

Global Spotlight Workshop

What Does COP21 Mean for the Role of Gas?

Asia prespective

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Outline

■ Asia and Climate Change

- Population
- GDP
- Energy/Gas Demand
- CO2 emission
- Climate Change Threat

■ Fight Against Climate Change

(focusing on China, Japan, Korea, Australia)

- Intended Nationally Determined Contribution (INDCs)
- INDC and CO2 emissions projection from respective fuels by country
- INDC implementation plan

■ Gas Industry's Action on Climate Change; Japan

- Diffusion of natural gas to 2030
- CO2 mitigation by diffusion of natural gas energy system
- R&D target to 2030 Japan

■ Conclusion

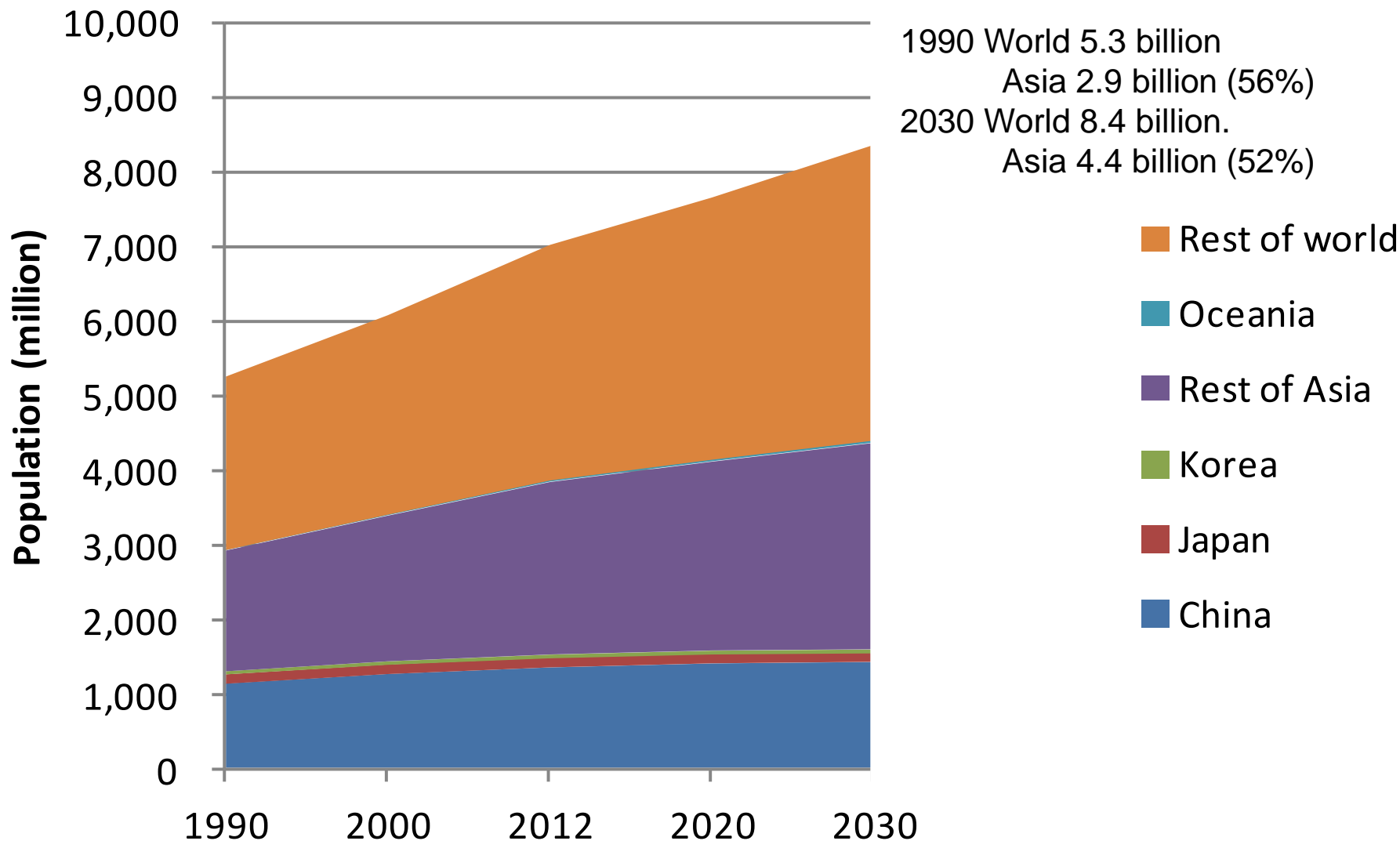




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Asia and Climate Change

Population



1990 World 5.3 billion
Asia 2.9 billion (56%)
2030 World 8.4 billion.
Asia 4.4 billion (52%)

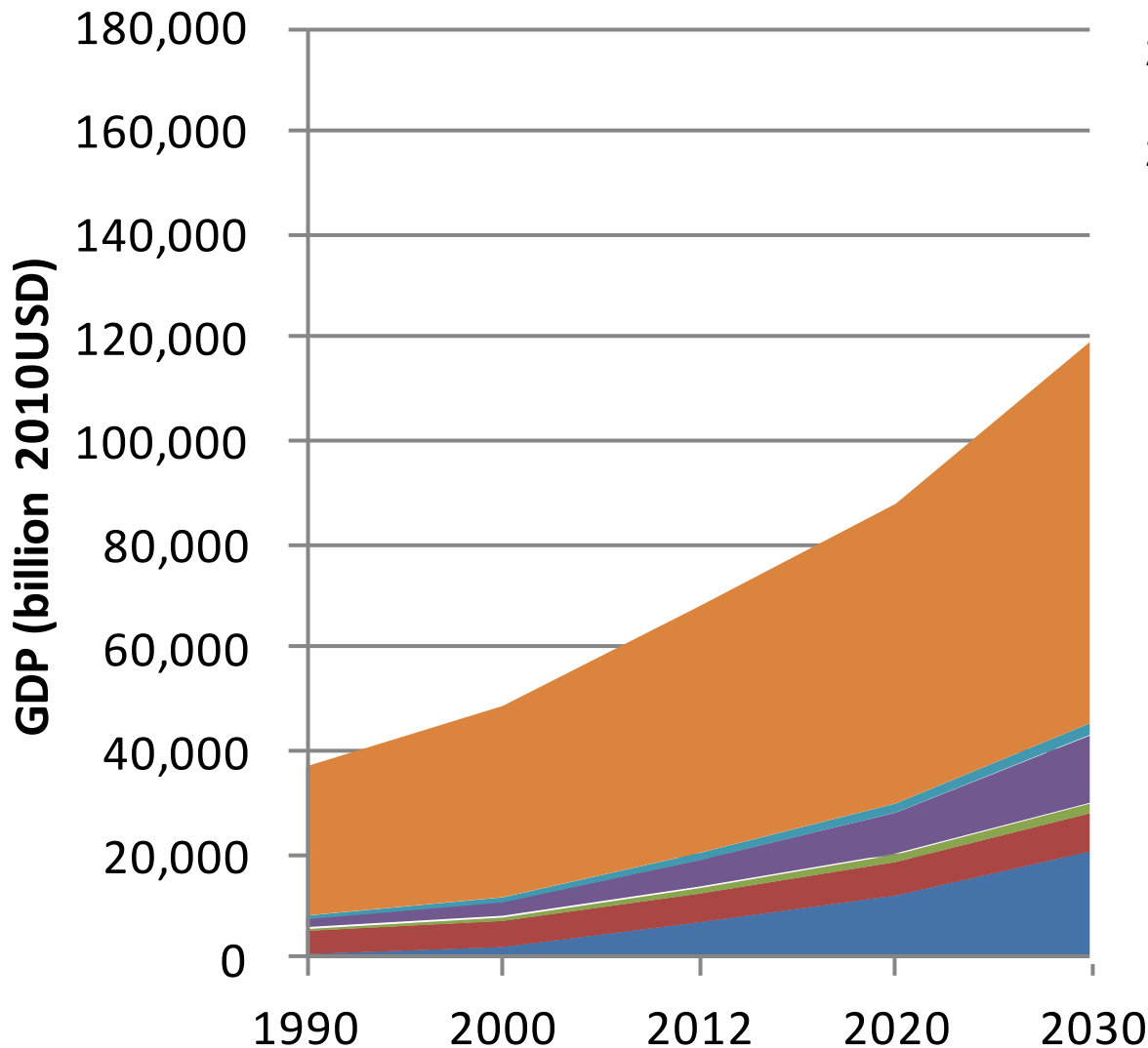
Source: IEEJ, Asia/World Energy Outlook 2014



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Asia and Climate Change

□ GDP



2000 World 48 trillion
Asia 11 trillion (22%)
2030 World 119 trillion
Asia 43 trillion (36%)

- Rest of world
- Oceania
- Rest of Asia
- Korea
- Japan
- China

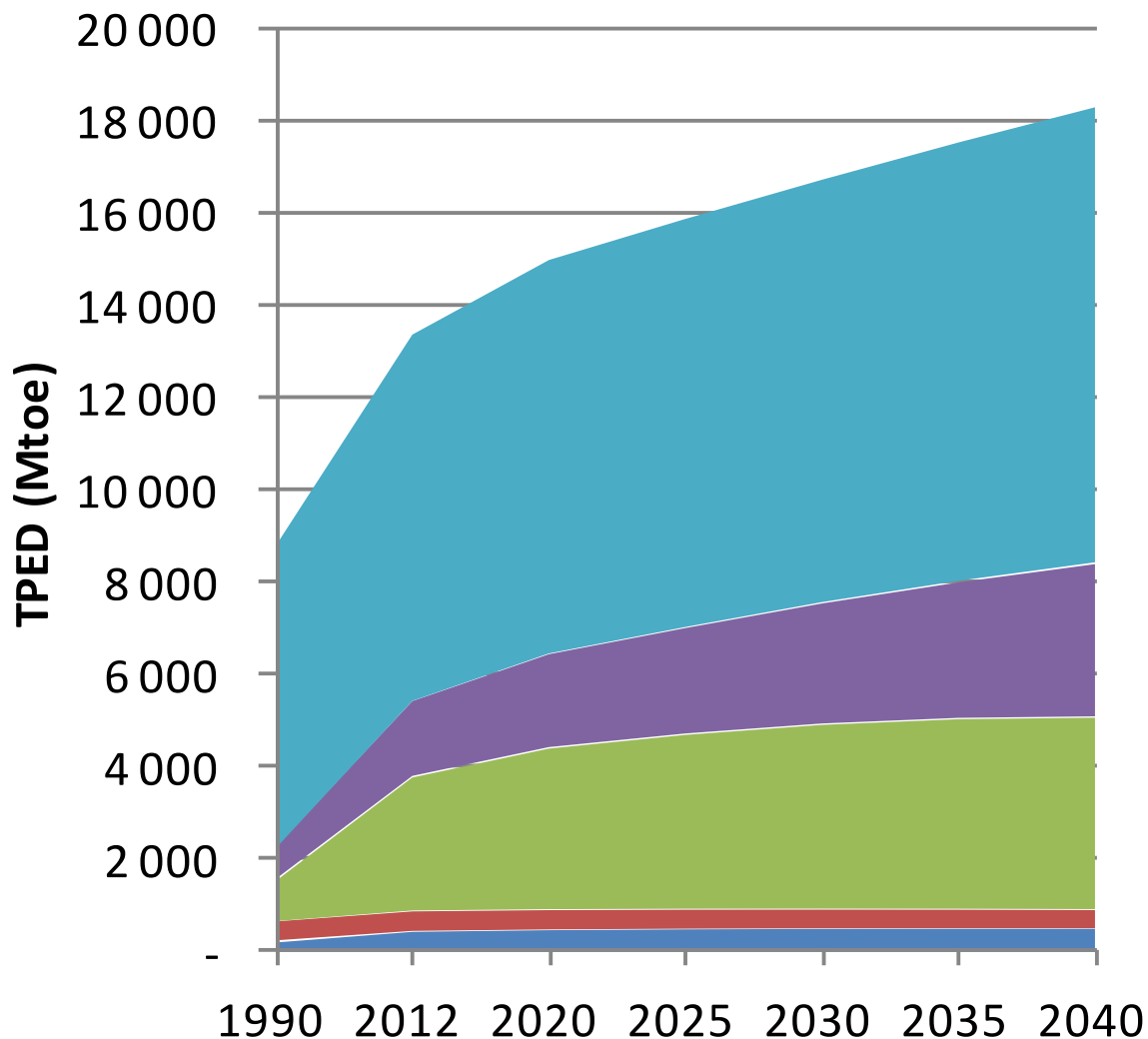
Source: IEEJ, Asia/World Energy Outlook 2014



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Asia and Climate Change

□ Energy Demand (Total Primary Energy)



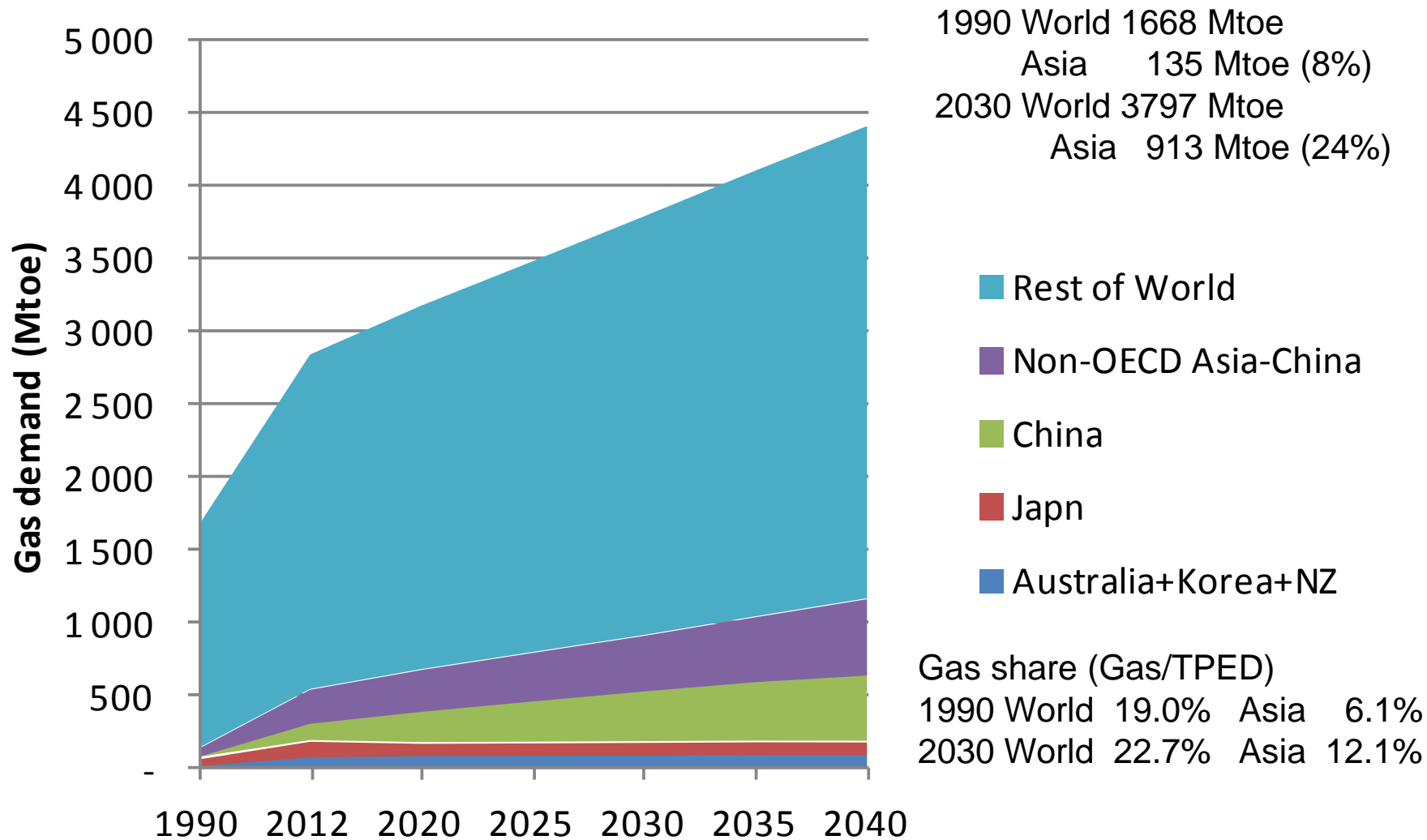
1990 World 8762 Mtoe
Asia 2219 Mtoe (25%)
2030 World 16720 Mtoe
Asia 7558 Mtoe (45%)

- Rest of World
- Non-OECD Asia-China
- China
- Japn
- Australia+Korea+NZ



Asia and Climate Change

■ Gas Demand



Asia and Climate Change

CO2 emission Asia top 14 countries



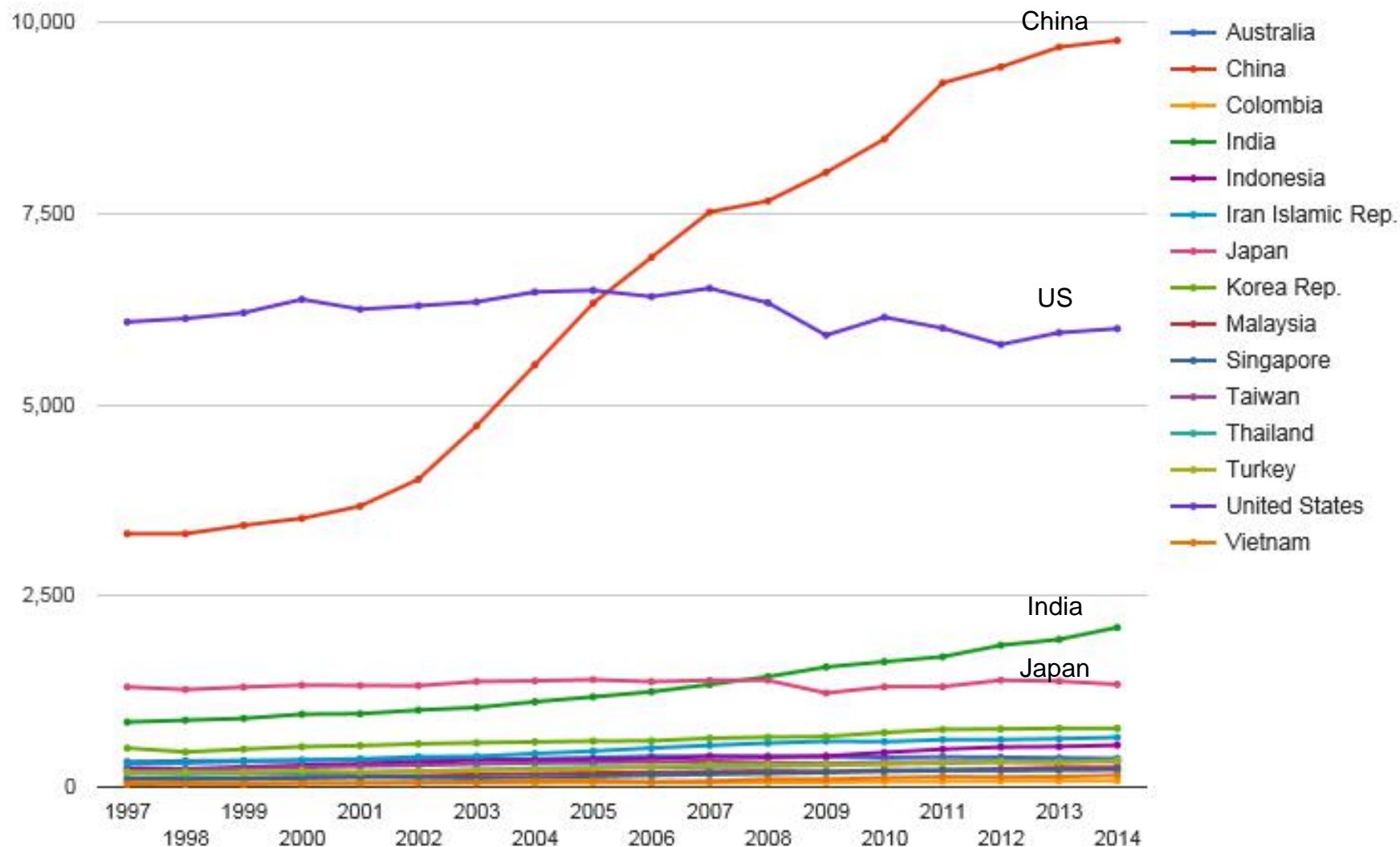
CO2 emissions (BP statistics) in million ton

rank	Country	2014	share	rank	Country	1997	share	2014/1997
1	China	9,761.07	27.5%	2	China	3,313.75	13.6%	295%
2	United States	5,994.56	16.9%	1	United States	6,081.19	24.9%	99%
3	India	2,088.02	5.9%	6	India	850.84	3.5%	245%
5	Japan	1,343.11	3.8%	4	Japan	1,310.78	5.4%	102%
7	Korea Rep.	768.34	2.2%	9	Korea Rep.	510.66	2.1%	150%
9	Iran Islamic Rep.	650.36	1.8%	18	Iran Islamic Rep.	303.81	1.2%	214%
12	Indonesia	548.65	1.5%	21	Indonesia	246.46	1.0%	223%
16	Australia	374.92	1.1%	17	Australia	333.33	1.4%	112%
17	Turkey	348.49	1.0%	24	Turkey	196.68	0.8%	177%
20	Thailand	346.91	1.0%	25	Thailand	182.56	0.7%	190%
21	Taiwan	332.93	0.9%	23	Taiwan	214.57	0.9%	155%
25	Malaysia	257.68	0.7%	34	Malaysia	119.23	0.5%	216%
27	Singapore	226.11	0.6%	36	Singapore	107.41	0.4%	211%
33	Pakistan	177.42	0.5%	37	Pakistan	96.21	0.4%	184%
34	Vietnam	154.61	0.4%	58	Vietnam	38.06	0.2%	221%
44	Colombia	84.27	0.2%	43	Colombia	63.84	0.3%	242%
world total.		35,498.68				24,423.00		
above Asian Countries tot.		17,378.62	49.0%			7,850.13	32.1%	

Asia and Climate Change

CO2 emission

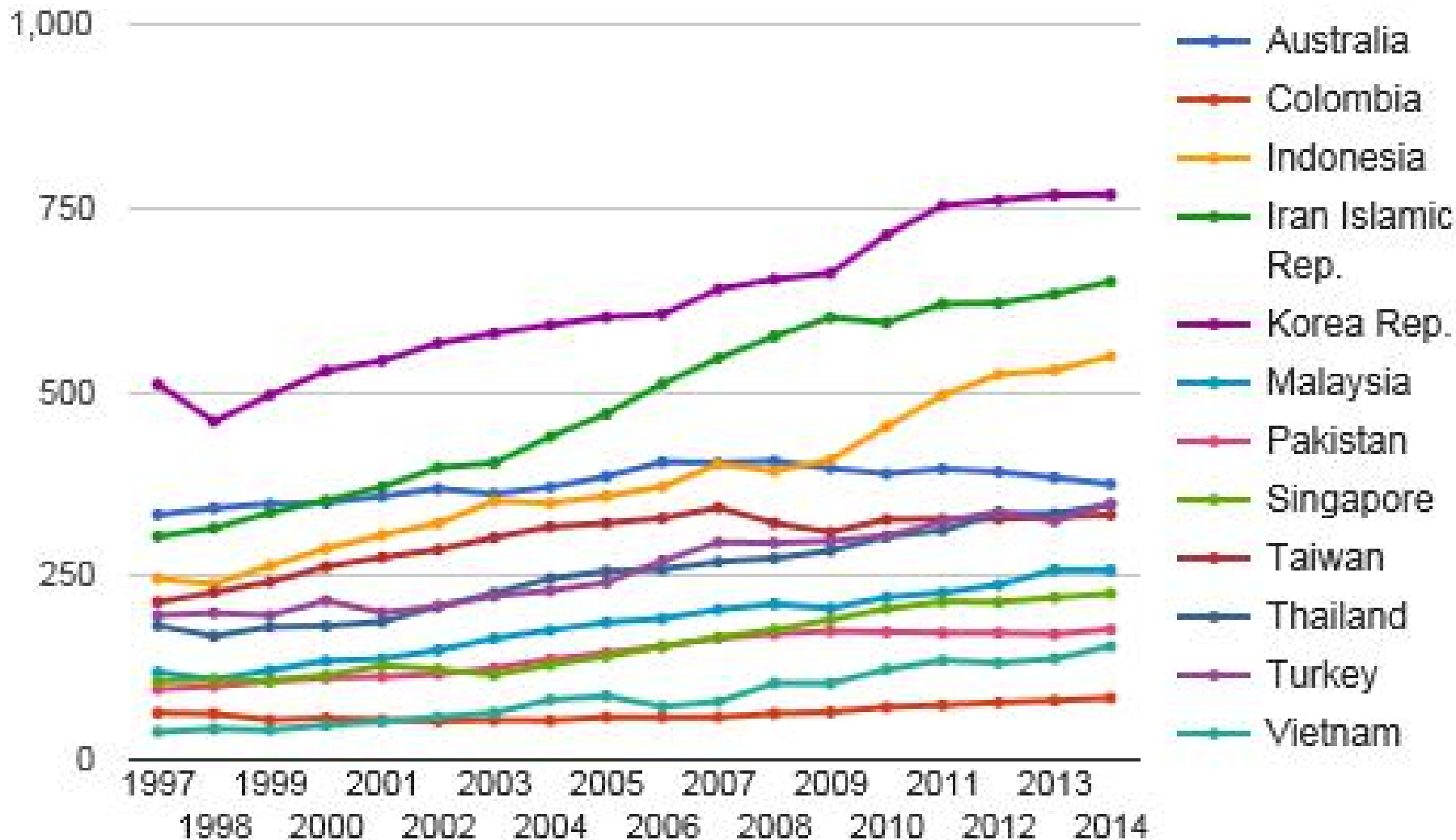
CO2 emissions (BP statistics) in million ton 1997-2014



Asia and Climate Change

CO2 emission

CO2 emissions (BP statistics) in million ton 1997-2014



Asia and Climate Change

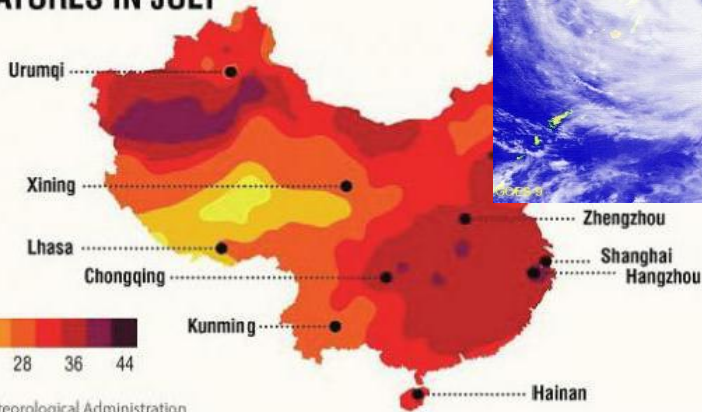
Climate Change Threat



monster typhoon, drought, flood, heat...



MAINLAND CHINA: HIGHEST-RECORDED TEMPERATURES IN JULY



Source: China Meteorological Administration

fig. 11A-B Chinese temperature records, July, left, Heat anomalies August 5-12, right

入阪 豊中
午後3時すぎ
最高気温 **37.9°C**

最高 気温	37.9	大阪 豊中
	37.5	京都 京田辺
	37	岡山
	36.5	高松

(°C)

統計開始以来
6月として最高

NHK
10

■ Asia and Climate Change

□ Climate Change Threat



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Six Climate Threats, and the 12 Countries Most at Risk

Drought	^{9/12} Flood	^{8/12} Storm	^{6/12} Coastal 1m	Agriculture
Malawi	Bangladesh	Philippines	All low-lying Island states	Sudan
Ethiopia	China	Bangladesh	Vietnam	Senegal
Zimbabwe	India	Madagascar	Egypt	Zimbabwe
India	Cambodia	Vietnam	Tunisia	Mali
Mozambique	Mozambique	Moldova	Indonesia	Zambia
Niger	Laos	Mongolia	Mauritania	Morocco
Mauritania	Pakistan	Haiti	China	Niger
Eritrea	Sri Lanka	Samoa	Mexico	India
Sudan	Thailand	Tonga	Myanmar	Malawi
Chad	Vietnam	China	Bangladesh	Algeria
Kenya	Benin	Honduras	Senegal	Ethiopia
Iran	Rwanda	Fiji	Libya	Pakistan

Source: World Bank

<http://www.irinnews.org/report/85179/global-twelve-countries-on-climate-change-hit-list>

■ Fight Against Climate Change

Intended Nationally Determined Contribution (INDCs)



United Nations
Framework Convention on
Climate Change

Economies	Submitted	Type	Reduction level (%)	Reference year	Time frames
Australia	2015/8/11	Absolute reduction from base year emissions	26-28	2005	2030
Japan	2015/7/17	Absolute reduction from base year emissions	26	2013	2030
United States	2015/3/31	Absolute reduction from base year emissions	26-28	2005	2025
China	2015/6/30	Intensity reduction from base year intensity	60-65	2005	2030
India	2015/10/1	Intensity reduction from base year intensity	33-35	2005	2030
Korea, Republic of	2015/6/30	Emissions reduction relative to a Business As Usual baseline	37	BAU	2030
Indonesia	2015/9/24	Emissions reduction relative to a Business As Usual baseline	29	BAU	2030



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Fight Against Climate Change; China

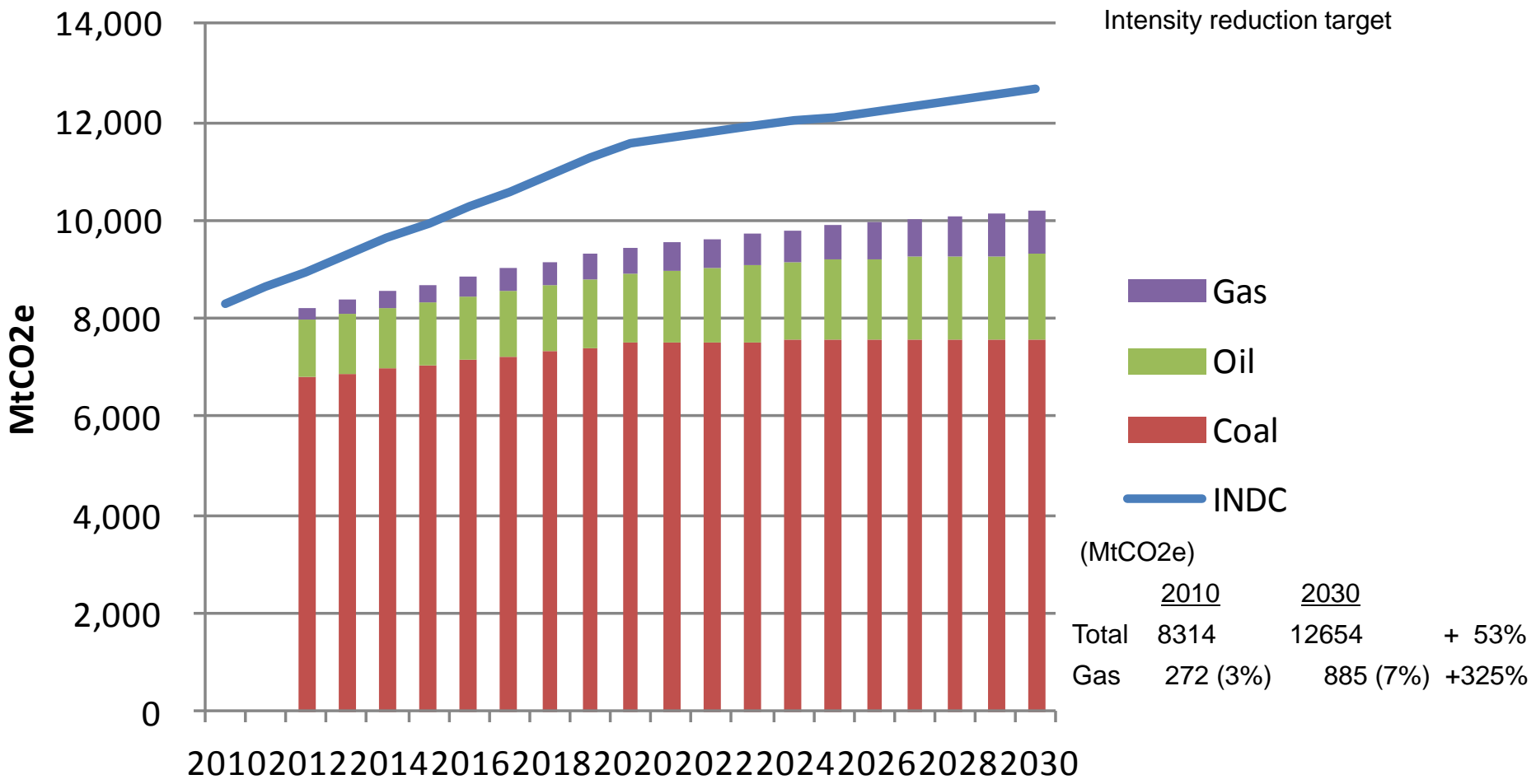
INDC and CO2e

emissions projection from respective fuels by country (WEO 2014)

Intensity reduction from base year intensity

▲60-65%

2030/2005





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Fight Against Climate Change; Japan

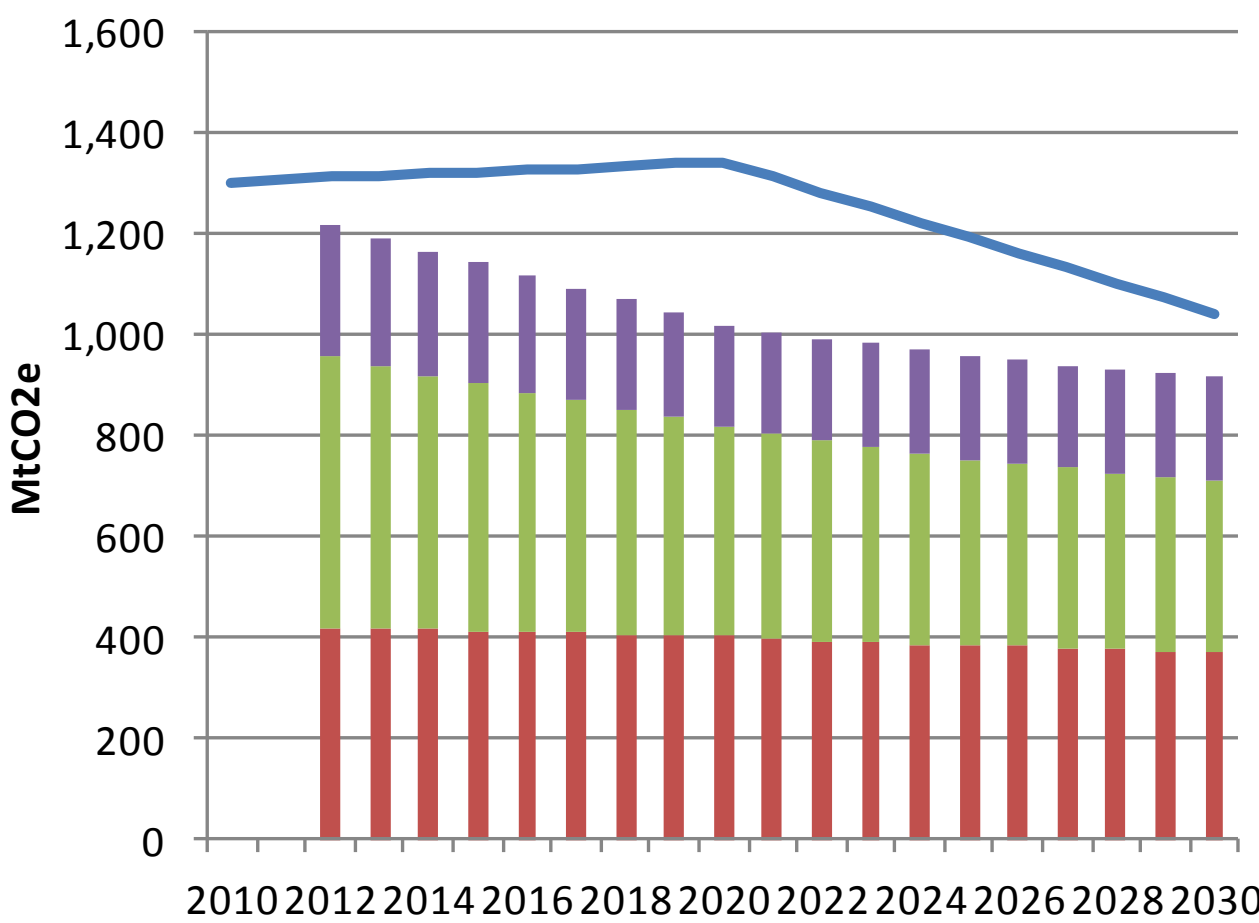
INDC and CO2e

emissions projection from respective fuels by country (WEO 2014)

Absolute reduction from base year emissions

▲26%

2030/2013



Absolute reduction target

- Gas
- Oil
- Coal
- INDC

	2010	2030	
Total	1304	1042	▲20%
Gas	260 (20%)	205 (20%)	▲22%

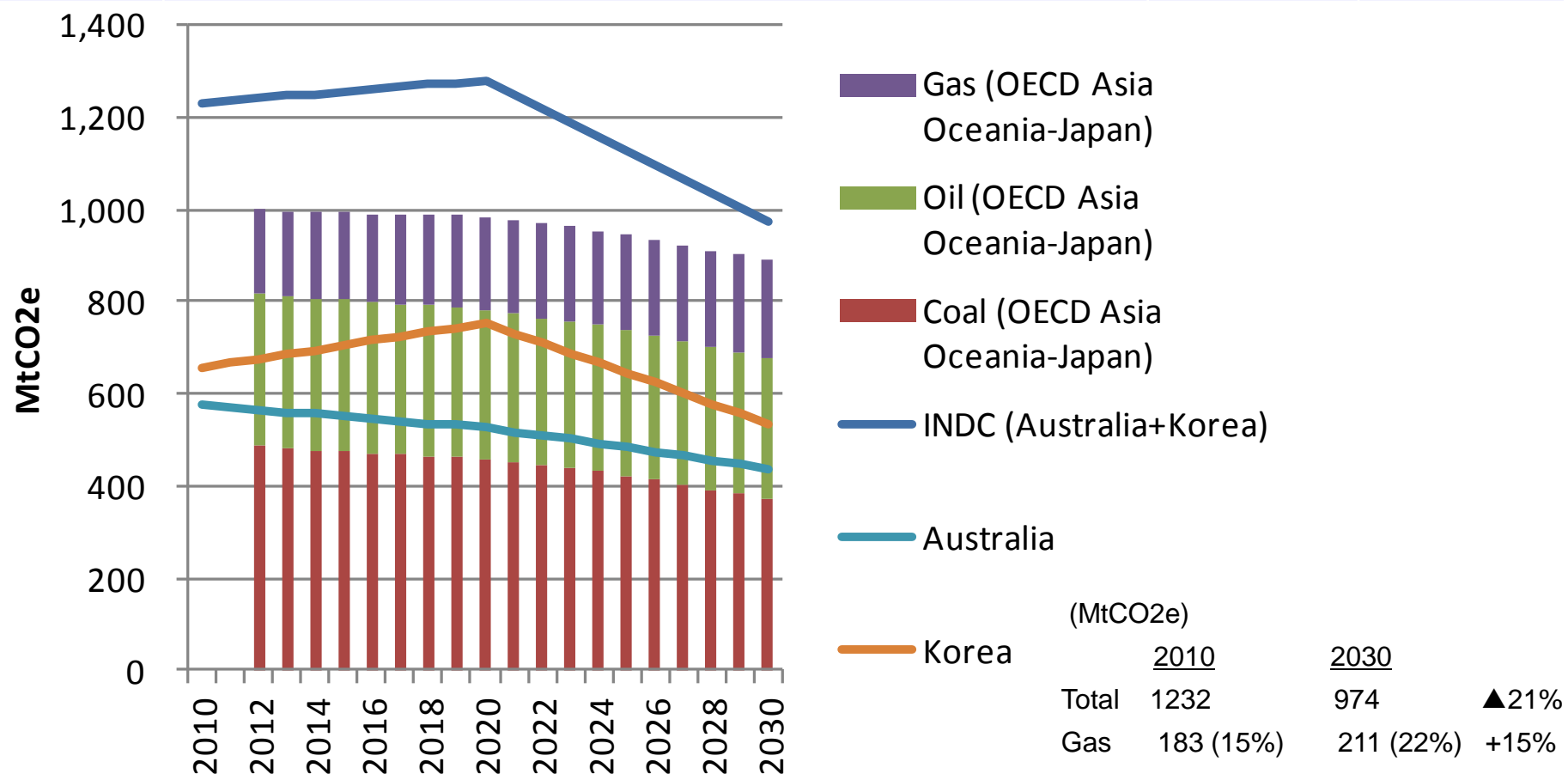


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■ Fight Against Climate Change; Australia + Korea + NZ

□ INDC and CO2e emissions projection from respective fuels by country (WEO 2014)

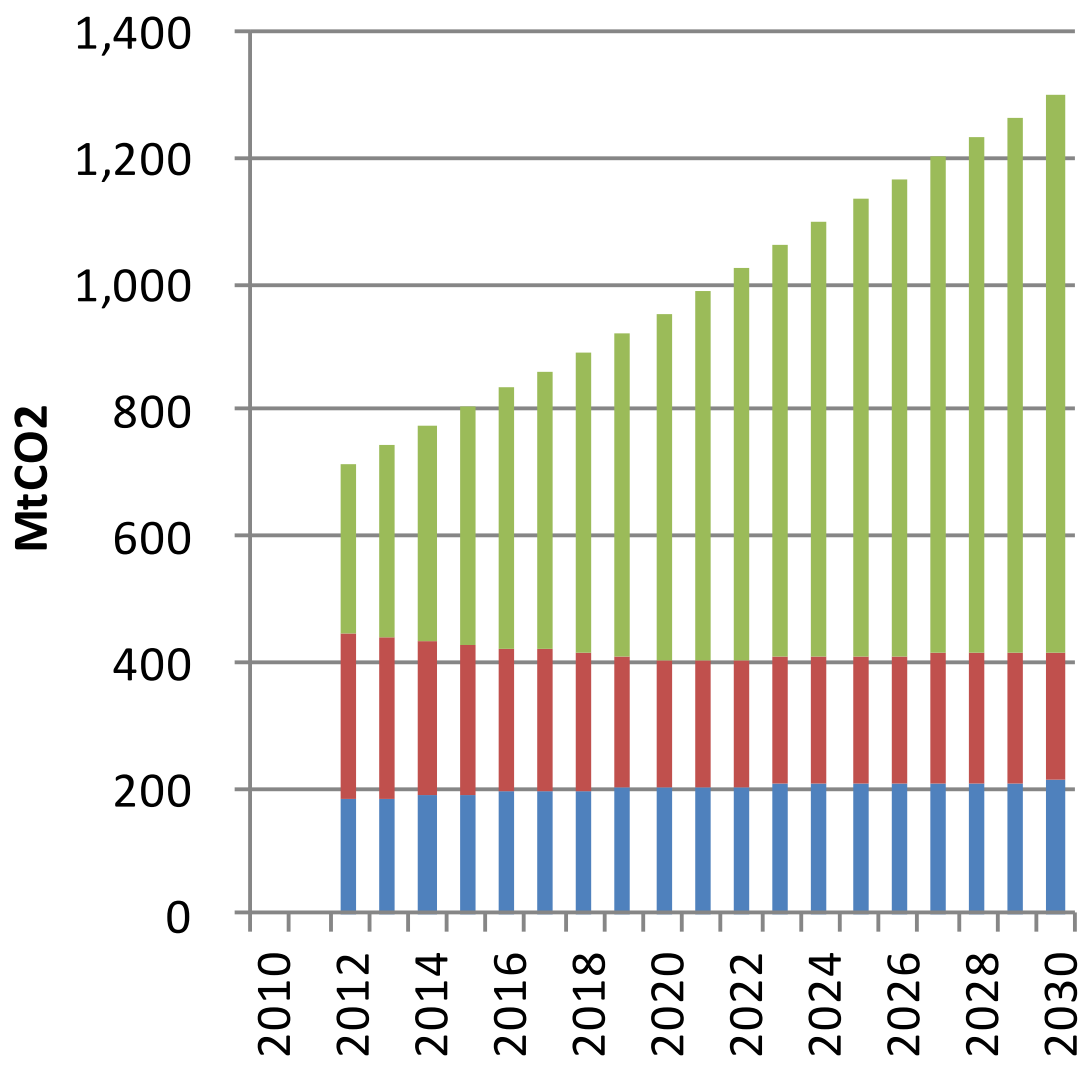
Australia	Absolute reduction from base year emissions	▲26-28	2030/2005
Korea	Emissions reduction relative to a Business As Usual baseline	▲37	2030/BAU





■ Fight Against Climate Change; Gas

□ CO2 emissions projection from Gas by country



■ China
■ Japan
■ OECD Asia Oceania-Japan
 Australia + NZ+ Korea

(MtCO2e)

	2012	2030	
Total	715	1,300	+82%
China	272	885	+225%
Japan	260	205	▲21%
Aus.+NZ +K	183	211	+15%

Source: WEO2014 New Policies Scenario

■ Fight Against Climate Change; China 1/2

□ INDC implementation plan

- ✓ Implementing Proactive National Strategies on Climate Change, Strengthen laws and regulations
- ✓ Improving Regional Strategies on Climate Change
- ✓ Building Low-Carbon Energy System
 - Coal; Control total coal consumption and enhance the clean use of coal. Highly-efficient electricity generation from coal.
 - Natural Gas; Expand the use of natural gas by 2020 to 10% share on primary energy base), 30 billion cubic meters of coal-bed methane production
- ✓ Hydro power, Nuclear power, Wind power, Solar power, Geothermal energy, bio-energy and maritime energy (Carbon free, carbon neutral energy)
- ✓ Recovery and utilization of vent gas and oilfield-associated gas

■ Fight Against Climate Change; China 2/2

□ INDC implementation plan

- ✓ Distributed energy and strengthen the construction of smart grid
- ✓ Improving energy efficiency of building, Green buildings (Renewable energy based)
- ✓ Increasing Carbon Sinks, Afforestation, increasing the forest carbon sinks
- ✓ Promoting the Low-Carbon Way of Life, Education, Change of lifestyle
- ✓ Enhancing Support in terms of Science and Technology, R&D Low carbon technology
- ✓ Promoting Carbon Emission Trading Market

■ Fight Against Climate Change; Korea

□ INDC implementation plan

- ✓ National Greenhouse Gas Emissions Reduction Roadmap (2014)
- ✓ Emission Trading Scheme (2015)
- ✓ Renewable Portfolio Standards for power sector
- ✓ Green Building Standards Code and a system for the Performance Evaluation of Eco-friendly Homes.
- ✓ Expand infrastructure for environment-friendly public transportation
- ✓ Introducing low-carbon standards for fuel efficiency and emissions produced from automobiles
- ✓ Various incentives, tax reductions for electric and hybrid vehicles

■ Fight Against Climate Change; Australia

□ INDC implementation plan

- ✓ \$2.55 billion Emissions Reduction Fund (ERF)
- ✓ Renewable Energy Target scheme (23% from renewable sources by 2020)
- ✓ A National Energy Productivity Plan with a National Energy Productivity Target of a 40 per cent improvement between 2015 and 2030
- ✓ Undertake consultation to determine further post-2020 domestic emissions reduction policies in 2017-2018



■ Fight Against Climate Change; Japan 1/3

□ INDC implementation plan

Gas Industry's involvement (direct & indirect)

✓ Industry sector

Promotion and enhancement of the industries' action plans towards a low carbon society

- industry sector voluntary reduction

Absolute CO2 Amount
vs 1990▲75.8%
vs 2005▲28.9%

Voluntary Plan Under Keidan-ren: Gas produced and CO2 Emissions

FY		1990	1997	2000	2005	2010	2011	2012	Result	2020	2030
CO2 emissions after adjustment	10,000 t-CO2	132.8	105.2	81.7	45.3	29.4	35.1	34.8	32.2	49.6	55.0
CO2 emissions intensity after adjustment	g-CO2/m3	83.6	46.2	32.2	13.6	8.0	9.3	9.2	8.8	10.1	10.0
Amount of city gas produced	100 mil. m3	159	228	254	333	369	378	379	367	502	550
CO2 emissions intensity (1990=100)		100.0	55.3	38.5	16.3	9.6	11.1	11.0	10.5	12.1	12.0

*2000-2012 intensity & amount target
*2020, 2030 CO2 intensity target

Intensity
vs 1990▲89.5%
vs 2005▲35.0%

■ Fight Against Climate Change; Japan 1/3

□ INDC implementation plan **Gas Industry's involvement**

- ✓ Commercial and other sectors
 - Setting energy saving standards
 - **Introduction of high efficient water heater (latent heat collection water heater etc)**
 - Introduction of highly efficient lighting
 - **Improvement of energy efficiency and conservation performance of equipment by the top runner program etc.**
 - **Utilizing BEMS and energy efficiency diagnosis**
 - Promotion of nation wide campaigns (thorough promotion of **Cool Biz/Warm Biz**, repair of local government buildings)
 - **Expansion of shared use of energy**



Energy –Efficiency label (Eco Label)
(more than 100%, not reaching standard)





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■ Fight Against Climate Change; Japan 2/3

□ INDC implementation plan **Gas Industry's involvement**

✓ Residential sector

- Setting energy saving standards for newly housing
- Thermal insulation in renovation of existing houses
- **High-efficient water heater**
(CO2refrigerant HP water heater, **latent heat collection water heater, fuel cell, solar water heater**)
- High-efficient lighting
- **Top runner program, etc.**
- **HEMS and smart meters**
- Promotion of nation wide campaigns (thorough promotion of Cool Biz/Warm Biz, and encouragement of purchase of upgraded, **Home CO2advisor**)

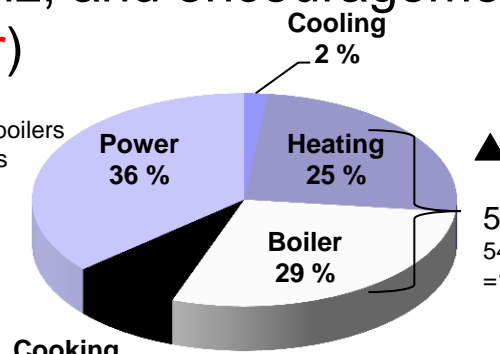


Energy –Efficiency label (Eco Label)
(more than 100%, not reaching standard)



Water Heater

2013 all the new boilers
2030 all the boilers
80>95%
up 19%



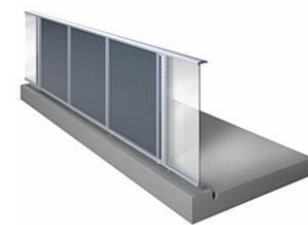
Energy of Household 23

▲ 10%

54%
54X19%
=10%



Fuel cell PEFC>SOFC



solar water heater



CO2 advisor



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■ Fight Against Climate Change; Japan 3/3

□ INDC implementation plan **Gas Industry's involvement**

✓ Transport sector



FCV **Mirai** (future)
by TOYOTA



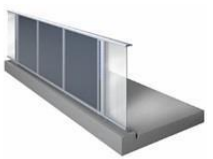
日本郵船

鬼 **Sakigake**
(bi-fuel tug boat)
by Yusen LNG&Oil



- **Improvement of fuel efficiency**
- **Promotion of next-generation automobiles**
- Modal shift to railway, **eco-friendly ship transportation**,
- Energy consumption efficiency improvement of railways and **aviation**
- Intelligent Transport Systems ITS (centralized control of traffic signals),
- LED traffic lights
- Automatic driving, eco-driving and car sharing

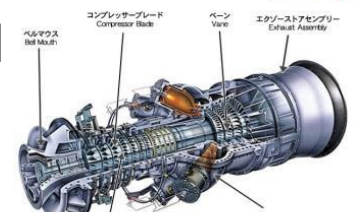
✓ Energy conversion sector



Bio-gas production at sewage treatment facility



- **Renewable energy**
- Nuclear power generations whose safety is confirmed
- **Pursuit of high efficiency in thermal power**



✓ Cross-sectional strategies

- **Promotion of the J-Credit Scheme**





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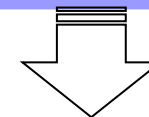
■ Gas Industry's Action on Climate Change

□ Diffusion of natural gas to 2030 Japan

Low-Carbon Apparatus	Expected Expansion of Use (2010⇒2030)	Expected CO2 Reduction [10,000 tons]
Cogeneration	4.6 mil. kW ⇒ 30 mil. kW	3800
Fuel cells for household use*1 (ENE-FARM)	20,000 units ⇒ 5,300,000 units	650
Switching to natural gas (industrial sector)	10.7%*2 ⇒ 25%	800
Gas air-conditioning	13 mil. RT ⇒ 26 mil. RT	288
Natural gas vehicles	40,000 units ⇒ 500,000 units	670
Total		▲ 62 mil.T

In calculating expected CO2 reduction, 0.69 Kg-CO2/kWh is used as the CO2 emissions factor grid power.

*1: Including LPG fueled equipment *2: Standard in 2009



24% of national target

Japan's INDC

2010 1304 mil.T > 2030 1042 mil.T

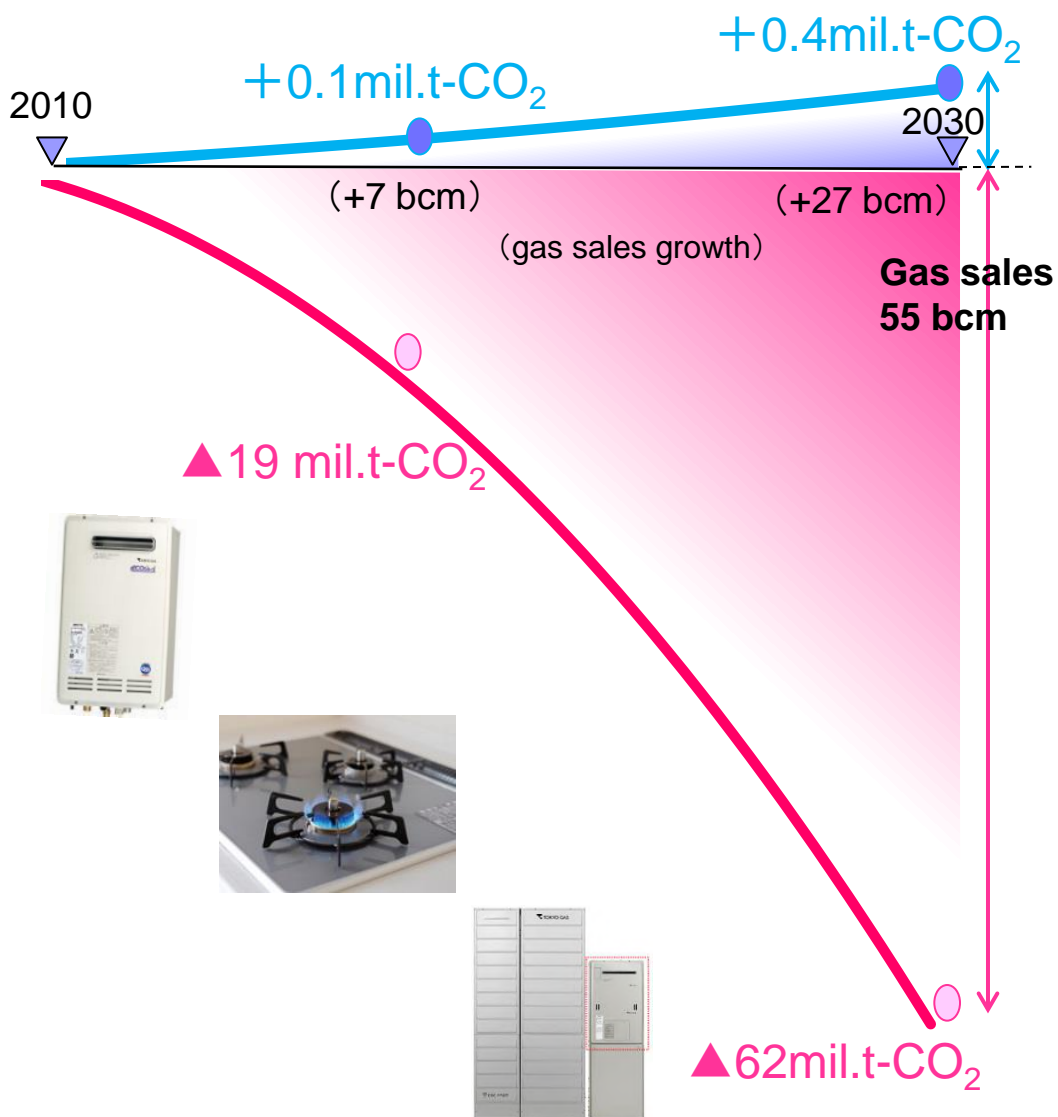
▲ 262 62/262=24%



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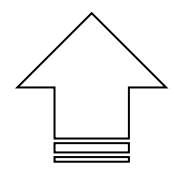
Gas Industry's Action on Climate Change

CO2 mitigation by diffusion of natural gas energy system Japan



Production/distribution

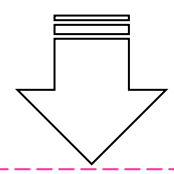
CO2 emission increase due to gas sales growth of gas from 2010



+0.4 mil.t-CO₂



Estimated CO2 emission reduction on demand side is approx. 100 times larger than the increase of CO2 emission on supply side



▲ 62 mil.t-CO₂

Estimated CO2 emission reduction due to the diffusion of natural gas system at demand side

Relative CO2 emission reduction associated with the use of natural gas system

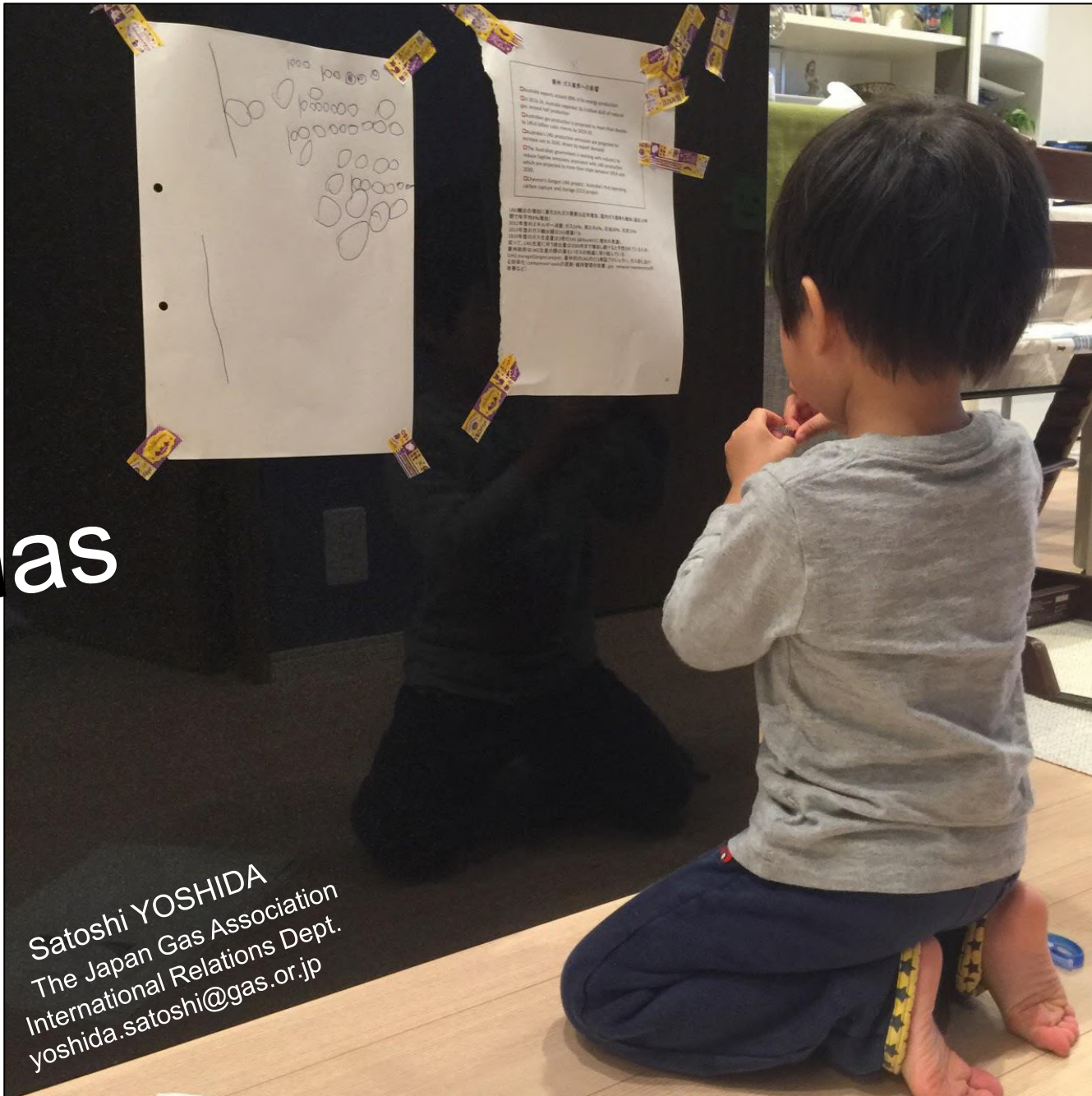
■ Conclusion

Q. What Does COP21 (Climate Change Discussion) Mean for the Role of Gas (and the industry) in Asia?

Its a great opportunity.....



- ✓ for Natural Gas to be recognized, once again, as most promising and established transitional (bridge) energy.
- ✓ for the gas industry to be a significant part of solution by taking active action.
- ✓ for the domestic gas industry to expand business and become a global energy player.



gracias



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