

background &  
key findings

## Release Speech

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# About the Project

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- **Nature** - WECO is an interactive and long range researched outlook currently focusing on China energy outlook and its implications worldwide done on an annual basis.
- **Objectives** - It provides independent insights and foresights with our own database and independent investigation to energy stakeholders.

## WECO 2014-2015,

- Focus on energy transition and policy options require for eco-civilization construction including tackling climate change;
- Prioritize energy trends and challenges around 2020 and their impacts on well-off (affluent) society as planned and the entire world.

# Features and Methods

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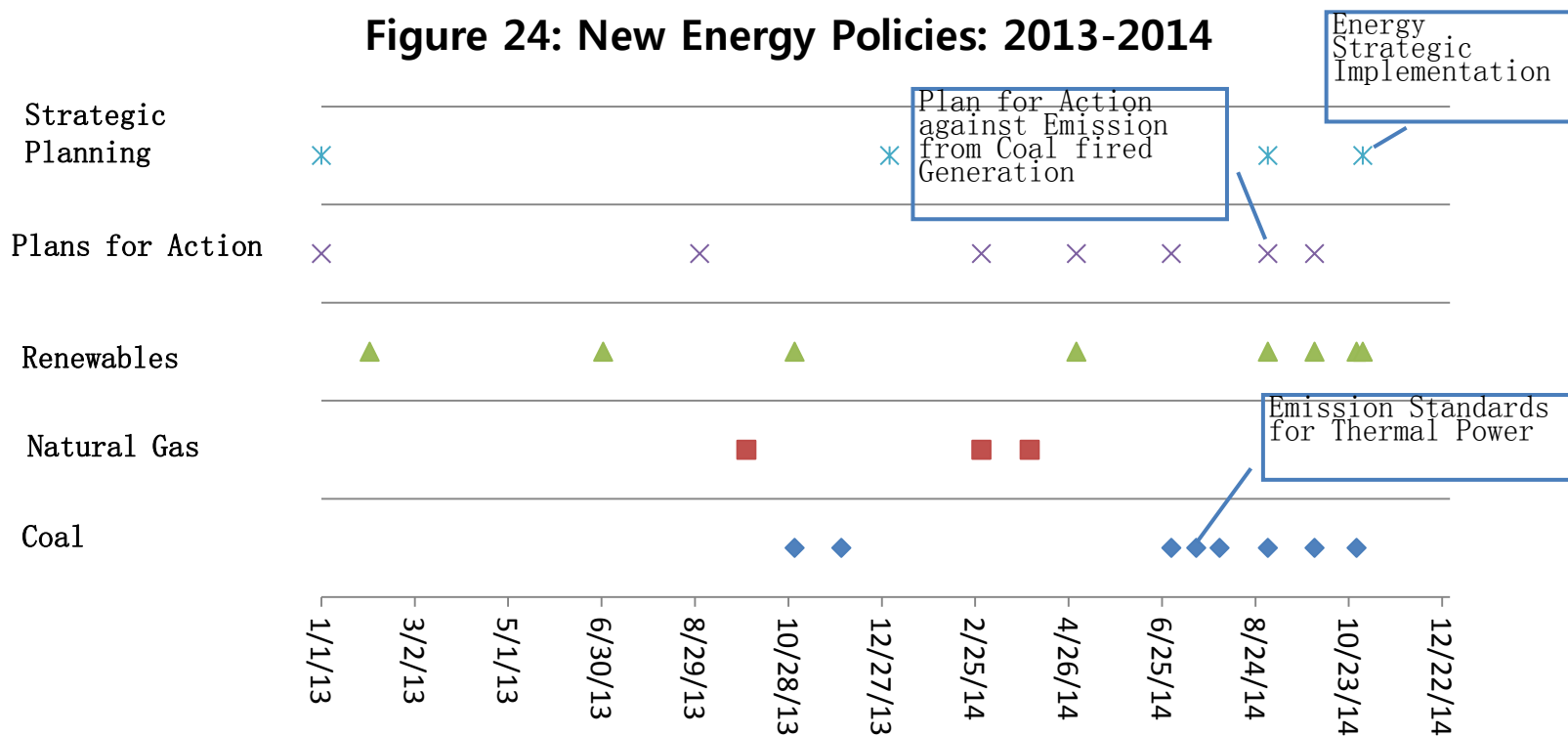
1. We emphasize systematic, holistic and synergetic approaches.
2. We emphasize **new policy scenario** in the outlook period (2011-2030) like the IEA does in its WEO.
3. However, new policy scenario is our current case, not central. We do not follow IEA like current policy case and 450 case, instead, developing **eco-energy strategy scenario** based on our best understanding of eco-civilization drive after the 18<sup>th</sup> CPC, which featured by environmental counter-pressures. **Climate commitments are included.**

# New Policies

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- A series of new and intensive policies, planning, regulations and plans for actions combined were released in the second half 2013 and throughout 2014, in a larger number than ever.
- Most of these new policies are subject to unavoidable and growing environmental concerns

**Figure 24: New Energy Policies: 2013-2014**



# Our comments on new policies

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## Key messages conveyed -

- (a) Shift to cleaner energy mix by reducing dependency on coal, e.g. diminishing burning coal and inefficient coal turbines.
- (b) emphasize sustainable development through innovations. Enhance savings and efficiency and reducing emission through recycling, high-tech, policy incentives while developing new sources.
- (c) Re-focus energy products as commodities through reform attempts and enhance public interests.

# Eco-energy New Strategy Scenario

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**As our central scenario, eco-energy strategy in our research indicates something new into the country.**

1. **Energy development** serves but not limited to economic growth
2. **Energy development** means not only sizable spending and supplies, enhanced employment and profit and tax resulted, but **energy services** featured by multiple A, and clean, diverse and flexible and efficiency utilization of all types of energy sources for the mankind.
3. **Energy development** is not only the business of the industry, but interests of the state and the public, not only a matter of a country, but the entire world. Therefore, multilateral and trans-regional and cross border cooperation is required and a must.

Based on all the above mentioned, we build up our own database.

# Database 2014

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- The database 2014 version is the “ballast” of our energy outlook as a whole.
- Our data are largely well-defined and streamlined based on our best understanding and in-house research of the said issues together with a set of assumptions (population, GDP growth rates, urbanization, energy prices and relevant indicators and index calculations).
- Therefore, our data are neither the same received from State Statistical Bureau or energy administration, nor the industry.

# Chapters for Outlook

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## □ **Chapter 1 Global Energy Trends**

- 1. Global energy trends
- 2. China energy outlook
- 3. Global implications

## □ **Chapter 2 New Energy Policy**

- 1. Energy policies in key EMs
- 2. Energy policy trends in China
- 3. Sustainable energy: needs vs. features
- 4. Policy options for China

## □ **Chapter 3 Clean Coal and Policy**

- 1. Global coal trends
- 2. Coal in China
- 3. Coal demand and supply
- 4. Policies towards clean coal

## □ **Chapter 4 Power Trends and Policy**

- 1. Global power trends
- 2. Power sector in China
- 3. Power system and reforms
- 4. Power policy

## □ **Chapter 5 Nuclear and Policy**

- 1. Global nuclear trends
- 2. Nuclear in China
- 3. Nuclear outlook for China
- 4. Nuclear policy options

## □ **Chapter 6 Energy Technology**

- 1. Energy technology worldwide
- 2. Energy technology advances in China
- 3. Critical technological contributions to outlook.



# Chapter on Energy Security

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## □ **Chapter 7 Reframing Energy Security**

- 1. Energy security, a global perspective
- 2. Energy security under EES scenario
- 3. Get energy security measurable

## □ **Chapter 8 Cooperation with Central Asia**

- 1. Cooperation advances
- 2. Oil & gas developments in Central Asia
- 3. Cooperation policies
- 4. Prospects and outlooks

## □ **Chapter 9 Cooperation with ASEANs**

- 1. Resources potential in ASEANs
- 2. Cooperation status quo
- 3. Destinations

## □ **Chapter 10 Cooperation with Africa**

- 1. Resources, production and exports
- 2. Oil & gas policies
- 3. Advances and natures
- 4. Prospects and directions

## □ **Chapter 11 Energy BRICS**

- 1. Definition and analyses
- 2. Energy BRICS analyses
- 3. Multilateral cooperation and repercussions
- 4. Playing fields and roles
- 5. Directions and mechanisms

# Executive Summary

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- I. World Energy Trends and Changing Framework into 2030**
- II. Basic Trend of Energy Development: China vs. the World**
- III. Energy Policy Trend in 2014-2015**
- IV. Sector Policy Trends**
- V. Technological Contributions**
- VI. Reframing Energy Security
- VII. Energy BRICS
- VIII. Recommendations for 2015 and the 13<sup>th</sup> Five-Year Plan**

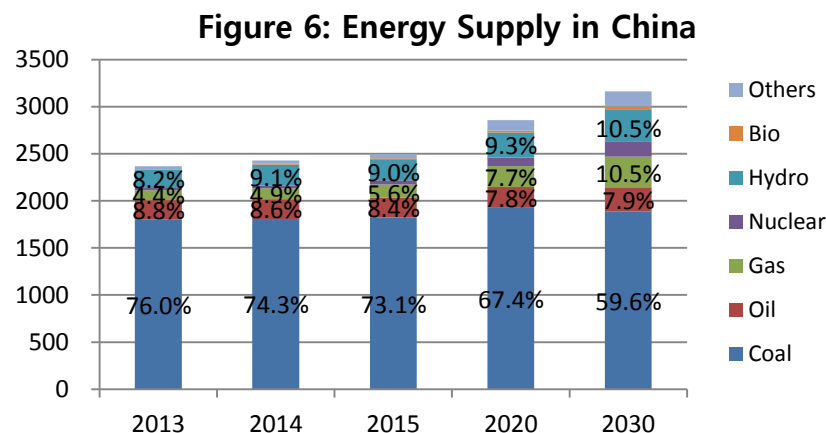
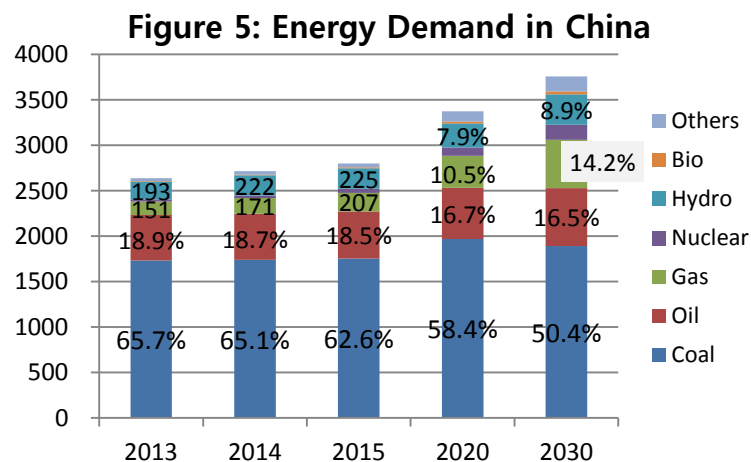
*Snapshots of key points on energy outlook on China*

# I. Energy D/S Outlook into 2030

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## 1. Energy demand continues to grow upward into 2020 and will level off thereafter.

- Energy D/S will continue to grow at 3.79% vs. 2.72% driven by economic growth, new Four Drives and the environmental pressures, combined. However, both slow down to 1-2% thereafter. Energy demand could be 3373 million toe while energy supply could reach 2855 million toe by 2020. These data could be expanded if...
- Meanwhile, energy mix will be reshaped obviously that is critical to the country in the next 5 years to come (i.e., the 13th Five-Year Plan).

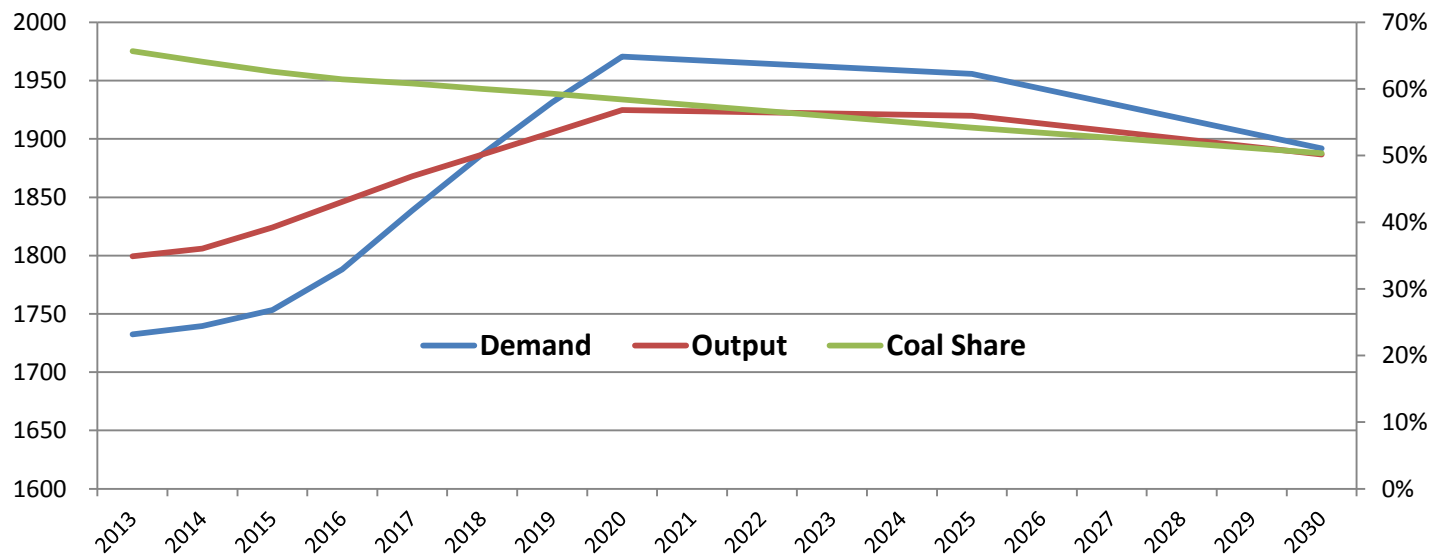


# II. Coal Demand Growth

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**2. Coal demand witness near-zero growth in 2014 and will be upward steadily until 2020 when reaching peak plateau (below 2000 million toe). The peak plateau could be lower if new policy could fully implemented and expanded.** Coal demand share will reduce from 65% in 2014 down below 50% in 2030, remaining the King of energy mix in China. Near-zero emission (SO<sub>2</sub>, NO<sub>x</sub> and ash) is possible. Clean coal is our future of choice.

Figure 7: Coal Demand & Supply and Share



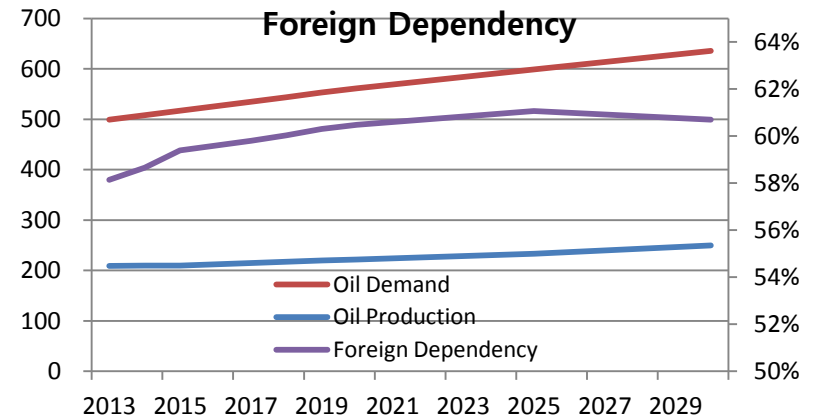
# III. Oil Outlook

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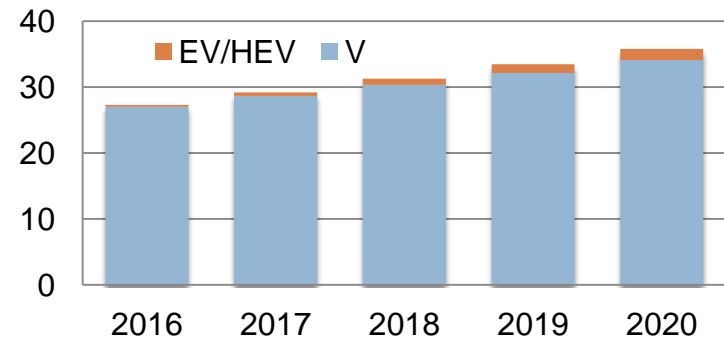
## 3. Oil demand will grow steadily while output increase at snail pace. Foreign dependency will be around 60% or lightly higher.

- Oil demand will be 636 million tones to production 250 million tones in 2030, well below some projections to 750, 800 or 936 million tones.
- We believe an incremental demand of oil could be substituted by non-oil fuels and constrained by oil saving and upgraded transporting system from substitution drive and technology advances view.
- E.g., new energy vehicles will be one of substitution, even EV/HEVs are far from satisfying our targets at present but could be boosted by new policy. At least, 100 mt of oil could be substituted.

Figure 8: Oil Output & Demand and



**EV/HEV Growth 5mm@2020**

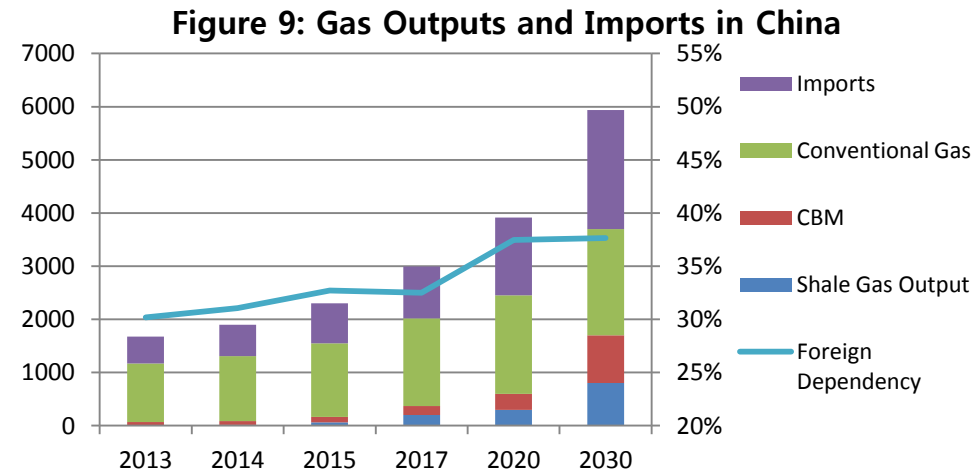


# IV. Gas Outlook

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4. Natural gas demand will continue to grow at two digital rate (although slow down a bit in 2014) driven by price reform, technology advances and clean energy policy. Surplus of supply is **impossible**.

- Gas fired generation is encouraged from 15% to 20%.
- Domestic output driven by unconventional gas sources while multiple import sources are ample.
- Gas surplus could be possible but not understandable and impossible if absorbed and managed well.

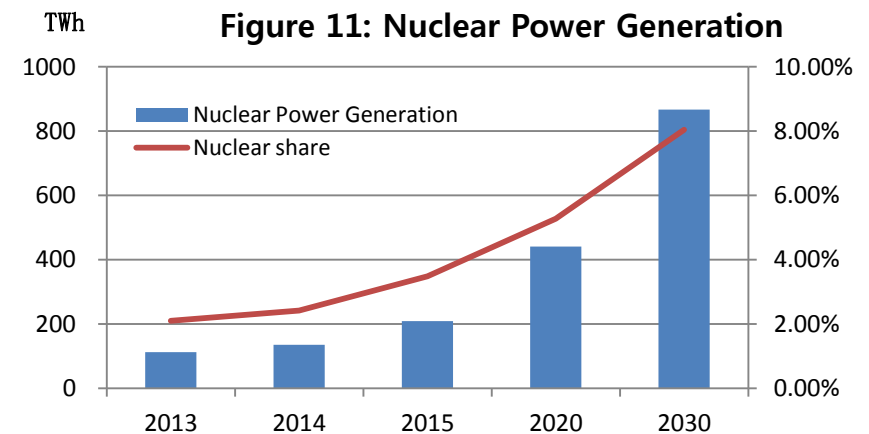
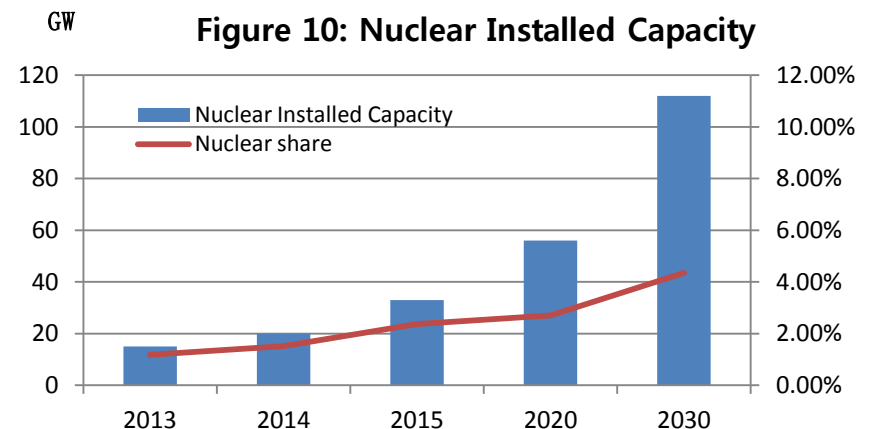


# V. Nuclear Outlook

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## 5. China is a lower nuclear power user (1% in its energy mix) with big potential to expanded.

- The next decade will be seen a rapid growth of nuclear electricity generation averaged at 12.8% from 2013 to 2030 (compared with 4.2% of electricity growth nationwide and 2% of energy demand).
- Nuclear electricity generation will be 867 TWh based on 112 GW installed capacity, accordingly, both shares in energy mix will be 8% and 4.35% in 2030.
- Why 112 GW? Lower than some expected because of our conservative view of nuclear sector and its constraints in industrial chains, HR and public acceptance.
- Acceptable size and growth rate are critical to nuclear policy making moving forward.

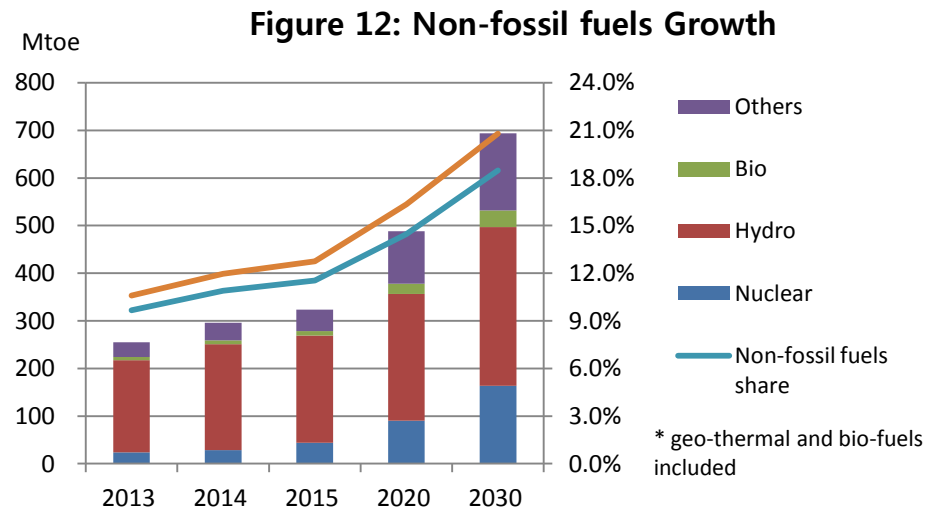


# VI. Renewables Outlook

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**6. Modern renewables will be witnessing rapid growth while hydro power increases steadily. Non-fossil fuels including nuclear, geo-thermal and bio-fuels will surpass oil in energy mix (16%) in 2020.**

- However, renewables encountered uncertainties. Besides higher costs and lower transfer rate, unstable utilization hours, not to mention management of wind and solar PV are distinguished from thermal powers. CSP and bio-energy are less developed.
- There exist wastes in wind, solar PV, even hydro sources being subject to policy innovation and marketization.



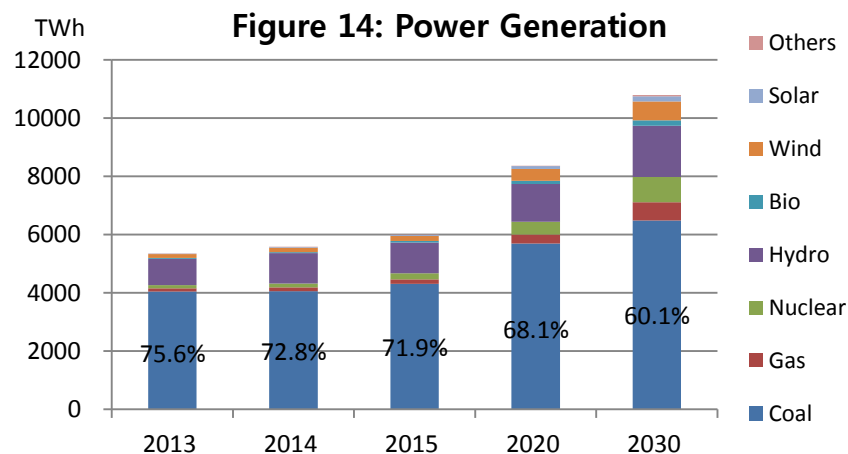
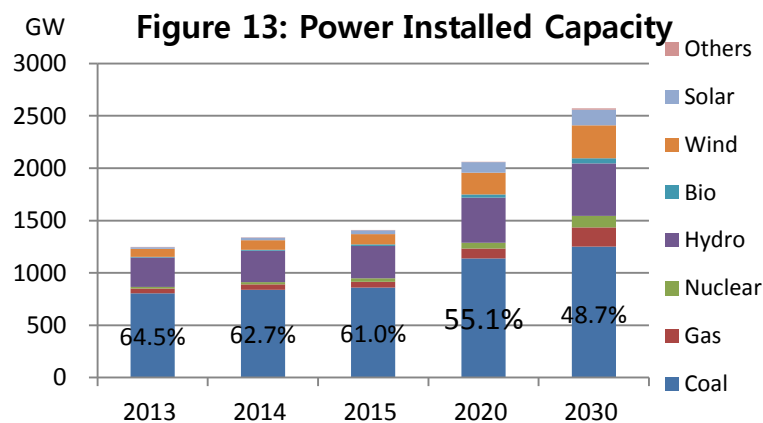


# VII. Electricity Outlook

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**7. Electricity Generation has reached 5540 TWh based on installed capacity 1338 GW. Shares of coal and hydro installed capacities will be decreased because of increases in nuclear, gas and renewables.**

Coal power capacity reduced from 65% down to 48.7%; gas used for power generation will increase from current 15% up to 20% if gas fired turbine facilities nationalized, gas price rationalized, plus policy renewed.

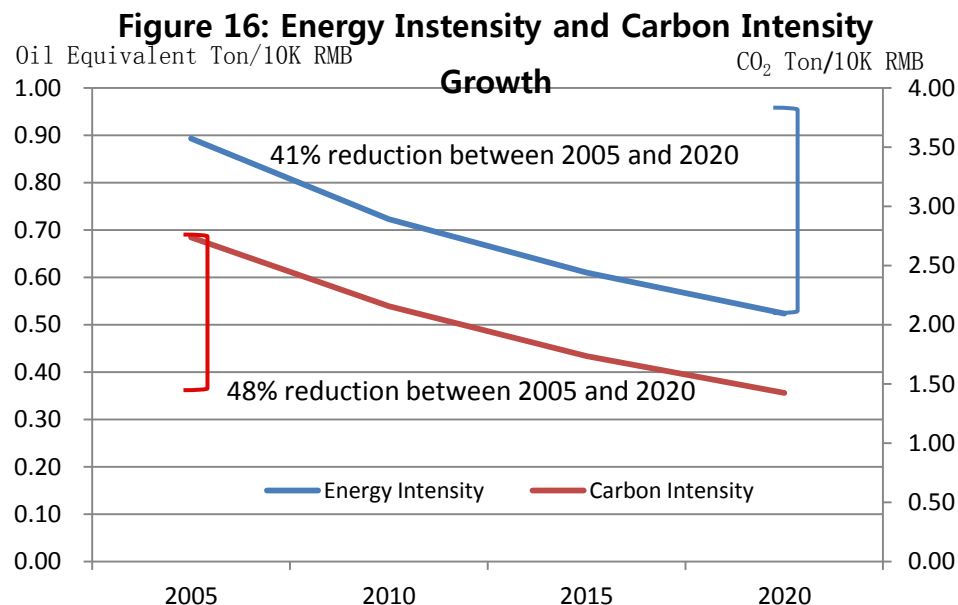


# VIII. Carbon Emission

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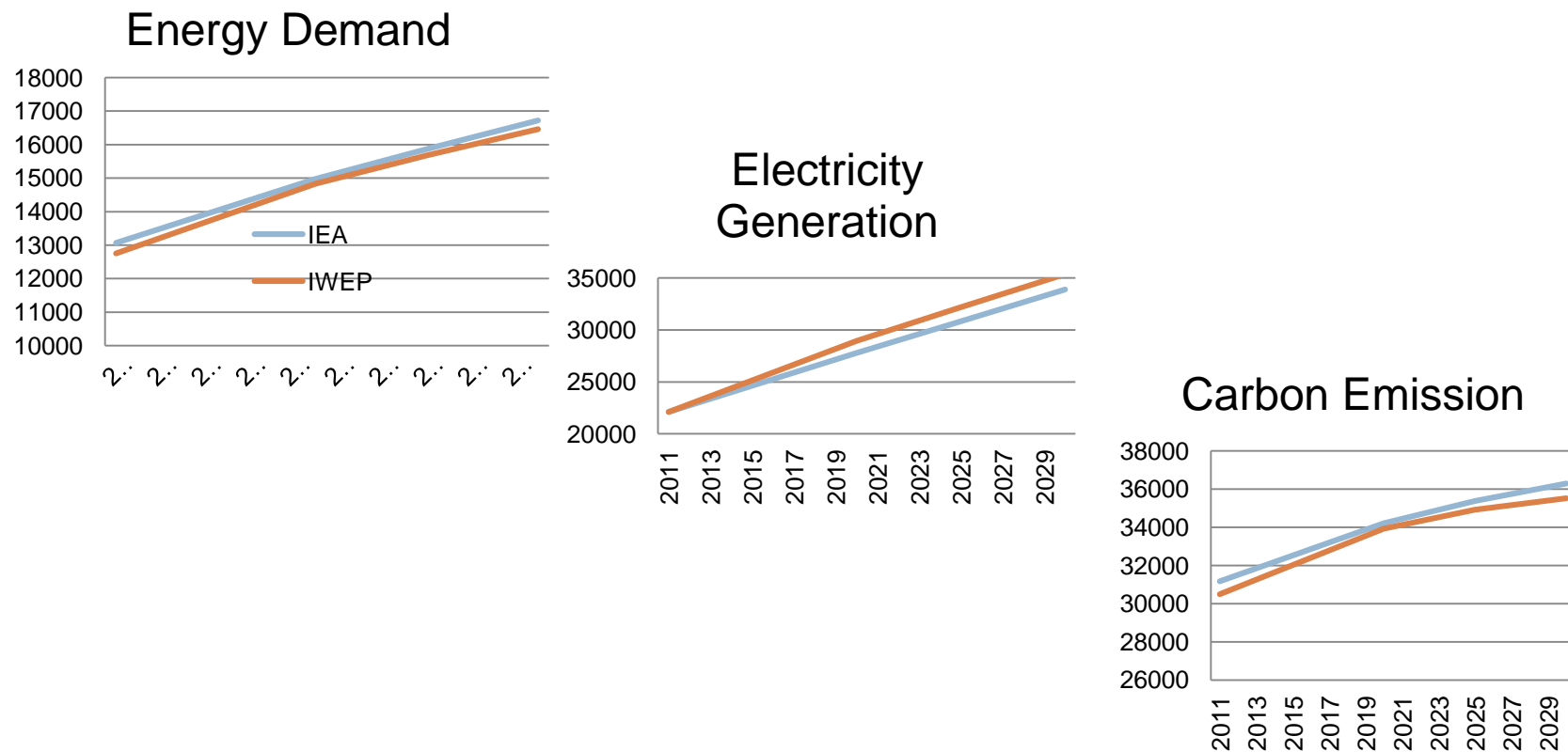
## 8. Under the EES scenario, carbon emission target would be met and surpassed.

- CO2 emission from fossil fuels could reach 8000 mt in 2015 and 9200 mt or higher in 2020 before leveling off thereafter.
- Because of coal demand peak in 2020, CO2 emission could fall around 9500 mt. Therefore, CO2 emission target for 45% reduction to that in 2005 will be met in 2019 and 48% in 2020, well higher than committed.



# IX. Differences (IEA vs. IWEPP)

## 9. Comparison between IEA and IWEPP on China's energy



# IX. Differences (IEA vs. IWEF)

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## IWEF energy mix vs. that of IEA:

- Our coal share is lower while gas share higher than those by the IEA in energy mix

Figure 17: Energy Demand Mix in China

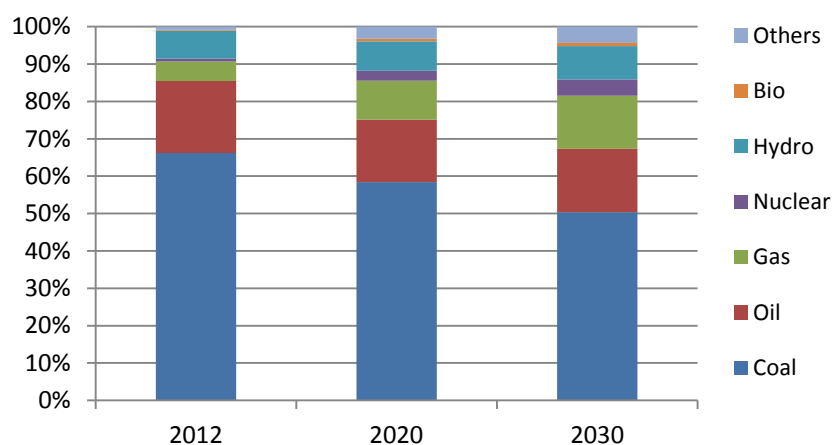
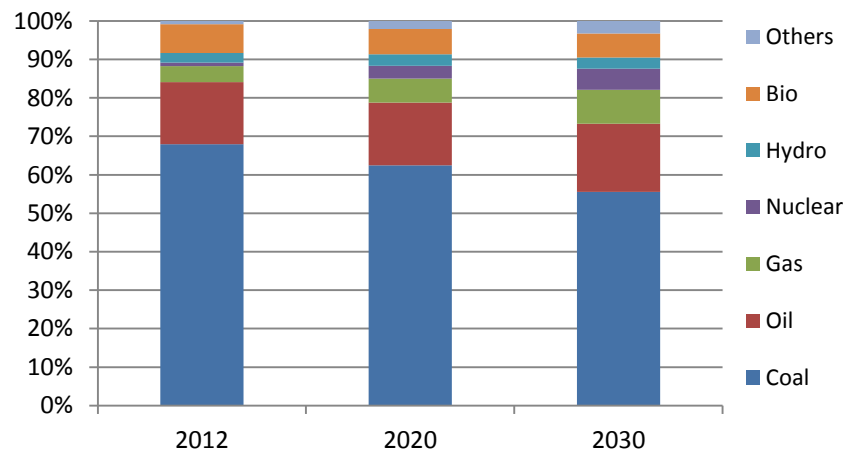


Figure 18: IEA Energy Demand in China Mix



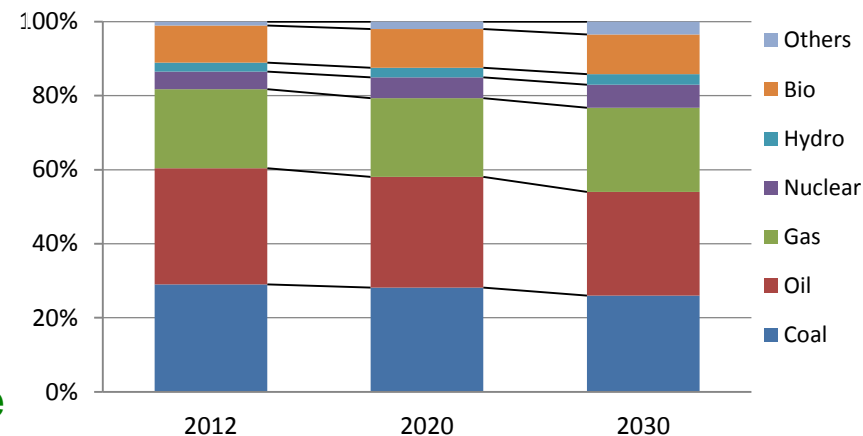
# X. Global Impacts

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## 10. Against the global energy demand mix, we believe China under EES scenario would facilitate global energy transformation into 2030

- IEA: Global energy demand will grow fairly steadily and see snail growth from 2% in 2025 down to 1% in 2030.
- However, shares of clean energy sources (gas, nuclear and renewables) will increase from 40% up to 46% in 2030 globally indicating a greater optimization in energy mix.
- This trends could be seen earlier because of changes taking place in OECD and Non-OECD (China mainly).

Figure 4: World Energy Mix



资料来源：IEA，WEO 2014

# XI. Energy Transformation - China

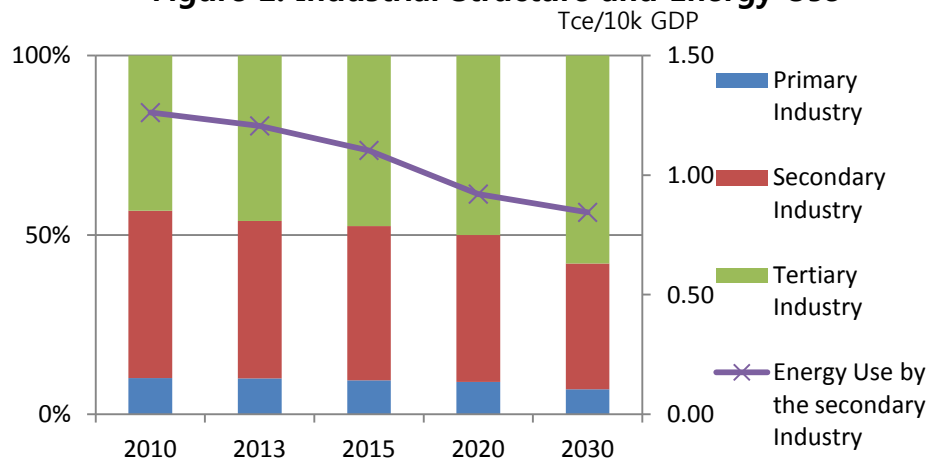
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## 11. There are evident transformation seen in OECD countries and non-OECD.

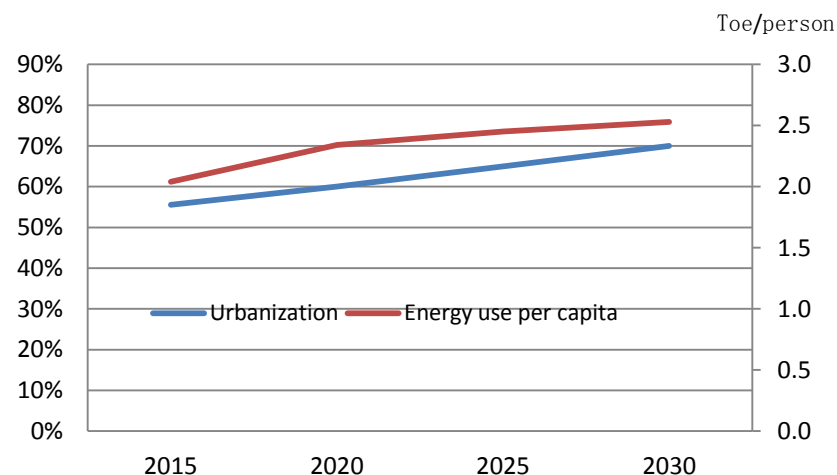
De-couple of energy demand and economic growth in OECD while the ties between the two are tightly indexed in Non-OECD. Energy efficiency, saving and innovation play key roles in both types of energy transformation.

Greater energy transformation will be seen in China around 2020 featured by reduction in energy use, enhanced energy efficiency, technology innovation.

**Figure 1: Industrial Structure and Energy Use**



**Figure 2: Urbanization and Energy Use**



# Key Data for Well-off Society

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Field	Items	Unit	2015 Planning	2015 EES	2020 EES	2020 Industry
Energy Consumption & Efficiency	Energy Consumption	100 mtce	40	41.9	48.9	52.7
	Coal share	%	—	63.6	57.3	60.4
	Non-fossil fuels	%	11.4	11.1	14.8	13.7
	Electricity	TWh	6150	6000	7390	8610
	Energy Intensity	Tce/10kRMB	0.68	0.71	0.59	0.64
	Coal use by thermal Power	Grame/kwh	323	318.6	308.6	308.6
Electricity	Installed capacity	GW	1490	1420	1830	2030
	Coal fired	GW	960	880	960	1210
	Hydro	GW	290	310	380	400
	Nuclear	GW	40	33.37	59.45	61.6
	Gas fired	GW	56	50	90	77.88
	Wind	GW	100	100	210	200
	Solar	GW	21	35	100	50
Ecosystem protection	CO2 emission intensity	Tone/10kRMB	—	1.43	1.12	1.23
	Reduction of CO2 cimmitted	%	—	33.3	47.8	42.5
Well being	Energy use per capita	tce	—	3.0	3.4	3.7
	Electricity per capita	kwh	—	4364	5133	5986
	Electricity per capita for residential	kwh	620	574	737	1172
	Population using gas	100 million	2.5	2.9	??	??

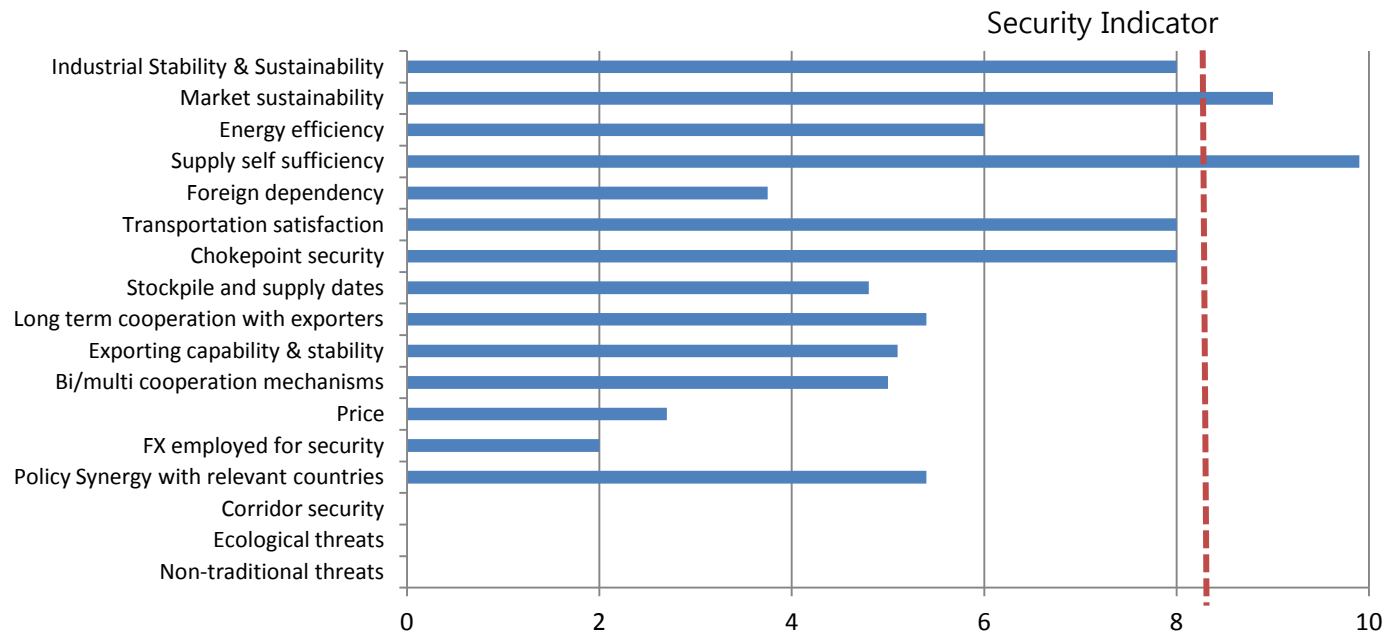
# XII. Energy Security Reframed

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**12. Today we are facing interlinked landscape of energy security. To make the concept measurable and manageable is required.**

**In our report, we reframe energy security by a set of relevant aspects covering energy industry, regulators, environmental concerns, biological care, societal relation, public expectation, international relations, infrastructure and future development before indexed.**

**Figure 25: Energy Security Evaluation**





# XIII. Energy Cooperation

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## 14. Such an energy security is also subject to multilateral cooperation arrangements:

- China-Russia-Central Asia
- China-ASEANs
- North Indian Ocean
- North Pacific
- Sino-Europe-
- Partner with Intl Institutions

- **Multilateral cooperation objectives:** build up mechanisms to enhance energy demands, efficiency, technology advances with intent to reframe an open, inclusive and sustainable energy government at regional, trans-regional level.
- **Energy BRICS** was proposed to strengthen multilateral cooperation with emerging economies.

# Conclusions

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- 1 There are some big gaps between new energy policies witnessed and studied and our EES scenario, which leaves a set of questions to be answered in the coming five years.
- 2 The year 2020 will be critical milestone for energy transformation in China before its moving to next one/new heights aiming at sustainable development. We believe this milestone 2020 could be the last chance to the country to build up its well-off society as expected.
- 3 Obviously, there are new requirements and efforts deserved to come to deal with shortages and laggards and pave way ahead in policy making from EES scenario points in the 2<sup>nd</sup> half 2015 and 2016 (we are closely watching, investigating and advising)

# Top 10 Outstanding Issues

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- ① Coal fired generation <50% while coal used for power >50%
- ② Oil demand and its substitution prospects
- ③ Gas “supply surplus” and utilization
- ④ Nuclear issues (size, growth rate and inland deployment)
- ⑤ Wind and solar power utilized
- ⑥ Continue to build up energy storage capacity
- ⑦ Intra-regional power grid connections
- ⑧ Near zero emission and its economics
- ⑨ Near zero emission and energy savings
- ⑩ Urbanization and energy services

# Advices

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1. **For Policy makers** - Policy refocus, enhancement in line with governmentally **smarter** role together with integration, inclusiveness and implementation are advised
2. **For the Industry** – We encourage the industry to be more open and resilient to market competition and upgrade energy supply oriented strategy towards energy services oriented strategy (indicating the importance of stability of supply, public acceptance, fairly accessible, more mobile facilities, smarter grid, and inclusive development).
3. **For the public:** A direct dialogue between the public, industry and the government is required and indispensable because joint efforts for better energy services, energy saving and emission reduction are imperative to unlock the benefits of the energy transformation worldwide.
4. **For the rest of the world:** A better understanding of Chinese energy policy deserves not only high level dialogues but also an exchange of data, analysis along with the outlook like today we've attempted.

# Thanks & Closer Cooperation

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- ❖ Thanks for your listening
- ❖ Thanks to IEEJ plus Mr. Masuda Tatsuo for your invitation and arrangements.
- ❖ We are seeking a closer cooperation with IEEJ on the energy outlook program.
- ❖ We are also seeking closer cooperation under the flag of CICA energy security roundtable panel I chair as well.

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