



Rural Electrification through Small Hydro Power in China

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China's First Hydropower Station, 1912



SHI LONG BA hydropower station

Turbine



Imported from Germany

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Historical Processes

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Small Hydro & Rural Electrification

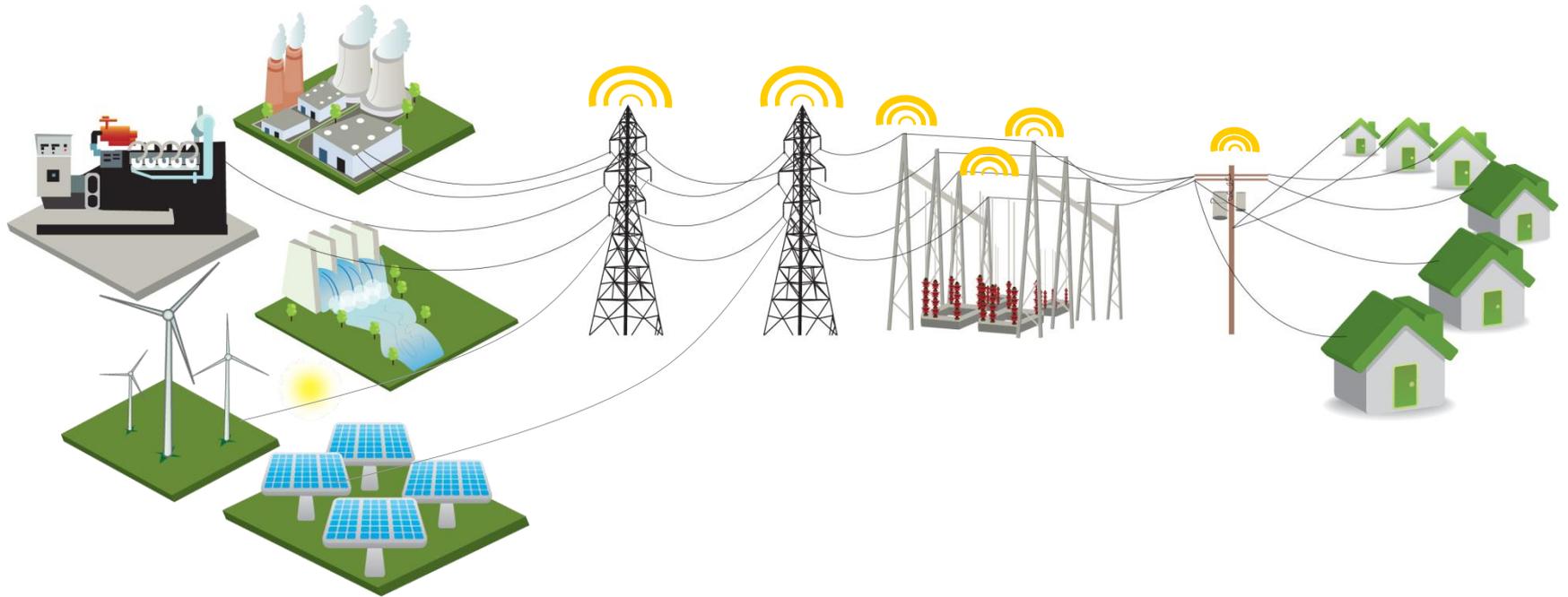
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Rural Electrification through SHP & Rural Dev.

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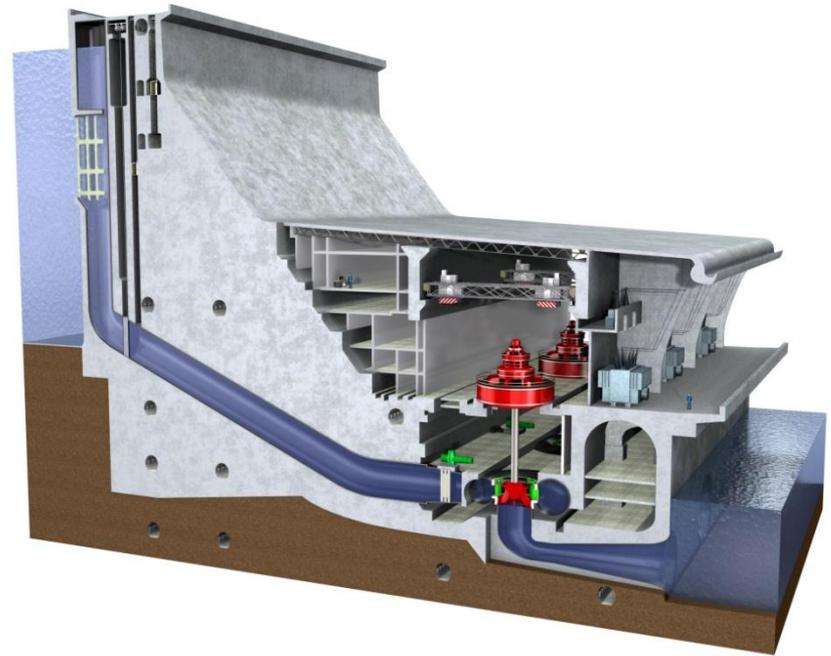
Historical Processes

Power system

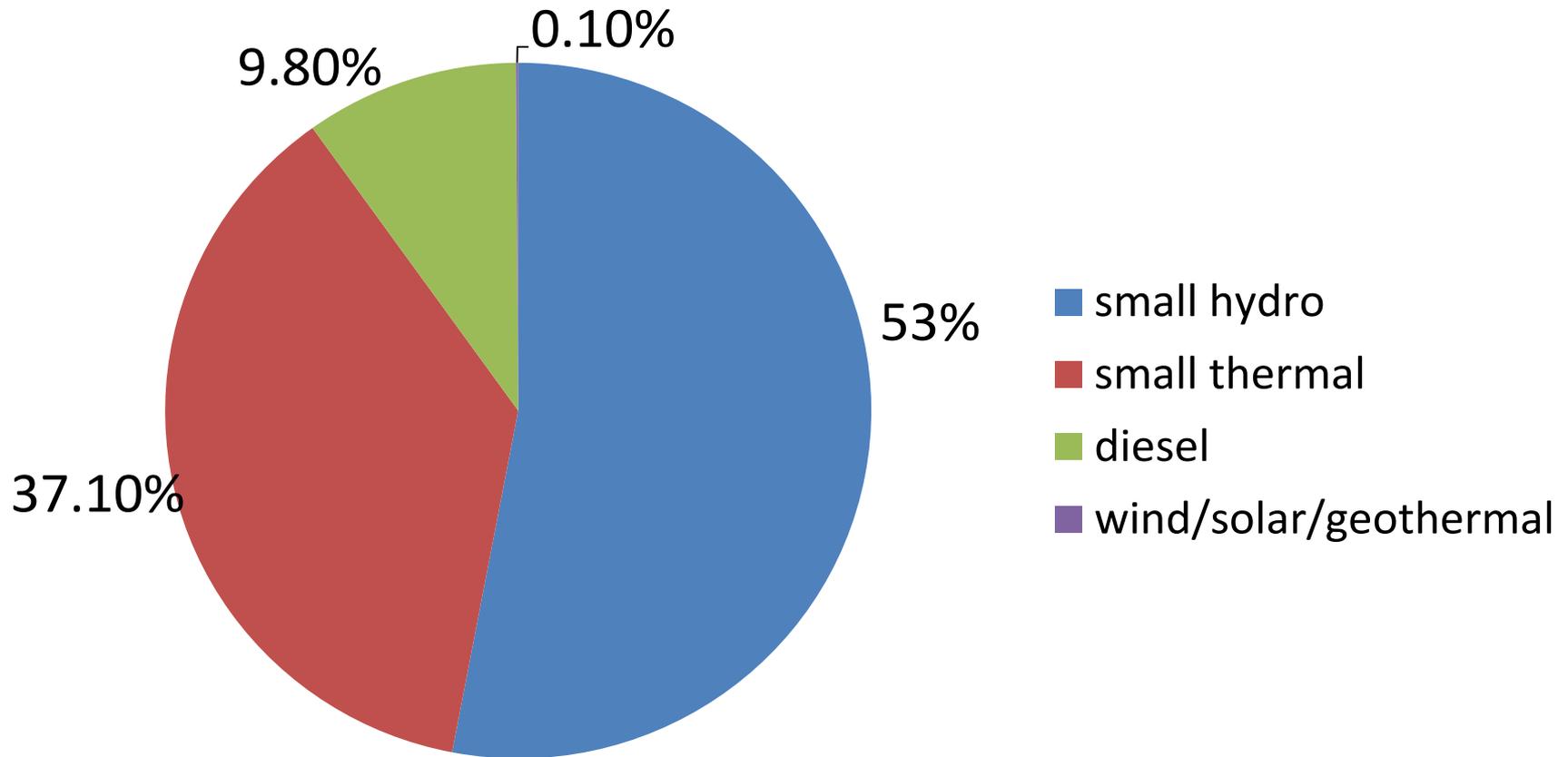


Definition of small hydro

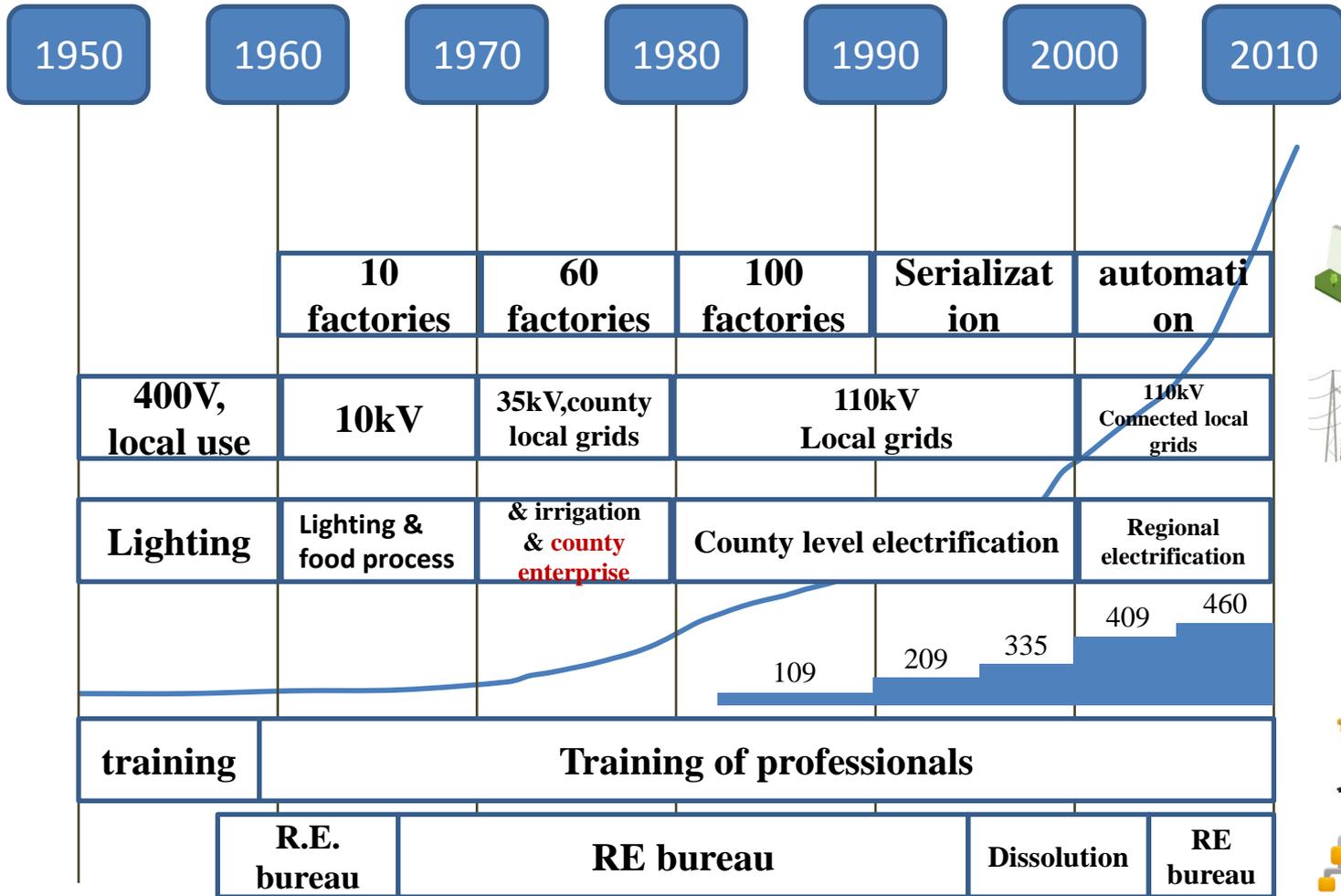
Period	Def. by size(MW)
1950s	< 0.5
1960s	< 3.0
1970s	< 12.0
1980-90s	< 25.0
2000-2012	< 50.0



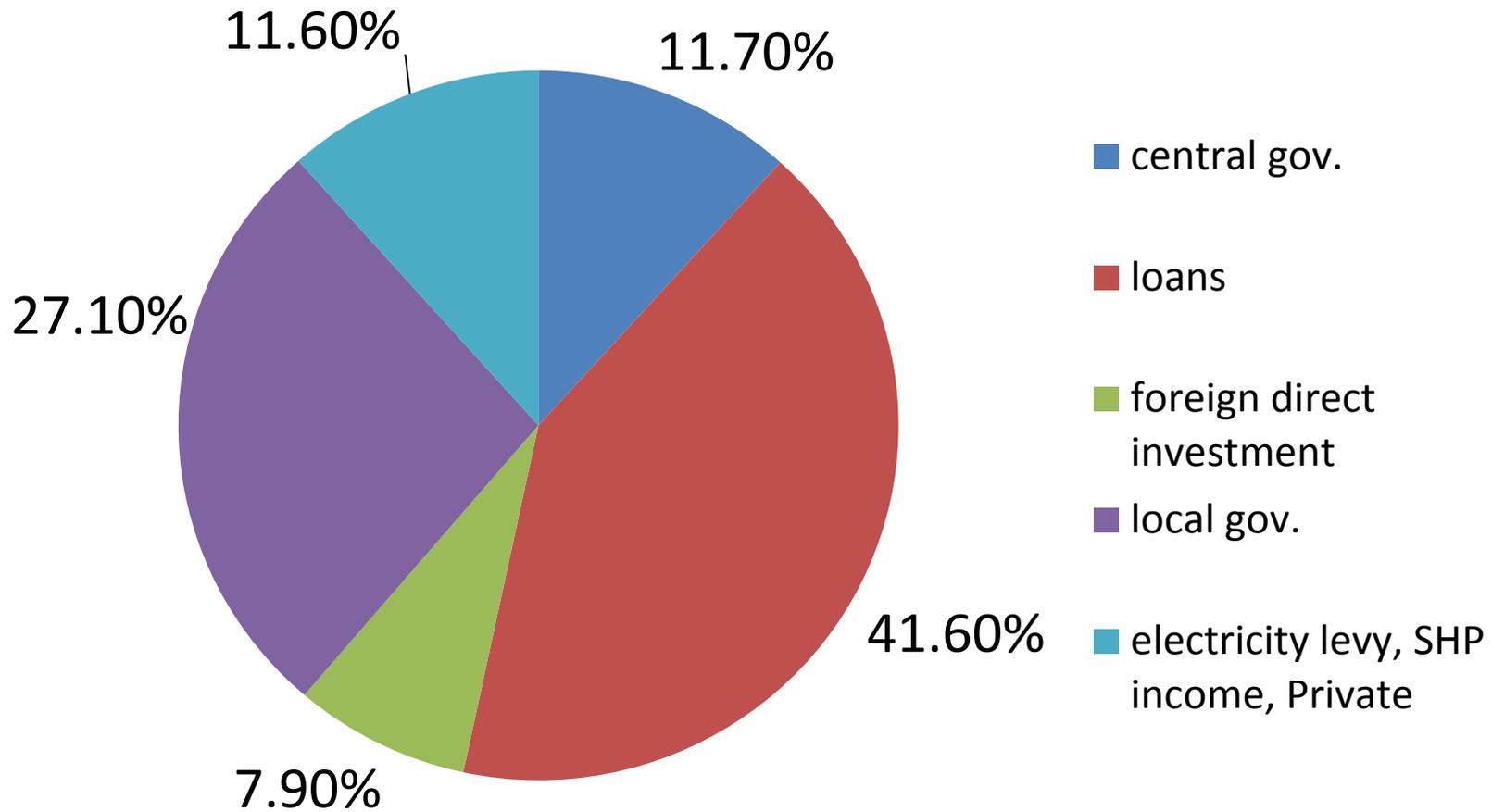
Structure of Electricity Supply (county-level and below) --- 1993



Historical Processes



Sources of investment in small hydropower (millions of RMB) (1996-2003)



6. Rate of access to electricity

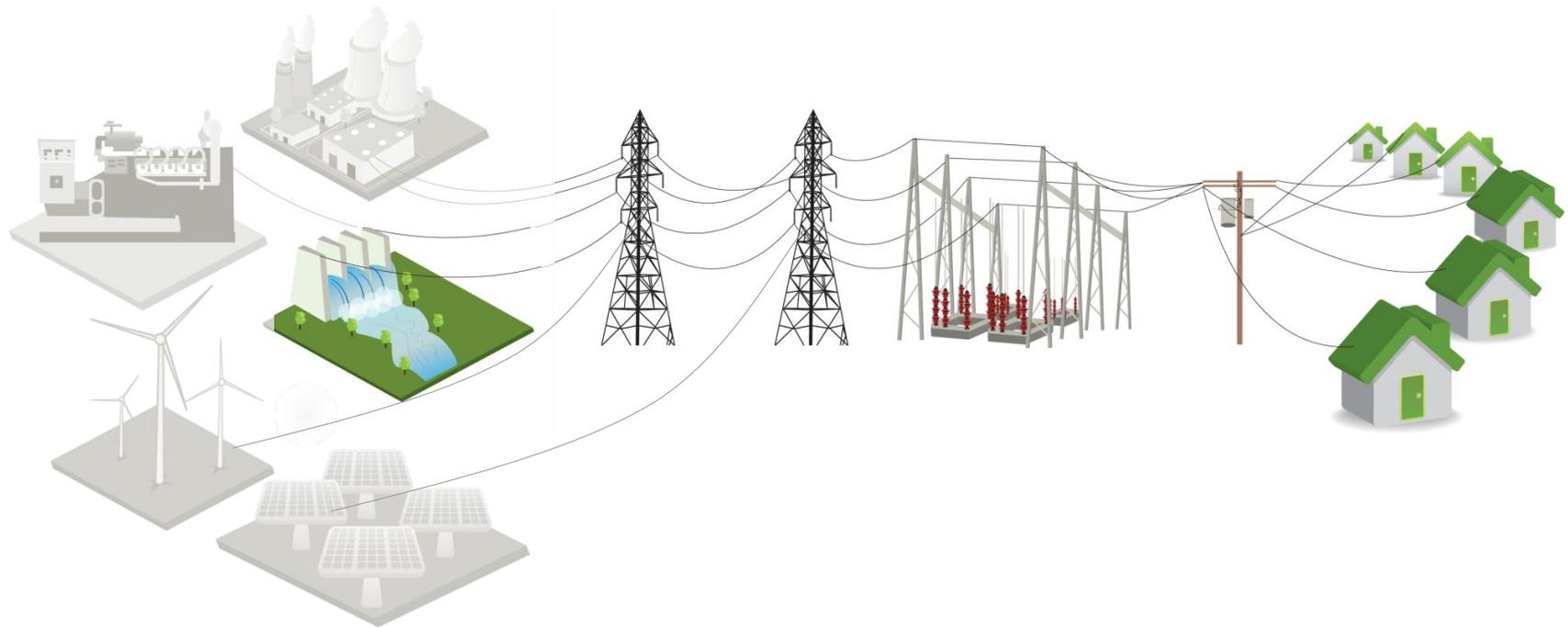
Stage	Period	Key features	Access to electricity
I	1949-1978	Slow by steady Dev.	63.28
II	1979-1998	Rapid expansion & large scale Dev.	98.94
III	1998-2011	Consolidation and upgrading	99.61
	- 2015	5 million people left	100



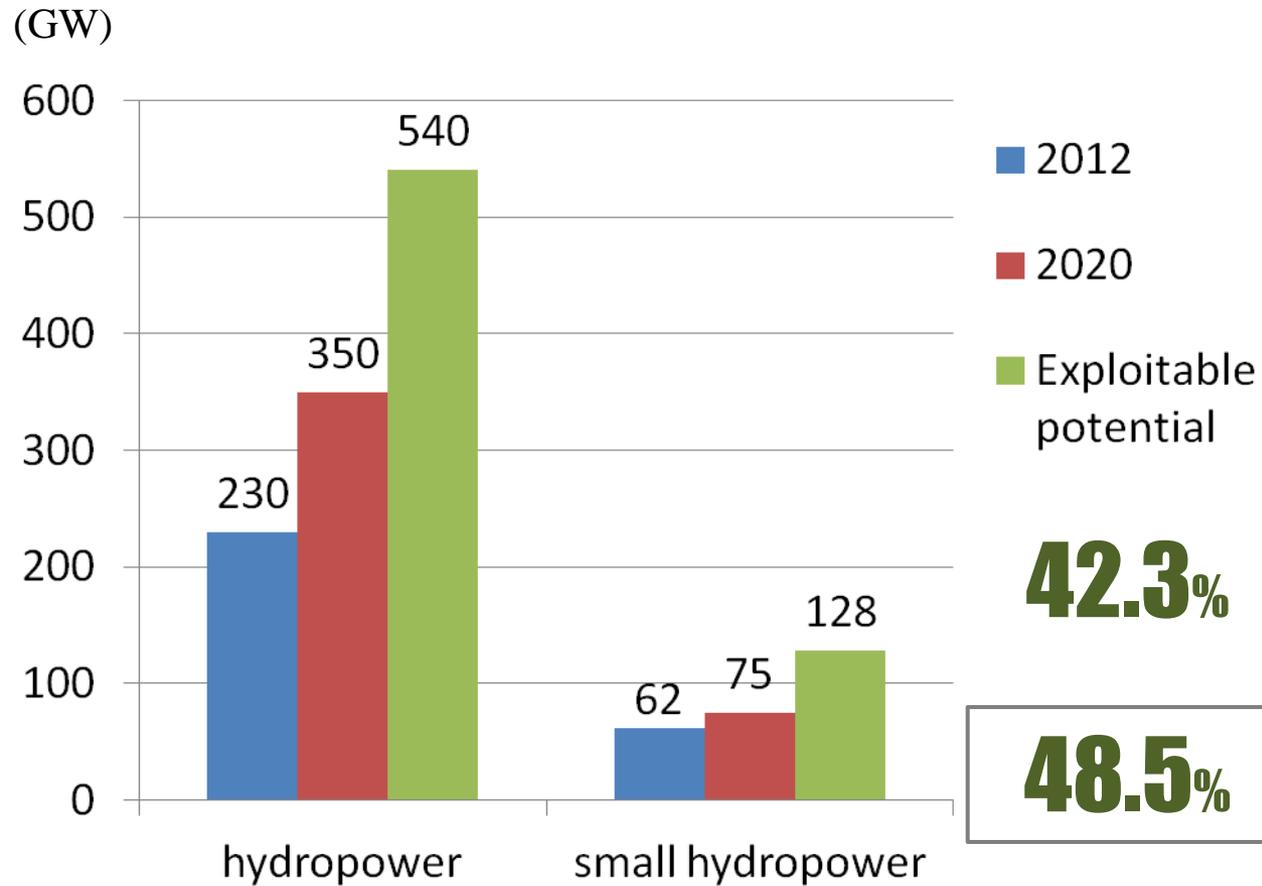
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Small Hydro & Rural Electrification

Why Small Hydro for R.E. in China?



Resources



Distribution- decentralized dev.



Sites: river

Rural areas

Local government (county) responsible for SHP development.

Serialization

- Small hydro turbines have a total of **26 models** in series, **83 kinds** of products, applicable in the head range of **2 ~ 1000 meters**.
- Auxiliaries including governor, exciter, valve, control panel and automatic components etc. all being produced in China.



■ **Completely done in manufacturer , trucked to the site**

■ **Less Time and Cost on site**



Comprehensive utilization

Dam /Reservoir	Diversion Type /without reservoir
Water supply	low unit cost
Flood control	little relocated people
Irrigation	small engineering quantity



Why Small Hydro?

- **Technology perspective**
 - Resources
 - Distribution
 - Serialization
 - Comprehensive utilization

Challenges

Challenges	Solutions
capital investment	Serialization
	Various raised fund
seasonal variation	Local Grids; connected with large grids
	Water-thermal/wind/polar
Project-Specific	Training
	Serialization

New challenges for China

Management



Security

Renovation



Efficiency

Certification

greenhydro ●●
**LOW IMPACT
HYDROPOWER
INSTITUTE**



Hydropower Sustainability
Assessment Protocol

November 2010



Environment



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Rural Electrification through SHP & Rural Dev.



Benefits of R.E. through SHP

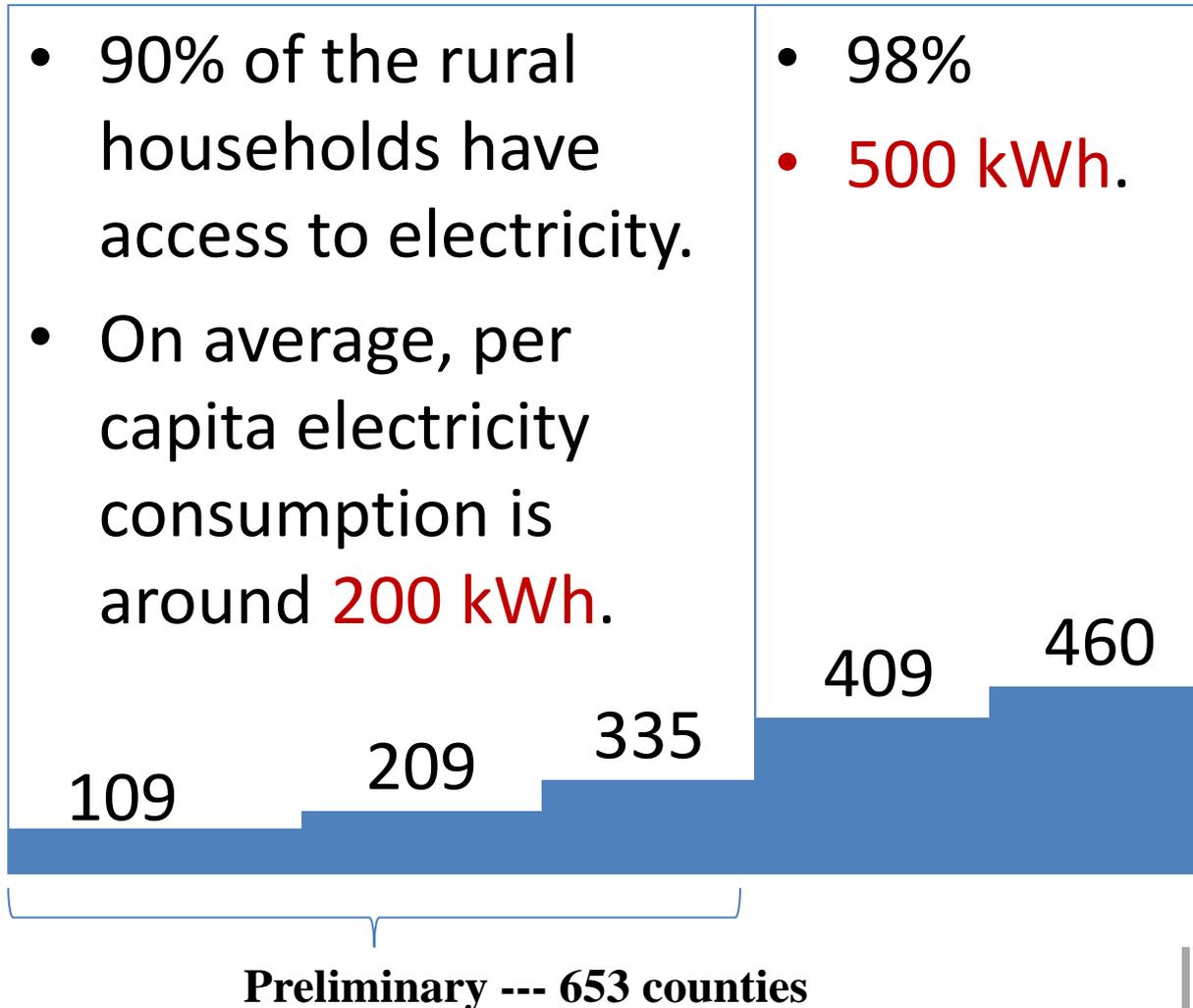
- Access to electricity;
- Agriculture;
- Comprehensive utilization of water resources;
- Medium and small river improvement;
- Rural economic development;
- Employment;
- Health;

Internal Demand

Year	Installed capacity at end of year (MW)	Average annual growth rate	Electricity consumption in the year (kWh)	Average annual growth rate
1950	3.6		0.02	
1979	6380	29.38%	59.28	31.74%
1998	44150	10.72%	495.50	11.82%
2002	51680	4.02%	721.20	9.48%
1950-2002		20.19%		22.36%

County enterprise

Program of rural hydropower electrification county



Favorable policies for SHP-RE

- ***“the one who invests owns and operates”***
- ***“revenue from electricity for development of electricity”;***
- ***a preferential rate of value added tax rate of 6% instead of the normal 17%;***
- ***the connection of small local grids to larger grids.***
- ***Policies designed to protect electricity supply areas for small hydropower***

CONCLUSIONS

- Put **it** under the time axis
- Put **it** under the rural electrification
- Put **it** under the rural development

- **It is small hydropower** in China.



Thank You!

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