



水电水利规划设计总院
China Renewable Energy Engineering Institute

RE Development and Investment Experience of China: An Introduction

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RE in China: the Status Quo and Prospect

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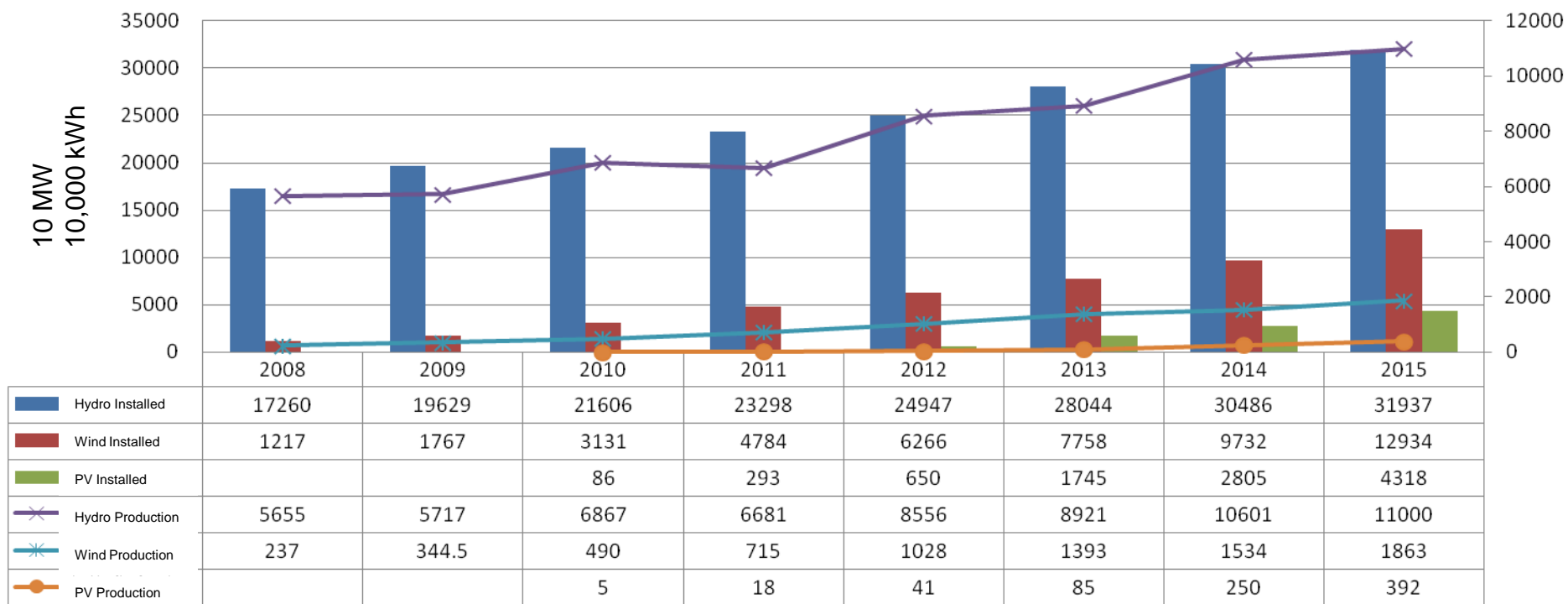
Promoting RE in China: Investment Policy and Experience

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Vision of Future: Enhancing International Cooperation in RE

1. RE: Expanding Scale in Utilization and Proportion in Consumption Market

By 2015, the total energy consumption of China reached 4.3 billion standard coal, 0.9% up compared to 2014. The non-fossil fuel took up 12%, 08% up compared to 2014 and 3.4% to 2010, providing strong support to the transformation of energy portfolio and the carbon reduction in China.

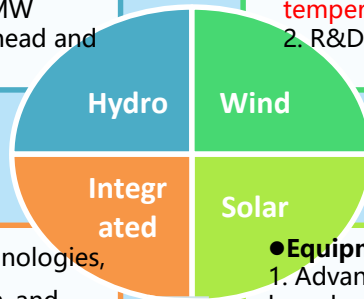


By 2015, China possessed 319.37GW, 129.34 GW, and 43.18 GW hydropower (22.71 GW from pumped), wind power and solar PV installed capacity with the accumulated power output reaching 1100 billion kWh, 186.3 billion kWh, and 39.2 billion kWh respectively. **China boasts the largest Hydro, wind and PV power installed capacity in the world.**

2. Full-fledged RE Technology and Industrial Chain

- Completion of Jinping I hydropower station, the world highest **Concrete Double Arch Dam above 300m**
- Progress of the key technologies, such as the **Safety and Risk Control of Large Scale Hydropower Projects**
- R&D of the **Equipment Set for Super High Dams above 200m High**
- Mastering the key technologies of large size impulse turbine units of 200~400 MW
- Domestic production of turbine units for pumped storage stations with 400MW installed capacity and 500m water head and above

- **Equipment Manufacture:**
 1. **1.5MW~5MW:** Production and Commercialization; rolling off of the large scale offshore wind turbine units
 2. **13121** sets of new wind turbines installed by 2015; Goldwind Technology, United Power, and Ming Yang Wind Power taking up 52% of the market in total
- **Key Technology:**
 1. Wind turbine units resisting complicated natural environment, such as **low temperature, typhoon, and high-altitude**
 2. R&D of mega wind turbine

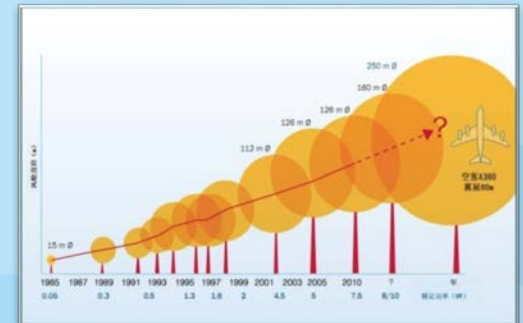


- Innovation of energy storage technologies, such as all VRB and air compression, and application in real projects
- Exploration in the integration of multi-type energies, and the construction of demo projects
- Diversifying the application of RE

- **Equipment Manufacture:**
 1. Advancing the properties of PV products, based on the "Fronrunner" demo base
 2. Enhancing the conversion efficiencies: polysilicon 16.5%, monocrystalline silicon 17%, and the system 81%
 3. 6 of the 10 largest PV module supplies in the world come from China; Trina Solar boasts the largest production in the world.
- **Key Technologies :**
 1. **Innovation in the technology** of high percentage connection of distributed PV stations.
 2. Promoting demo application of Photo thermal



Jinping I, 305m high



Upgrading Large Capacity Wind Turbine

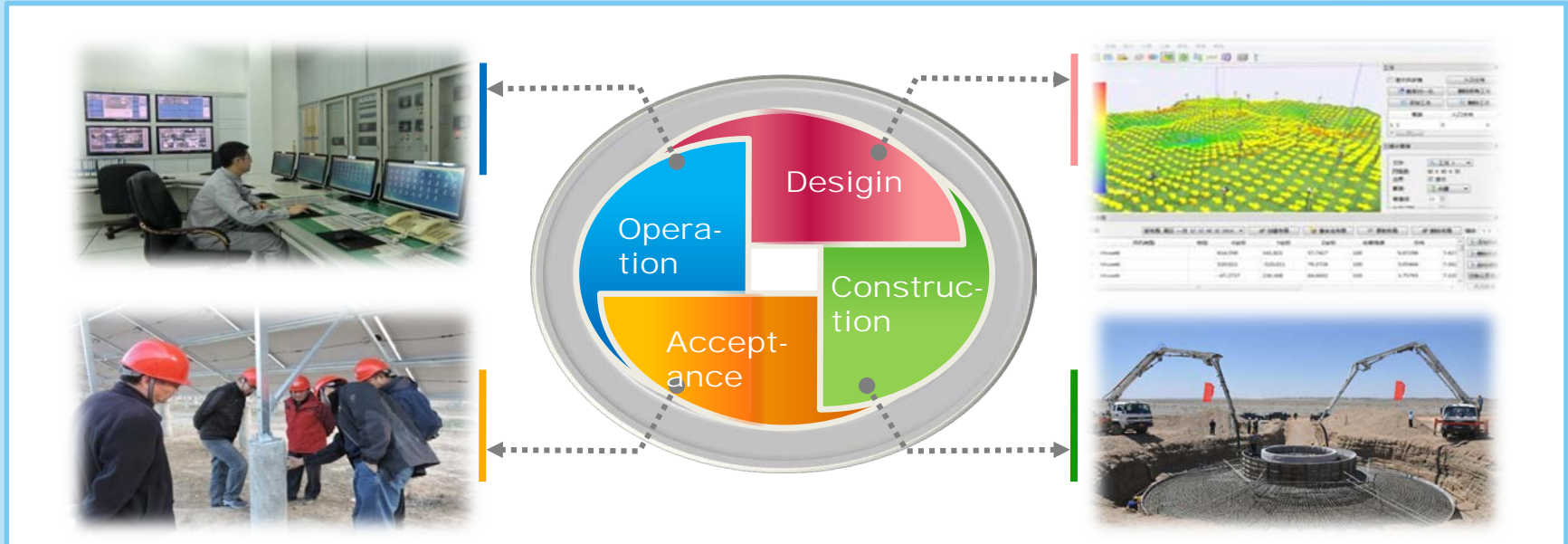


"Fronrunner" PV Demo Base in the Subsidence Area in Datong, China

China Boasts World leading Equipment Manufacturing Capacity in Hydropower, Wind Power and Solar Power

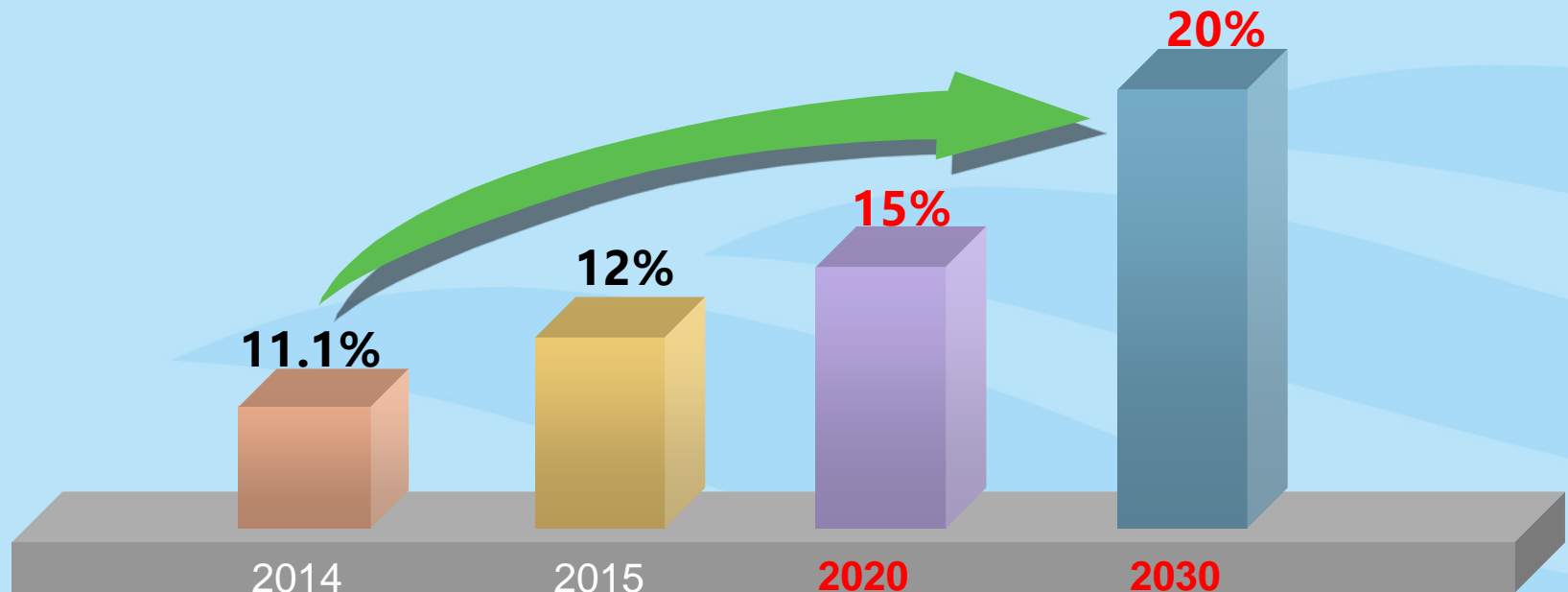
3. Developing Complete RE Industry System

- **Policy System** : Based on the *Renewable Energy Law*, China has developed a complete RE subsidizing and monitoring policy system.
- **Standardization and Certification System** : China possesses a full-fledged standardization policy system to guide the development of the industry. There are dedicated standardization institutions for hydro, wind, solar power respectively, covering the whole life cycle of projects.
- **Capacity Building** : Investment from Chinese enterprises, such as the five power generation companies, China Guangdong Nuclear, Guohua Group, and the Three Gorges Group, have boosted RE construction in China and the world. Engineering corporations from POWERCHINA, such as PowerChina Chengdu, PowerChina Huadong, PowerChina Shanghai, PowerChina Xibei, PowerChina Zhongnan, and PowerChina Guangdong, carried out extensive preliminary and planning studies and design work of large-scale hydropower projects and onshore and offshore wind power projects in China. They possess strong investigation, design, and EPC capacity.



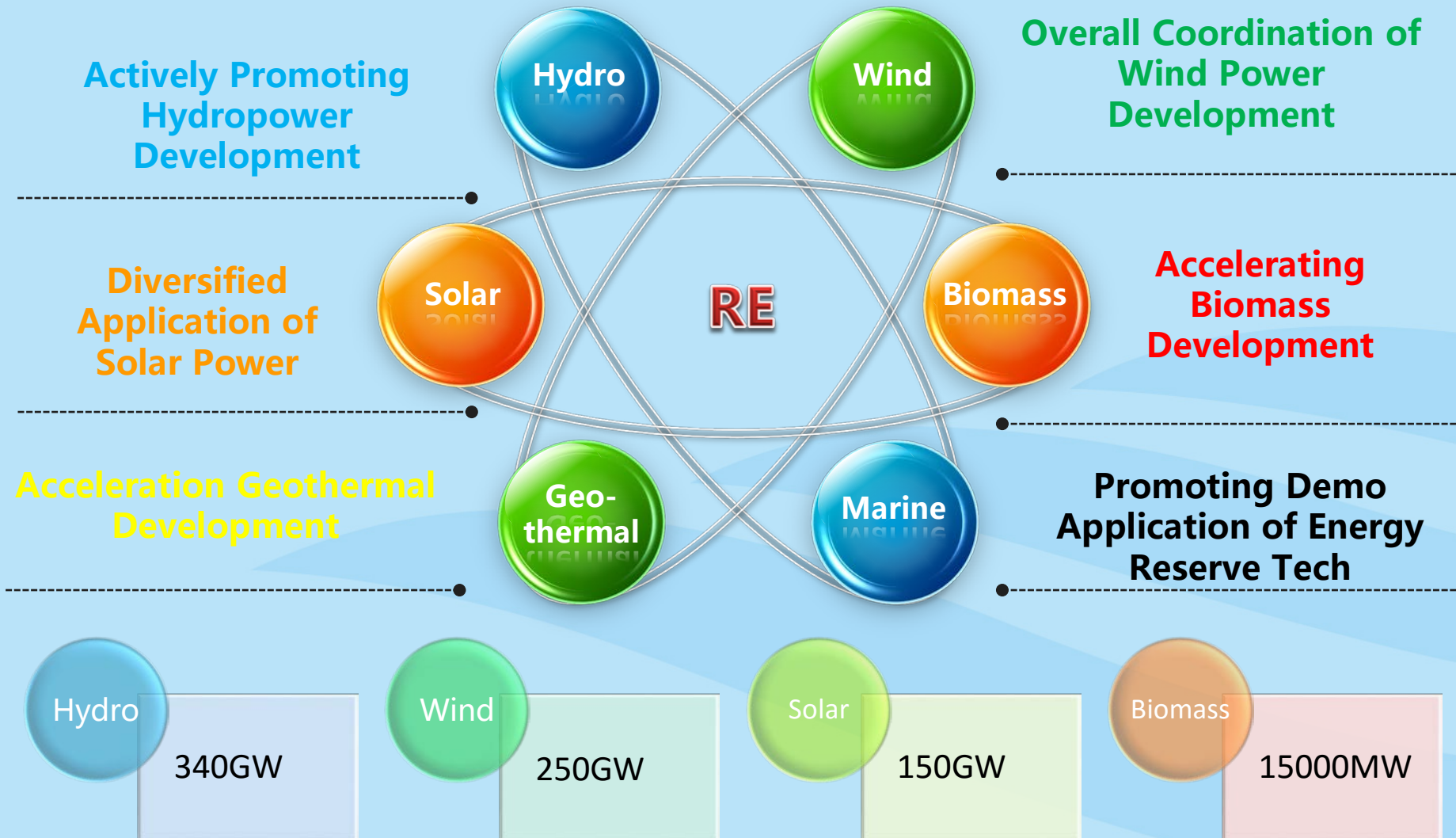
4. Overall Prospect of RE Development in China

RE is the direction of world energy development. Chinese government pays significant attention to RE development and has announced the ambitious goal to raise the proportion of non-fossil fuel in energy consumption to 15% by 2020, and 20% by 2030.



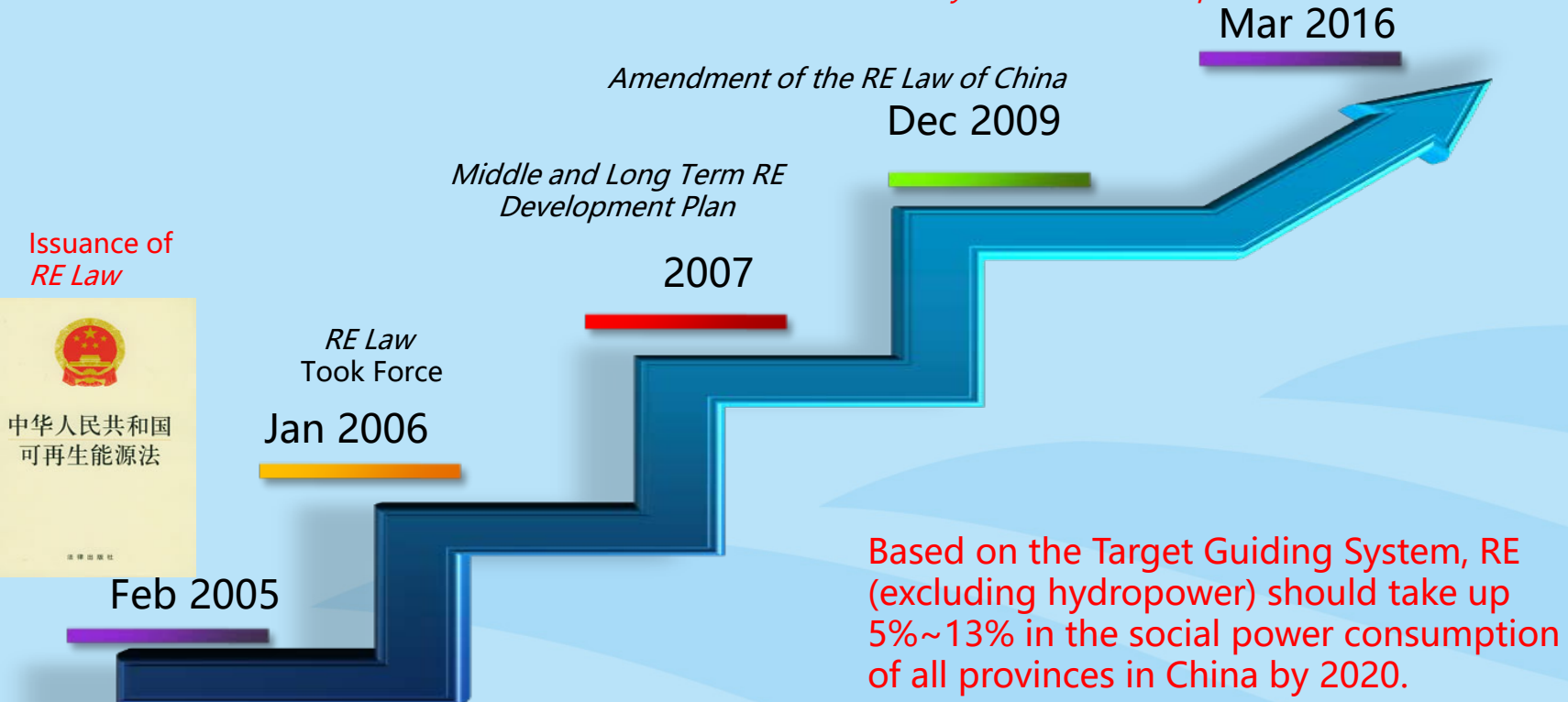
The percentage of Non-fossil Fuel in Primary Power Consumption

5. RE in the Thirteenth Five Year Plan of China



1. Enacting RE Law and the related regulations, guiding the industry development

Regulation on the Full Price Subsidy Takeover of RE Power Generation
Guidance Opinion on the Establishment of Target Guiding System in RE Development and Utilization



2、 Mature pricing policies, creating a stable market for investment

(1) Founding of RE Development Fund

Some of the fund is allocated by the Ministry of Finance from the yearly public budget, while the rest comes from the added fees to power payment.

The special fund will go to:

- The scientific and technological studies, standard compilation, and demo projects in RE development and utilization
- RE project supplying energy to rural and pasturing area
- Development of isolated RE power system in remote area and islands
- RE resources investigation, evaluation, and information system development

The Added Fees intend to support:

The first, second and the third lists of the subsidized items was issued in 2012

The forth list of the subsidized items was issued in 2013

The fifth list of the subsidized items was issued in 2014

The sixth list of the subsidized items was issued in 2016

(2) The Subsidy Policy of Benchmark Power Price

RE (excluding hydropower) in China adopts benchmark prices. Onshore wind power and Solar PV follow certain benchmark prices in different regions, while agriculture and forest biomass, offshore wind, and Photo thermal power use the same benchmark price nationwide.

Wind	•2016 Benchmark Price : 0.47~0.60 Yuan RMB/kWh
PV	•2016 Benchmark Price : 0.80~0.98 Yuan RMB/kWh
Offshore Wind	•Intertidal Zone 0.75 Yuan RMB/kWh , Coastline Zone 0.85 Yuan RMB/kWh
Photo thermal	•1.15Yuan RMB/kWh for demo projects

3、 Enhancing Planning; Guiding the Industry; Promoting Investment from Enterprises; Upgrading the Manufacturing Capacity

RE Integrated Utilization

- The Thirteenth Five Year Plan for RE development
- The planning of regional energy reform demo projects, such as Zhangjiakou RE demo zone
- The planning of hydro, wind, and solar power complementary demo base

Hydro

- The Thirteenth Five Year Plan for Hydropower development
- Nationwide water resources investigation and river planning of 40 rivers, including Jinsha River, Yalong River, and Dadu
- Pumped storage planning in more than 20 provinces of China

Wind

- The Thirteenth Five Year Plan for Wind Power development
- The planning of large-scale wind power bases, such as in Jiuquan of Gansu Province, Inner Mongolia, Shanxi, and Huaidong in Xinjiang autonomous region
- The planning of offshore wind farms in provinces, such as Jiangsu, Fujian, Guangdong, and Hainan

Solar

- The Thirteenth Five Year Plan for Solar Power development
- The planning of “frontrunner” demo bases in Datong, Yangquan, Baotou, Jining, Xintai, and etc.
- The planning of photo thermal demo projects

4. Ideas on the Incentive Policies for RE Investment during the “13th Five Year Plan

Developing the RE industry in market environment, allocating the projects through competition, and pulling down the cost of the industry

Exploring mechanisms such as RE quota, carbon reduction, and green certificate to develop full-fledged RE market mechanism

Imposing Non-RE power generation quota and assessment mechanism on coal-fired thermal power projects to ensure room for RE power consumption

Accelerating the development of micro-grid and distributed PV stations and cultivating strategic new markets, based on the Power System Reform

Vision of Cooperation :

It is estimated that there should be about 2.5 trillion RMB investment in RE during the “13th Five Year Plan” . There will be a huge market for RE investment in China. On the other hand, China is willing to participate in RE development and construction in the world market, leveraging our strengths in technology and cost and capacity from manufacturing, investment and development, construction to operation.

As we go further in countering climate change and pushing forward energy reform, RE has become a key area for “green” economic development. China is willing to carry out cooperation with all nations by capacity building, technical exchanges, project construction, and talent training. We hope to join hands with all nations to promote the development of RE industry.

The Core Business of CREEI



- the only appointed institution in Charge of RE technology management of China
- Industry Planning
- Technology management
- Project check and acceptance
- Quality monitoring
- Standard compilation
- Policy studies
- RE budget administration
- Safety facility check and acceptance
- National RE power generation monitoring institution
- National RE information management center
- International and inter-governmental Cooperation
- One of the 16 energy study and consulting bases of China
- Standardization Commission and 8 Sub-commissions

CREEI is the RE technology administrative institution of China and boasts strengths in technology, information, resources, and talents. CREEI is willing to provide full-ranged technical exchanges, cooperation and service in planning and studies, policy consulting, project design, project assessment consulting, and project construction. CREEI is willing to join the world to explore the prospect of RE cooperation and contribute to the sustained and sound development of RE industry in the world.



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Thank You !