

Renewable Energy Development Review and Outlook



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The RE policies and plan in China



International co-operation in RE



Look forward to the future



China's Plan and Policy

China developed RE through learning international experience, especially benefit from EU and the U.S.



China's RE development review before 2002



Aimed to solve the lack of energy in rural, and put forward:

- Biogas plan;
- Rural electrification plan;
- Saving coal gas;
- Rural energy program.

RE technology in test and experiments stage

- EU mainly promote wind generation by German, Denmark, Spain and US
- EU mainly advance PV solar by Holland, German and Canada, also US

Scaled up since 2002

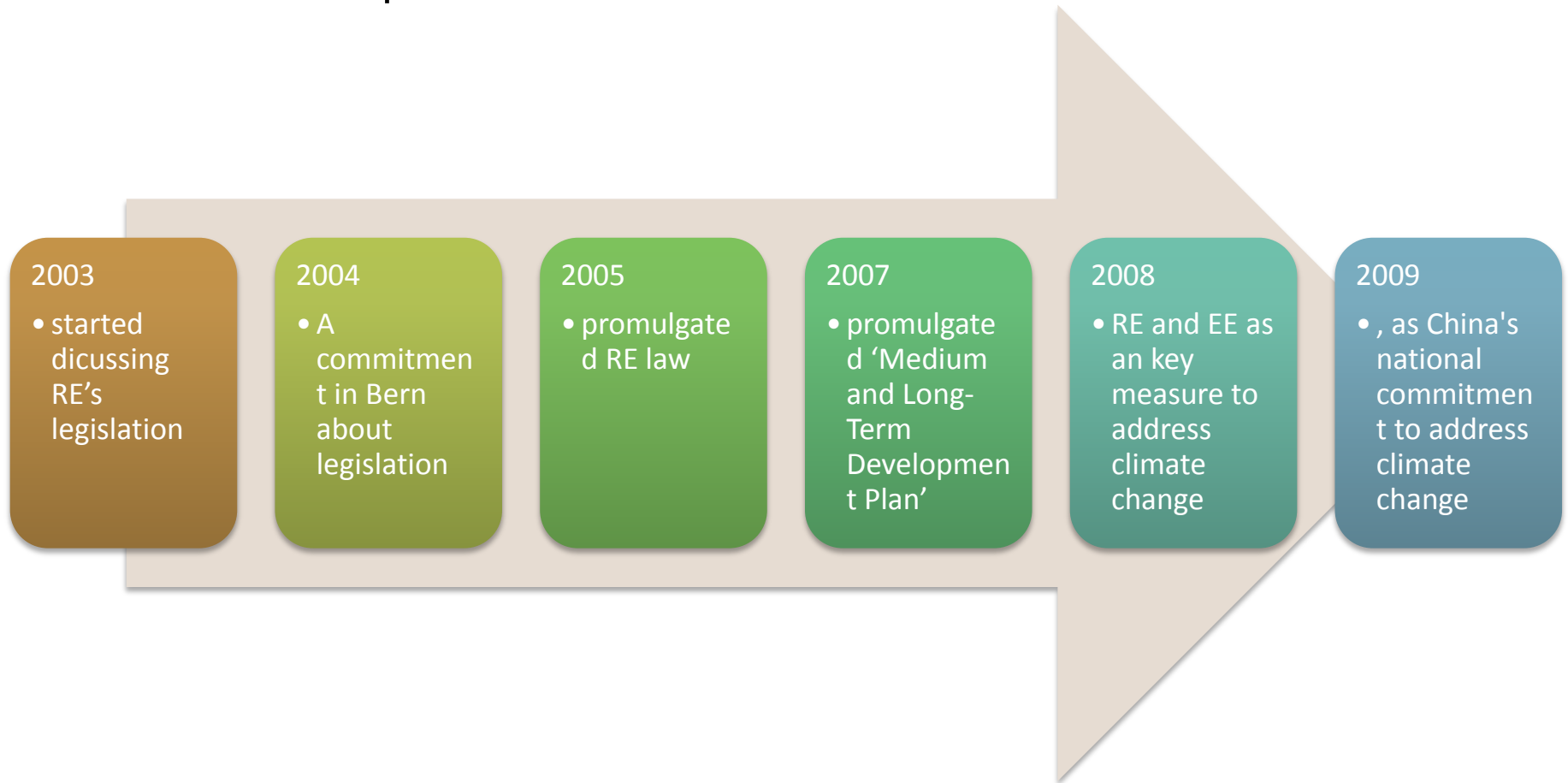
- From 2002 to 2003 sending electricity to the rural promote PV industry
- In 2003, started competitive bidding programme of wind power



China's RE development review before 2002



Since Johannesburg meeting in 2002, China gradual integrate with the international cooperation



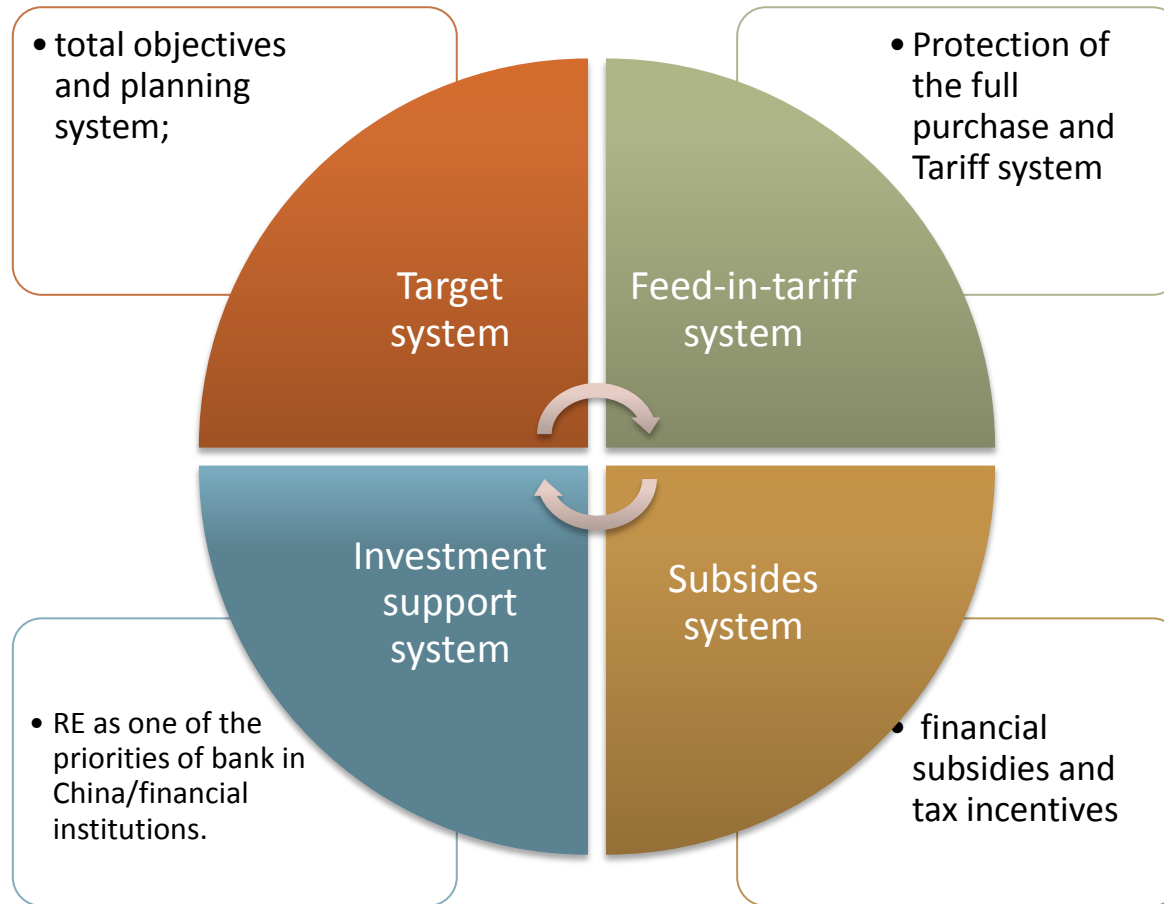
RE Policies in China



In order to promote the uptake of RE, increase energy supply, improve energy structure, ensure energy security, environmental protection, sustainable development of economy and society, NPC take Renewable Energy Law as a guide to the legal basis for the development of RE .



Renewable Energy Law provides for various systems





Target and planning system

- national energy needs
- the actual situation of RE resources

- 
- *a national RE development and utilization of the total long-term goals*
 - development of RE technologies

- 
- *national RE development and utilization plan*

- Developed by **Energy department of the State Council**
- approval and implementation by **State Council**





Feed-in-Tariff system

Protection of the full purchase for RE system

- the State Council department in charge of energy, the State Electricity Regulatory agencies and the State Council financial departments
 - *RE share in the total electricity generation*
 - *specific method on priority scheduling and full purchase to power grid enterprises*

Tariff system

- Renewable energy feed-in tariffs based on 'government guided' prices, authorized the **State Council department in charge of price**, according to different types of RE power generation characteristics and different local conditions,
- Tariff should be publicized.





Main point of RE tariffs in China

Tariffs system learned from the US, German and UK

- German's stationary Tariff system
- The US's PTC, ITC and tax allowance
- UK and Canada's bidding price

Specific tariffs

- Wind power with fixed feed-in tariff regime
- One price for PV
- Biomass power with fixed feed-in tariff by resources and technologies
- Off-shore wind power, PV and etc. with bidding price and approved price





Financial allowance and investment preferential

RE fundation to use in

- Scientific investment, standard set up and exemplify;
- rural's renewable projects;
- remoted districts and island's independent electricity system set up;
- resources research, comment and informations system set up;
- advance in local areas with devices.

Investment and tax allowance for

- The projects listed in the National RE developing guide table
- the project with the credit terms,





China RE development plan

It is a dynamite planning system and modified based the real situation

China RE development plan



The targets of the 2007 'Medium and Long-Term Development Plan for Renewable Energy in China

General target : 10% by 2010, 15% by 2020

Solar energy

Solar power:

In 2010, 40 MW
In 2020, 180 MW

Solar heater :

In 2010, 150 million m²
In 2020, 300 million m²

Wind energy

Wind power

In 2010, 500 MW
In 2020, 3000 MW

Biomass energy

Biomass power:

In 2010, 550 MW
In 2020, 3000 MW

Bio-liquid fuel:

In 2010, 5 million tons
In 2020, 12 million tons



China RE development plan



Several planning for RE development in policy-making

New energy and Renewable Energy in the 12th Five Year Plan

- Officially released in August 2012



The State Council's strategic emerging industries development plan, including the new energy and new energy motor industry

- Ministries have approved in principle, and now are working on details





2020 Targets to review

In all, the non-fossil-fuel sources will up to 15% share of primary energy

Hydropower: 3 GW
Wind power: 30GW
Solar power: 180 MW

be increased to

3.8GW
200GW
50GW or more

Biomass for power: 30 GW
Bio-liquid fuel : no targets

be reduced to

15 GW,
developing as far as
possible



New changes on policies in 2009



In the first half year of 2009, competitive bidding program of solar PV

On 26th Dec. 2009, new amendments on RE law

In April,

‘Golden Sun’ program was initiated

- Providing capital subsidies for solar PV installations
- Off-grid (stand-alone) installations receive 70% capital subsidies while grid-connected installations receive 50% subsidies



New changes in 2010 & 2011



A competitive bidding for 280 MW power project of solar PV (0.7228RMB/kWh)

Revised Golden Sun program implement measures implement unified bidding to key components

Off-shore Wind Power concession tender

New energy development included in emerging industries in the national strategic development plan

fixed price for solar PV(FIT) was issued by NDRC



The Outlook of the RE development

Wind power, solar energy begin to large-scale development, at the same time, biomass and other technologies depend on technological breakthroughs, requires patience and perseverance.



Driving force



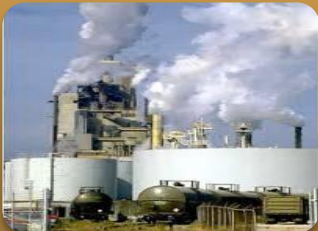
Energy

- Energy supply security
- Diversification of energy sources



Climate Change

- 80% GHG emission is from burning fossil fuels for energy
- 90% GHG emission reduction depending on clean technology



All in all

- Need 15%-20% RE by 2020
- Need 50% RE by 2050
- That's the hope of RE





Power generation

- The capacity of wind power and solar power should increase GW annually



Bio-liquid fuel

- Mostly fuel ethanol and biodiesel but limited to development
- Place hope on lignocelluloses and seaweeds



Heating

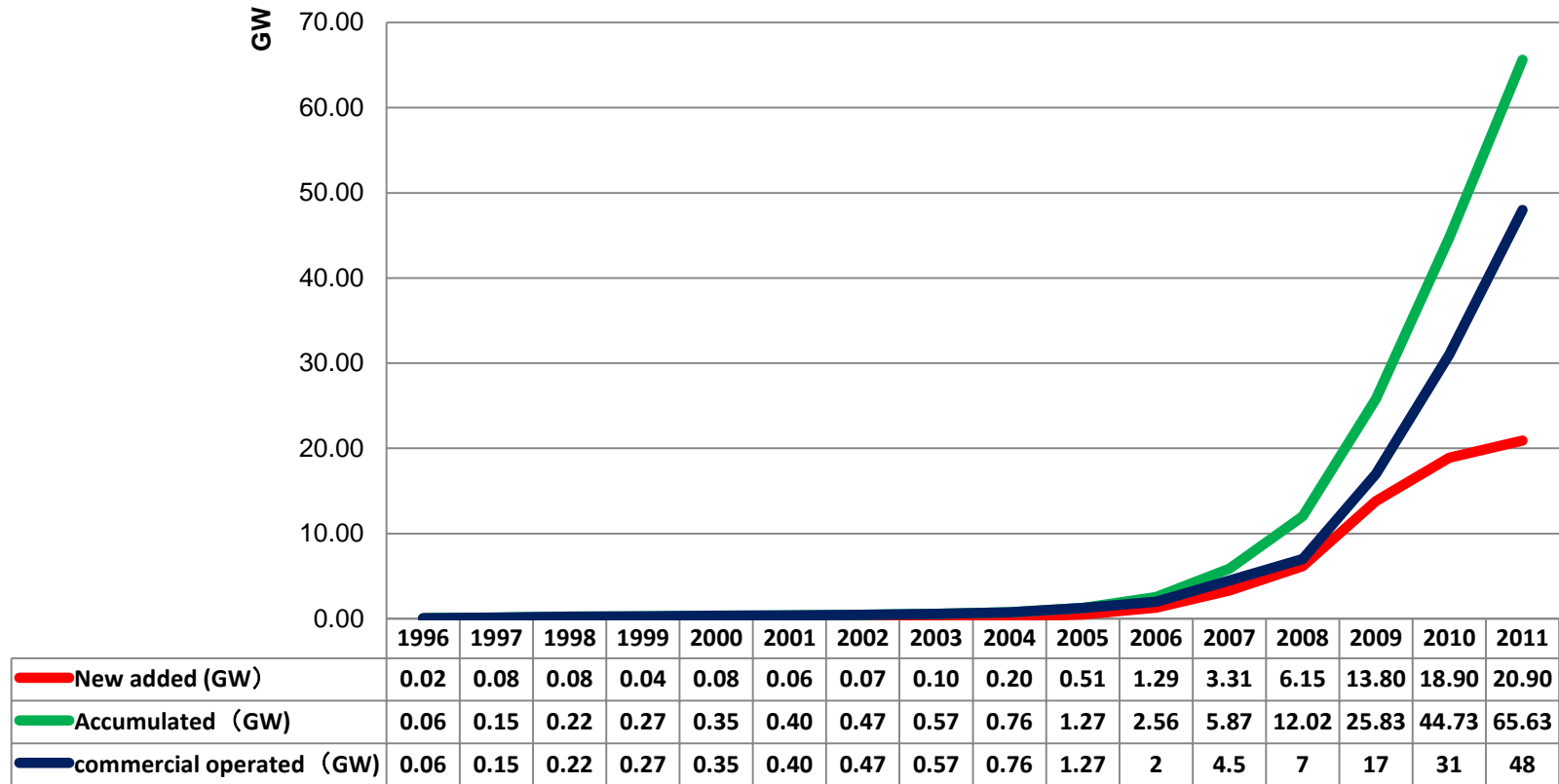
- Biomass heating is still used as the fodder in many developing countries' rural
- Solar hot water/heating is cheapest RE



Wind development in China



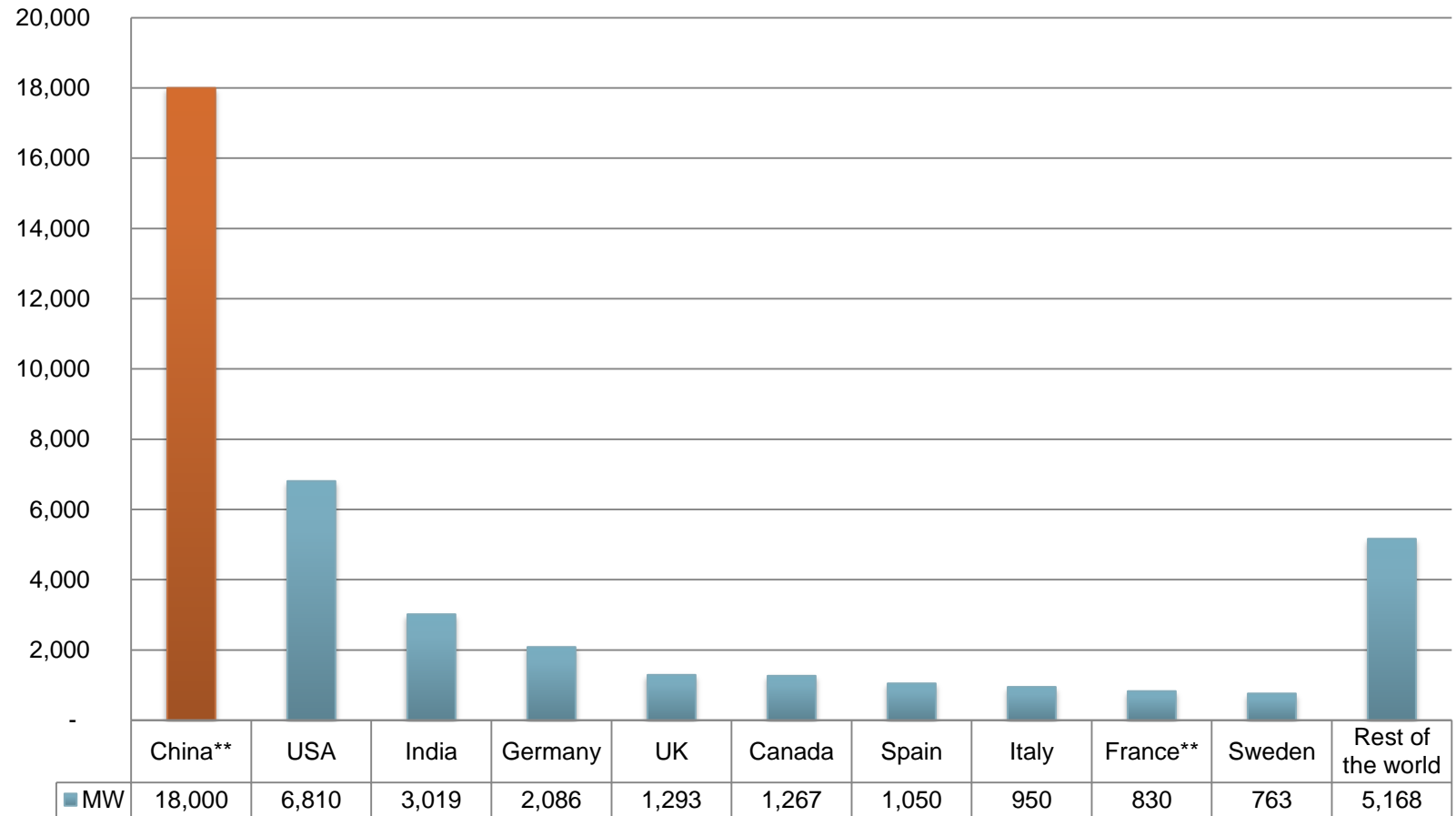
New added, accumulated and commercial operated installed capacity of wind power in China(1996-2011)



Wind development: China and the world



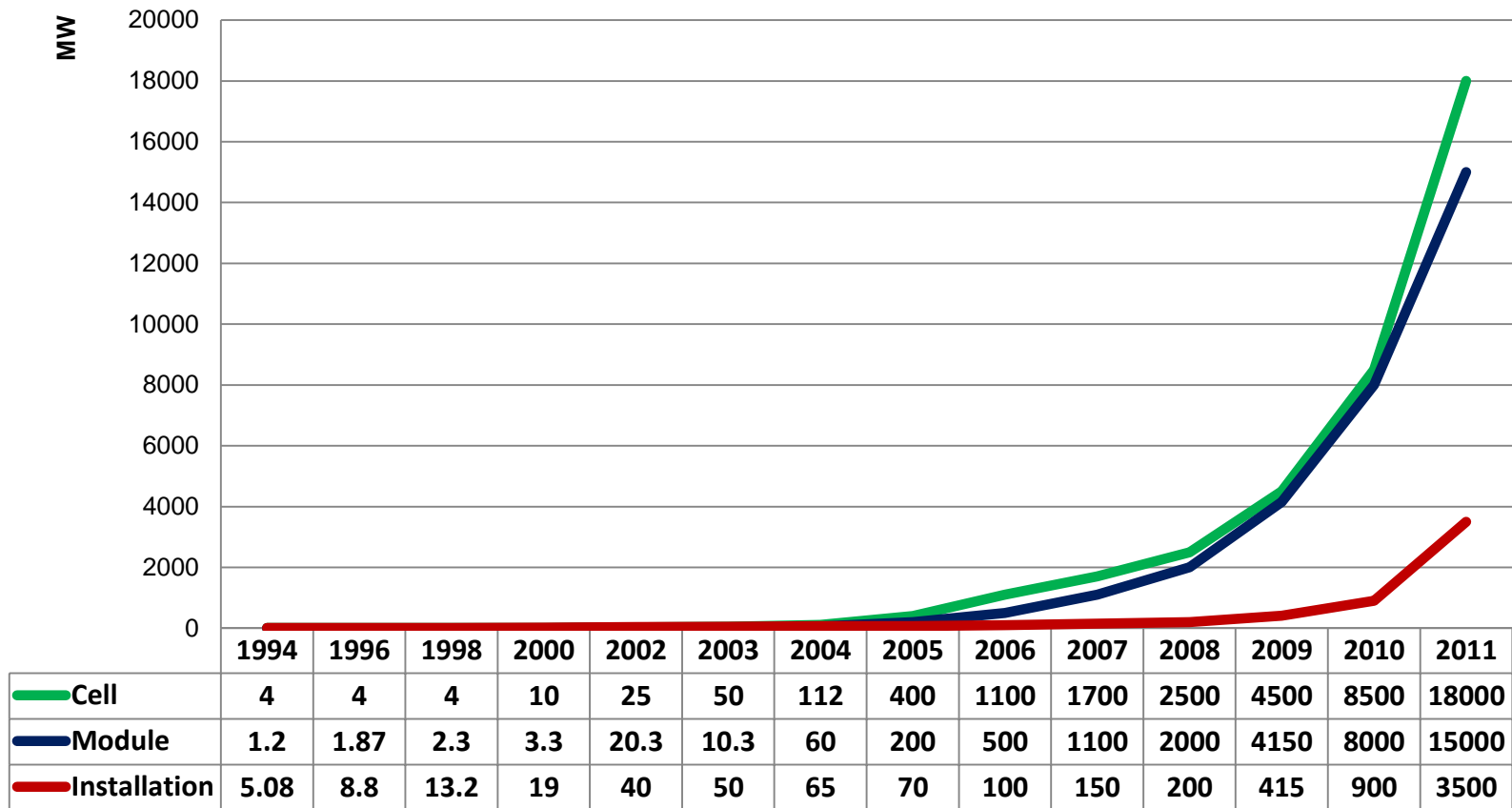
Global New added installed capacity of wind power in 2011



Solar PV production and installation



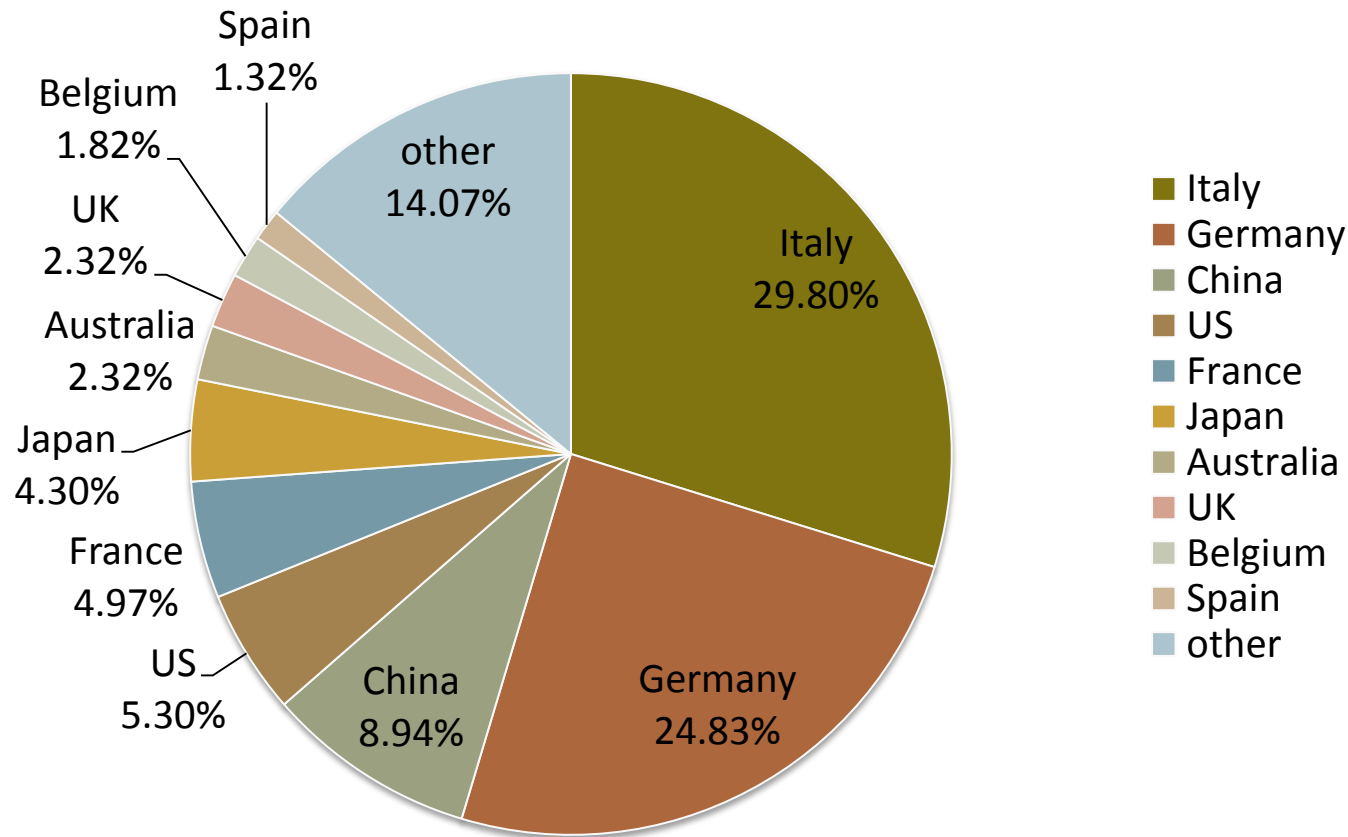
Solar PV production and installation in China



Solar PV Market in the world



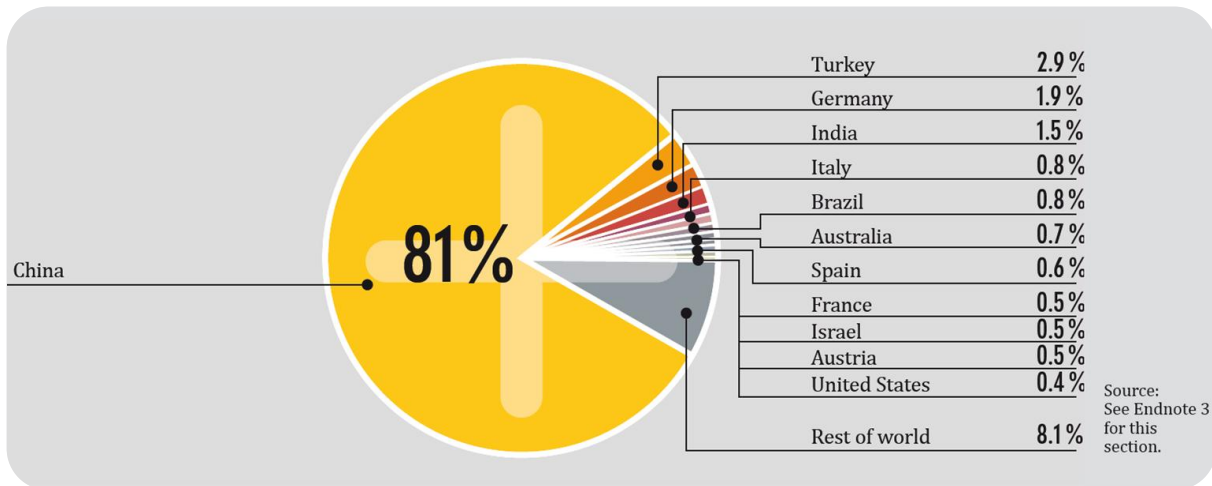
2011 New added Market of Solar PV in the world



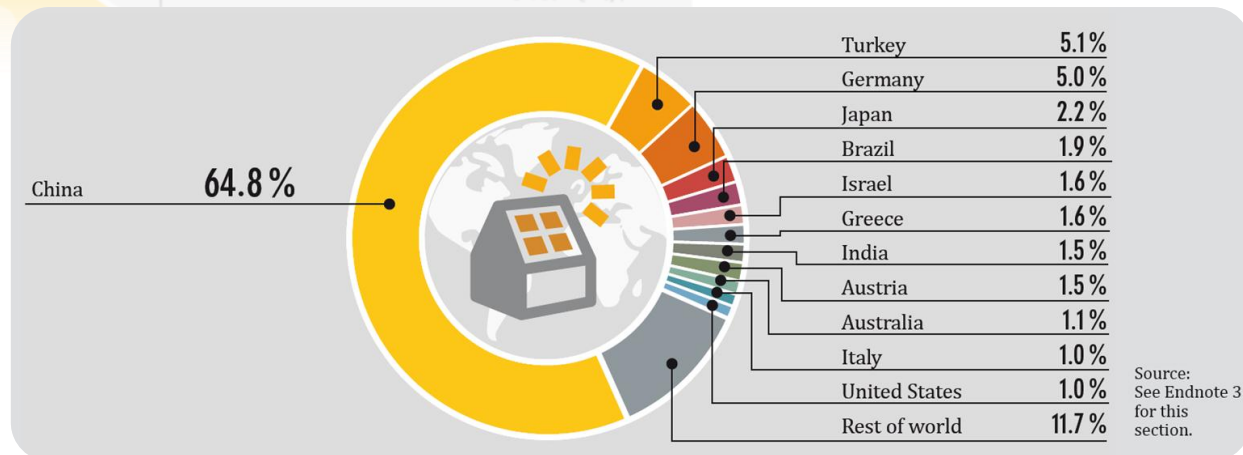
Solar hot water system: China and the world



Solar Heating Added Capacity, Top12 countries, 2010



Solar Heating Total World Capacity, Top12 countries, 2010



The outlook of the RE development



Wind power

- Global capacity will grow to 400-500 GW by 2020, closing to nuclear energy
- China wind power will increase to 100 GW by 2015 and 200 GW by 2020, will be 5 times of its 'nuclear energy

Solar PV

- The cost of solar PV will reduce to 0.8-1 Yuan/kWh by 2015 and 0.6-0.8 Yuan by 2020.
- The installations will be reached 10 GW by 2015 and it will be reached 50-100 GW by 2020.
- China will be about 15-25 GW and 50 to 100 GW by 2015 and 2020 respectively.

CSP

- Accelerating the progress of commercialized
- China will be 50 MW and 1 GW by 2015 and 2020 respectively

Lignocelluloses to alcohol

- should make a breakthrough after 2020, by then, Bio-fuels production will have great development.



Conclusion



- **Renewable energy** still is one of the national priorities of economic development in China
- **Cost reduction** is the right direction of RE application world wide.
- **USA, EU and China** are the major driven force for RE development in the world
- The **cooperation** between China, U.S. and EU on RE technologies R & D &D
- The current market is still very small in the world and it still needs a **political support** world wide





THANKS !

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