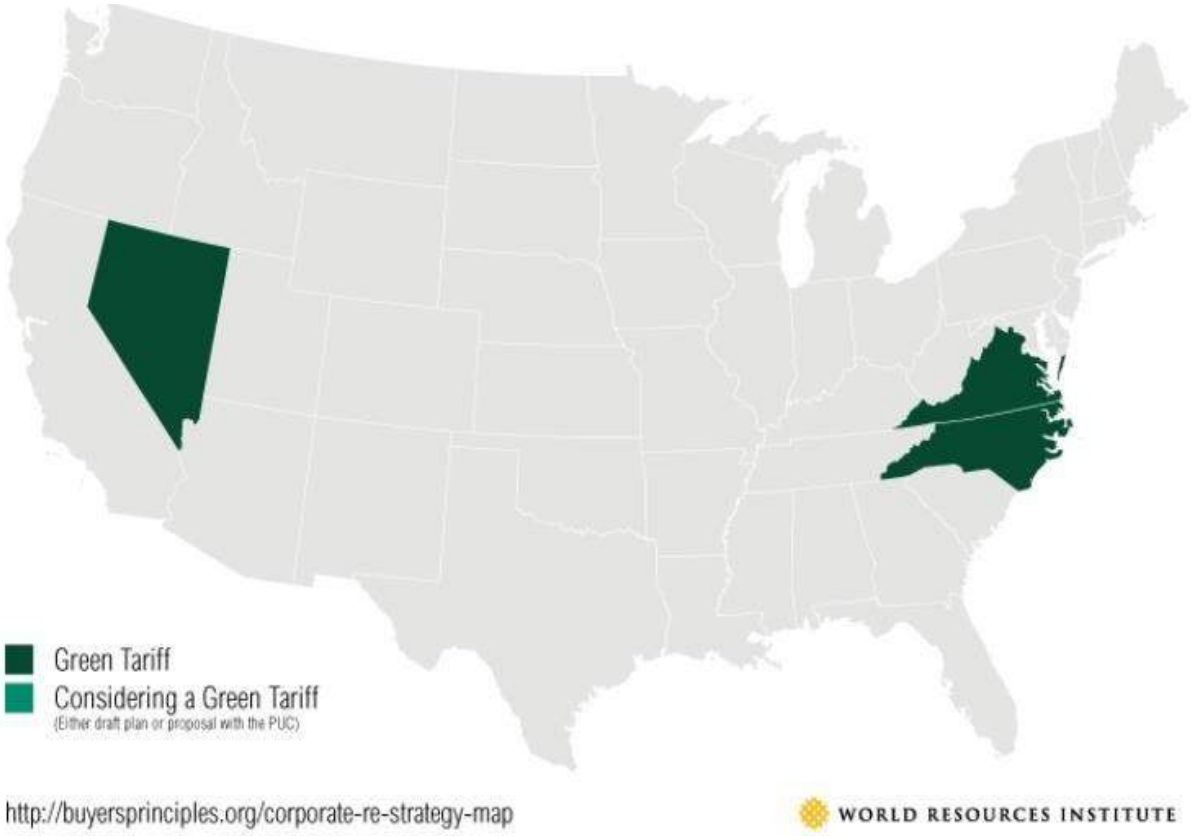
30% Even the most energy-efficient big box stores can only supply 30% of their electricity on-site with rooftop solar energy; data centers, for example, can self-supply far less.

70% The remaining 70% of renewable energy needs must be delivered through the grid. Today, many companies have no way to choose renewable energy options from the grid, whether through their local utility or other generators.

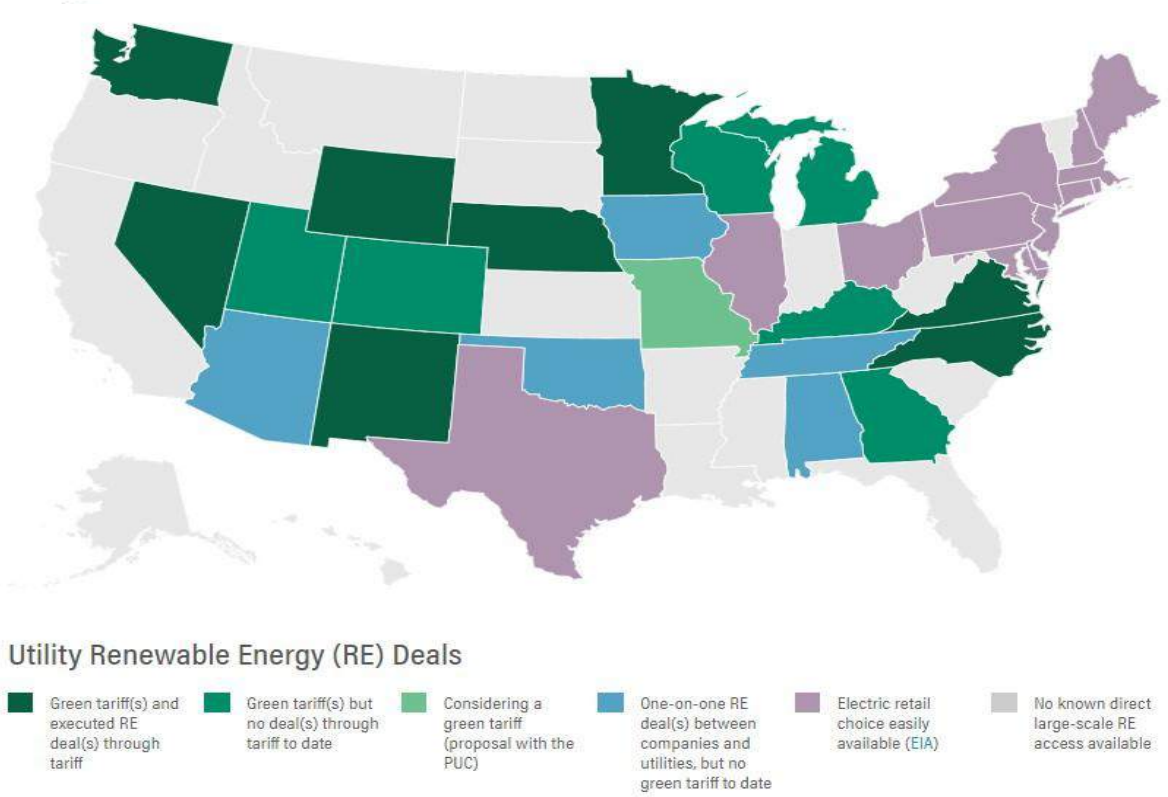
Driving Beyond Green Tariffs in Regulated Markets

WRI Launched Clean Power Council in September, 2017

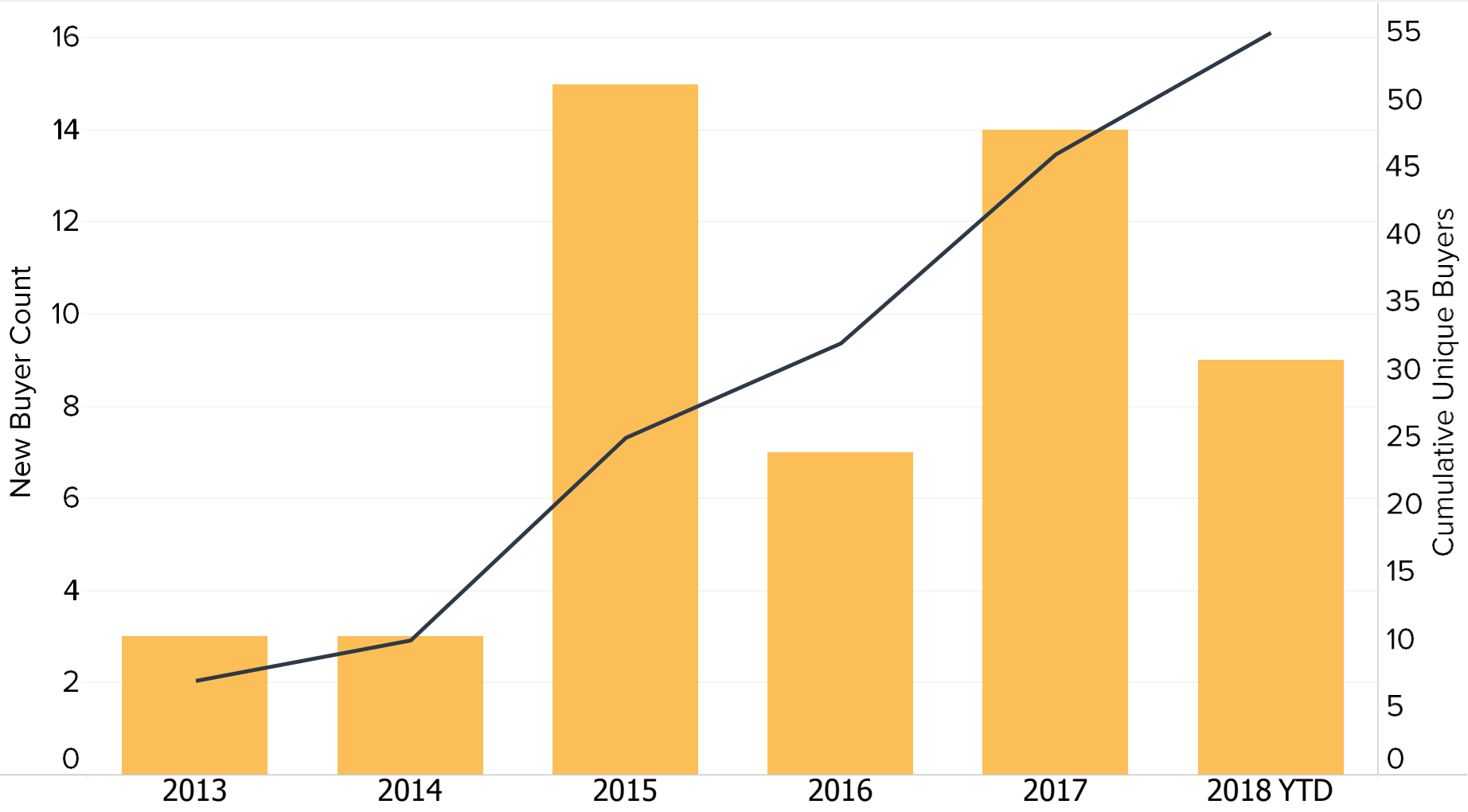
Year 2013



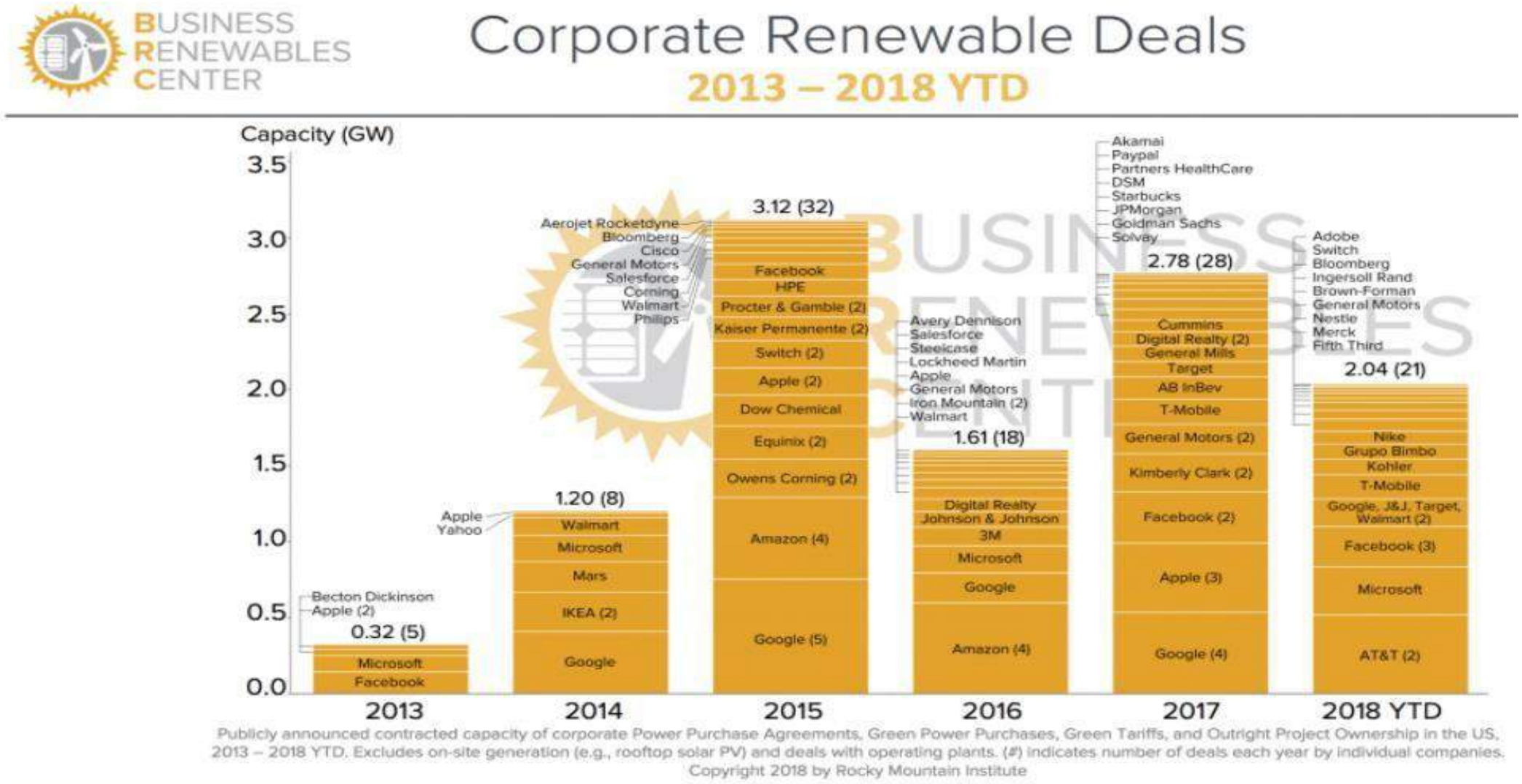
Now……



Market Expansion: New Buyers



Lay of the Land: 11 GW of corporate deals now



Publicly announced contracted capacity of corporate Power Purchase Agreements, Green Power Purchases, Green Tariffs, and Outright Project Ownership in the US, 2013 – 2018 YTD. Excludes on-site generation (e.g., rooftop solar PV) and deals with operating plants. (#) indicates number of deals each year by individual companies.

Just The Past 5 Years: 2013-2018

51 new buyers joined the market — 10x growth vs. 2008-'13

BUSINESS RENEWABLES CENTER
A ROCKY MOUNTAIN INSTITUTE INITIATIVE

Raise awareness

- Increasing understanding
- Providing balanced view
- Supporting buyer-internal case

Build community

- 214 members, inc. 117 buyers
- Active member networking
- Community meets semi-annually

Develop tools and resources

- Primers, guides, templates and case studies
- In-person training sessions
- Market place of developers and projects

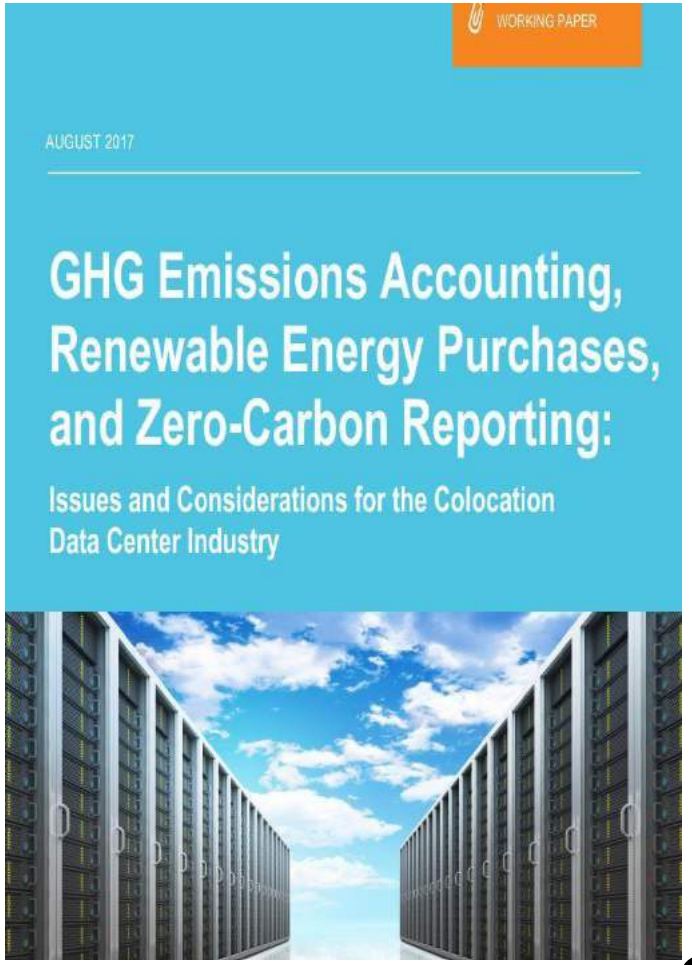
Future of Internet Power

Vision: An internet powered by 100% renewable energy

- Started as 4 tech companies to now **13** members across industry sectors.
- **best practices** in deploying renewables at colocation data center
- Launched **Corporate Colocation and Cloud Buyers' Principles**

BSR | Future of Internet Power

Adobe · Akamai · AUTODESK · Time Warner Cable · ebay · Hewlett Packard Enterprise · vmware · Symantec · salesforce · workday. · Bank of America · ca technologies



RENEWABLE THERMAL COLLABORATIVE

A project of REBA Renewable Energy Buyers Alliance

Founding Members:

L'ORÉAL

P&G

MARS

GM

Kimberly-Clark

City of Philadelphia

Cargill

Heating & Cooling

A Climate Challenge

50% OF GLOBAL
final energy is comprised of energy used for heating and cooling

39% OF GHG
emissions from energy-related sources can be attributed to heating and cooling.

$270 BILLION
amount heating and cooling cost in the United States annually.

WWF

WWF – An International Network

Over 100 offices in 60 countries

Growing Climate Business Engagement across the network

Priority focus on scaling corporate demand for and access to renewables to drive transition

Priority Markets: Mexico, India, China

Ongoing work: Australia

Emerging work: Western Europe, South East Asia

Emerging focus: Renewable supply chain

Progress on REBA Mexico

WWF playing a central convening role;

creating a "center of gravity" for business

Navigating the market post-reforms

Certificate obligations beginning in January

Similar to REBA -US model

- Benchmarking and business case - identifying companies that are most likely to obtain benefits from sourcing RE;
- Benefits and risks of different sourcing options - Sourcing Guide
- Buyer's Roadmap
- Guides and personalized technical assistance
- Bootcamps - Training sessions with experienced buyers, developers, suppliers, experts and regulators + Webinar
- Access to RE providers and experts
- REBA Summit

Progress on REBA India

- WWF & CII focus energy intensive sectors first
- Buyers first and then regulators, policy-makers, DISCOMs
- Identifying companies with energy intensity and readiness
- Buyers' Day – buyers only discussions : challenges, opportunities, buyers principles, capacity and training needs, etc..
- One annual "Summit" event to bring together the industry and unify the learnings of the year

Progress on REBA China

- **WWF paying the coordinator role.**
- **Build Awareness on motivation, options and available resources**
- **Policy advocacy to enable corporate renewable purchasing**
- **Facilitate communication by stakeholders** (buyers, sellers, grid, NGOs)

Workshop

- With Swedish Embassy and H&M to build capacity & facilitate best practice sharing
- With APPLE to identify demand from international brands and their Chinese suppliers , and to jointly advocate for policy improvement

Guidebook/tools

- Distributed Photovoltaic Project Development Guideline for Corporations

Institutional network

- Green Electricity Consumption Cooperation Organization
- China Renewable Energy Buyer's Working group(with WRI China & RMI China) under GECCO

中国可再生能源学会风能专业委员会
（中国风能协会）
CHINESE WIND ENERGY ASSOCIATION
水电水利规划设计总院
China Renewable Energy Engineering Institute
能源基金会（中国）
国家可再生能源中心
CHINA NATIONAL RENEWABLE ENERGY CENTRE
落基山研究所
气候组织
THE CLIMATE GROUP
世界资源研究所
WORLD RESOURCES INSTITUTE
鉴衡认证
CREIA
WWF
wbcsd


Together Possible !!!
© Brad Josephs

SFOC
Solutions for Our Climate

Making Power Prices Right

Solutions for Our Climate

Joojin Kim

October 10, 2018

Ministry of Trade, Industry and Energy's power cost projections (submission to National Assembly dated Sept. 28, 2018)

		Coal	LNG	Renewables	
				PV	Onshore Wind
2030 Korea (KRW/kWh)	Academy of Industrial Organizations	**92.8~ 109.6**	92.9~94.7	**67.9~88.9**	**81.7~106.4**
	KEEI	**100.1**	98.7.1	**66.0~80.3**	**93.2**

	Coal	Natural Gas	Renewables	
			PV	Onshore Wind
2022, US EIA ($/MWh)	**130.1**	**49.0**	**63.2**	**59.1**
2025, UK BEIS (£/MWh)	**136**	**82**	**63**	**61**

Unlike common belief, is coal still a cheap power source?

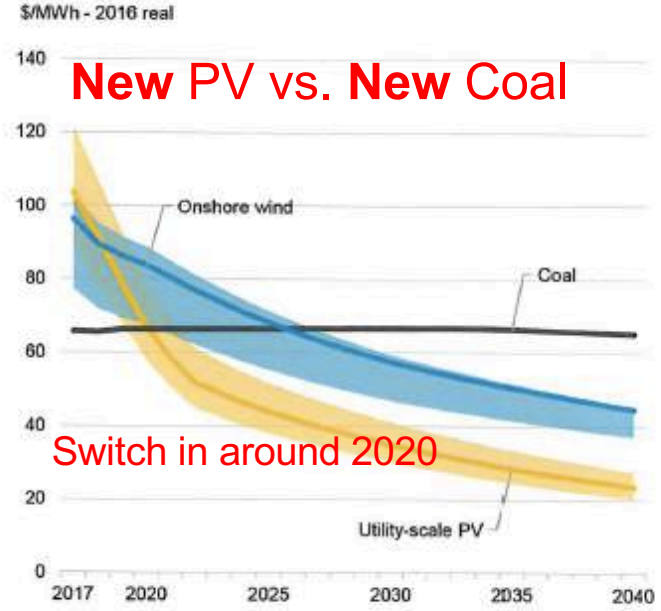
SFOC Solutions for Our Climate

Bloomberg's Analysis of Coal and Renewables in "Korea"
(not the US or the EU, but Korea)

한국
경제성 분석

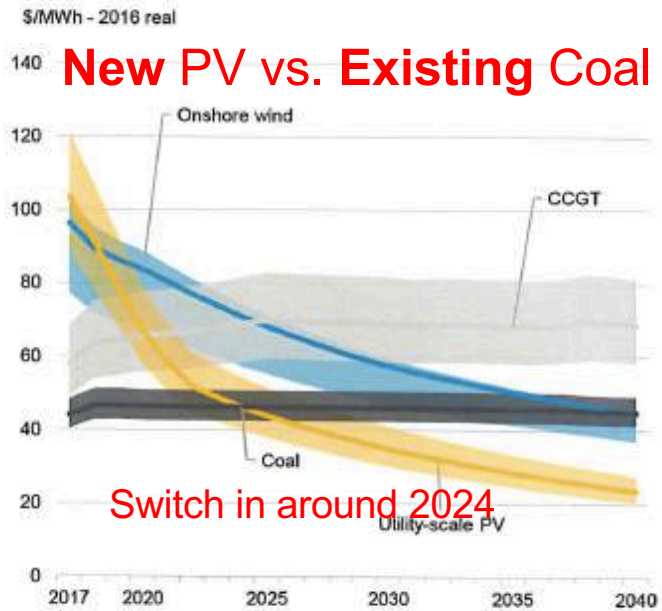
Despite such analysis, Korean policy-makers sometimes believe coal is cheap because of the way coal is priced in the hourly power market

신축 발전소의 균등화 발전원가 (LCOE)
(신재생 에너지 vs 화석연료)



Source: Bloomberg New Energy Finance

신규 신재생 에너지 발전소 비용 vs
기존 화석연료 발전소 한계 발전 비용



Source: Bloomberg New Energy Finance

56 June 26, 2017

Bloomberg
New Energy Finance

Source: Bloomberg New Energy Finance, Presentation made on June 26, 2017 at Westin Chosun Hotel

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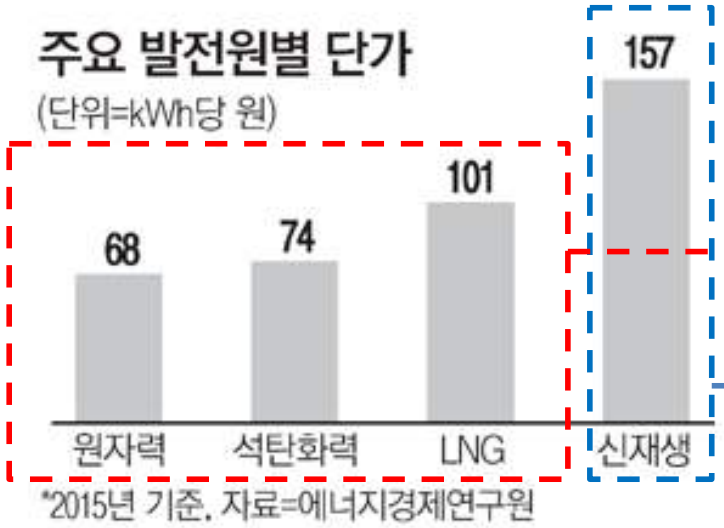
How Power Pricing gets wrong



http://news.mk.co.kr/newsRead.php?sc=30000001&year=2017&no=407835

Coal, nuclear and LNG prices here do not accurately reflect key business risks

Spot price of each electricity source (similar to variable interest rate)

Similar to 15-20 yr. forward price of PV and wind (similar to fixed interest rate)

Risk	Coal, Nuclear	Renewables
Currency Risk	KEPCO (consumer) pays	GENCO pays
Fuel Price Risk	KEPCO (consumer) pays	GENCO pays
Redundancy Risk	KEPCO (consumer) pays (Capacity Payments)	Limited Risk (except for curtailment)
ETS / Climate Risk	KEPCO (consumer) pays	Limited Risk

If coal or nuclear were to enter into 5 year power purchase agreements, would the prices be the same?

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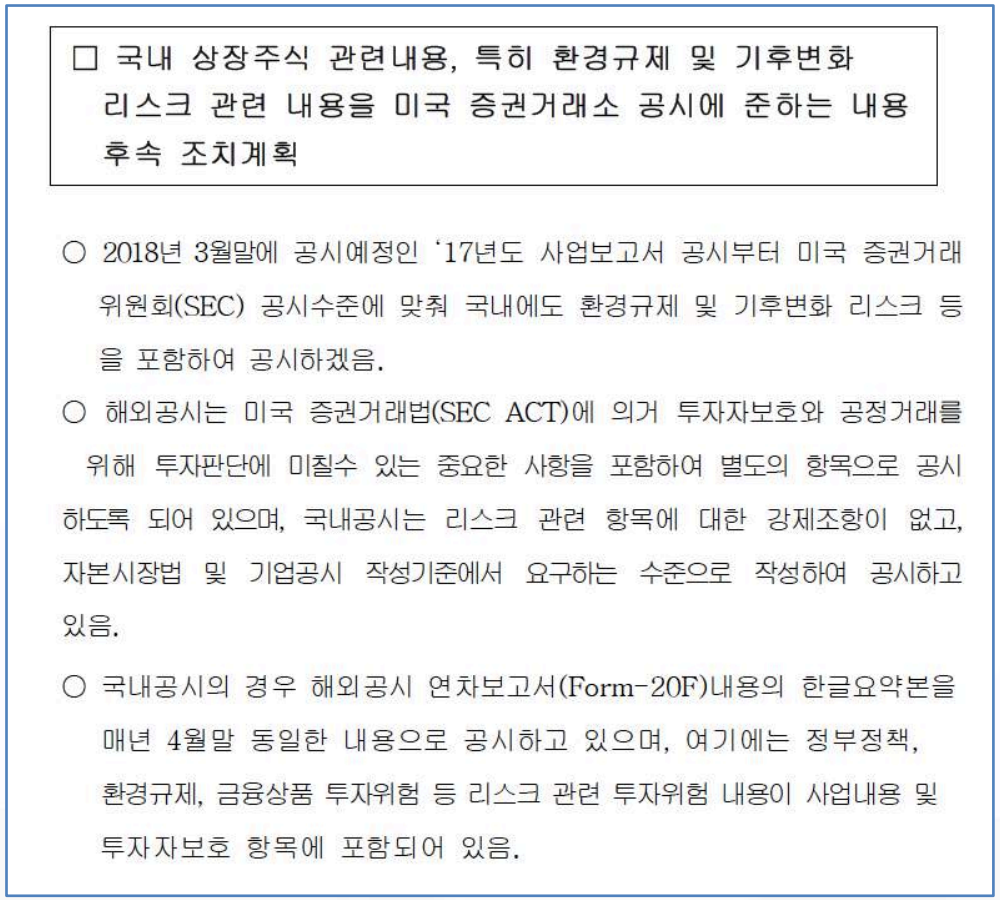
KEPCO submission to National Assembly dated Feb. 19, 2018, re insufficient climate / environment risk disclosure



□ 국내 상장주식 관련내용, 특히 환경규제 및 기후변화 리스크 관련 내용을 미국 증권거래소 공시에 준하는 내용 후속 조치계획

○ 2018년 3월말에 공시예정인 '17년도 사업보고서 공시부터 미국 증권거래위원회(SEC) 공시수준에 맞춰 국내에도 환경규제 및 기후변화 리스크 등을 포함하여 공시하겠음.

○ 해외공시는 미국 증권거래법(SEC ACT)에 의거 투자자보호와 공정거래를 위해 투자판단에 미칠수 있는 중요한 사항을 포함하여 별도의 항목으로 공시하도록 되어 있으며, 국내공시는 리스크 관련 항목에 대한 강제조항이 없고, 자본시장법 및 기업공시 작성기준에서 요구하는 수준으로 작성하여 공시하고 있음.

○ 국내공시의 경우 해외공시 연차보고서(Form-20F)내용의 한글요약본을 매년 4월말 동일한 내용으로 공시하고 있으며, 여기에는 정부정책, 환경규제, 금융상품 투자위험 등 리스크 관련 투자위험 내용이 사업내용 및 투자자보호 항목에 포함되어 있음.

- **KEPCO will disclose at the level equivalent to SEC disclosures beginning with its 2017 business report to be disclosed in Mar. 2018**
- KEPCO has made disclosures pursuant to the Korean Capital Markets Act, which does not have compulsory requirements on risk factors
- With regard to domestic disclosures, KEPCO discloses a Korean summary of its Form 20-F by the end of April each year, which includes environmental regulation, gov't policy related risks

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