

# Electricity Interconnection in Northeast Asia: Barriers and Opportunities, a Chinese Perspective”

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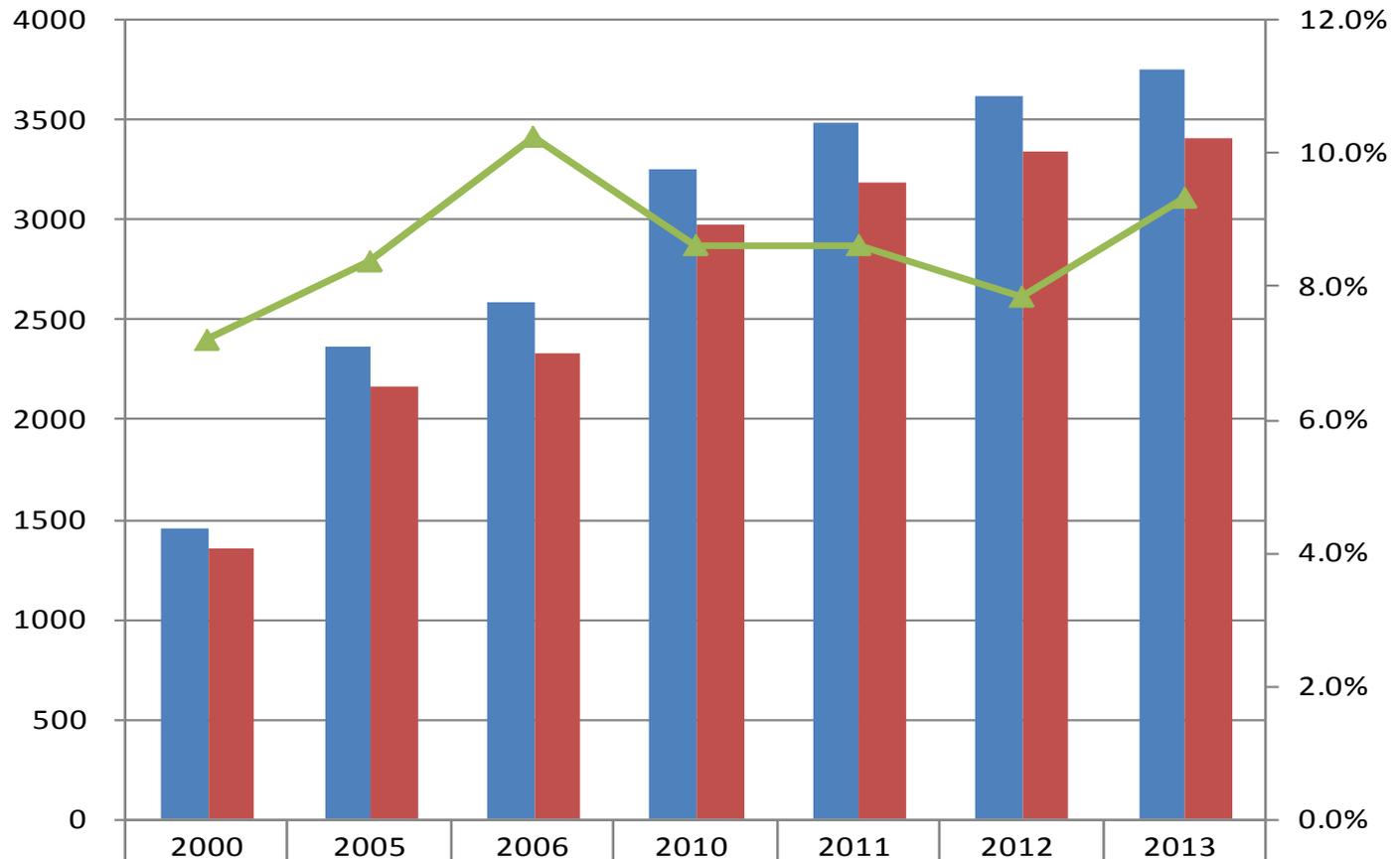


# Outline

1. China's energy and electricity development
2. Opportunities of Electricity Interconnection in Northeast Asia
3. Barriers of Electricity Interconnection in Northeast Asia



# China's energy present situation



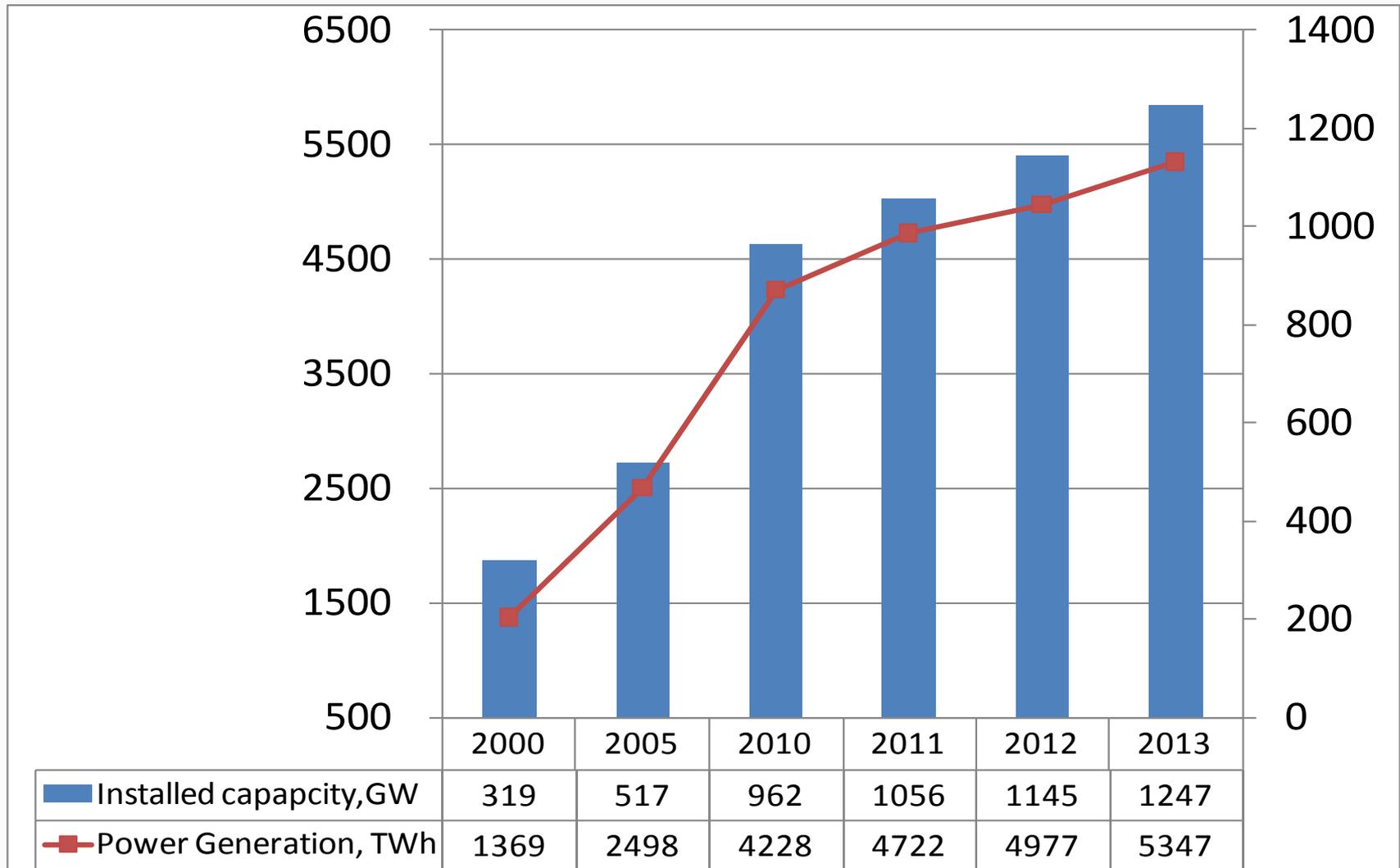
Consumption, Mtce	1455	2360	2587	3249	3480	3617	3750
Production, Mtce	1350	2162	2322	2969	3180	3333	3400
Dependency rate	7.2%	8.4%	10.2%	8.6%	8.6%	7.9%	9.3%

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# China's power capacity and generation

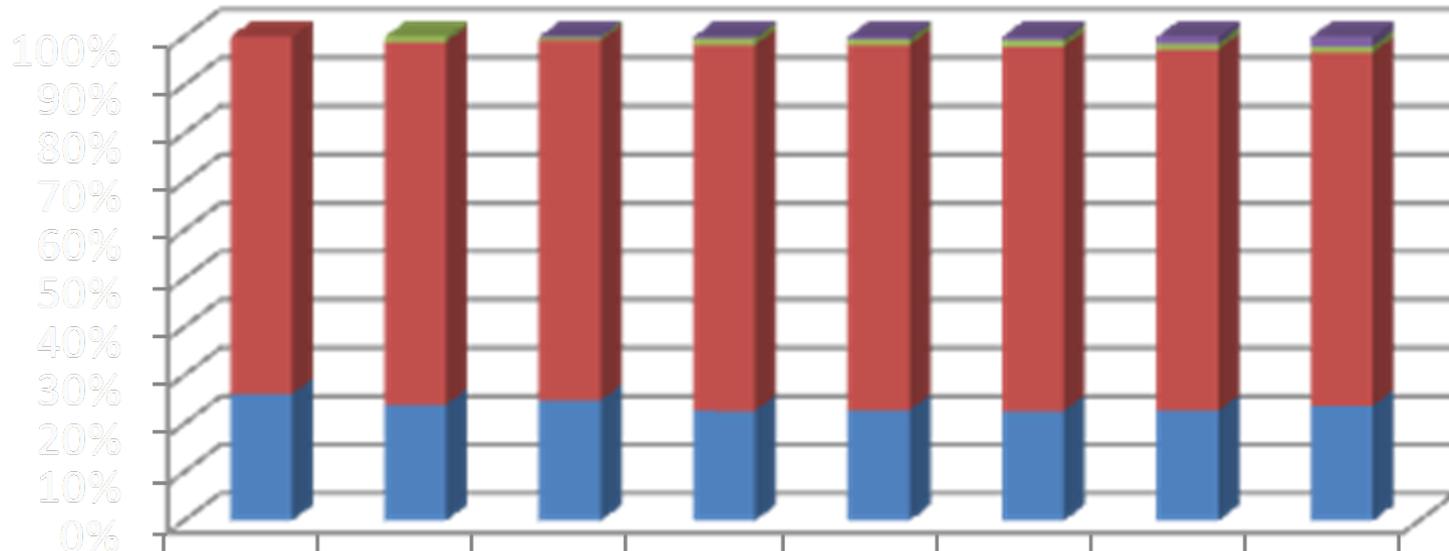


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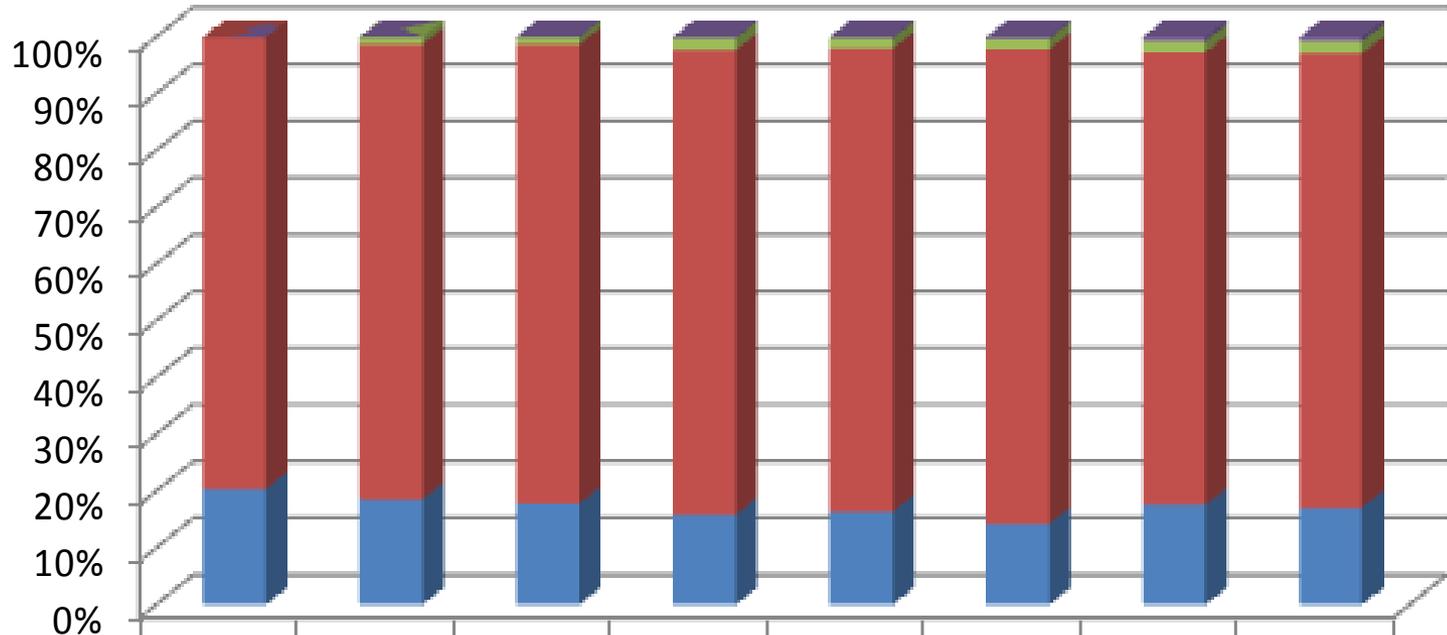
# China's power capacity breakdown by source



	1990	1995	2000	2005	2010	2011	2012	2013
Others	0.0%	0.0%	0.1%	0.3%	0.4%	0.7%	1.3%	1.8%
nuclear	0.0%	1.0%	0.7%	1.3%	1.1%	1.2%	1.1%	1.2%
Thermal	73.9%	75.0%	74.4%	75.7%	73.4%	72.5%	71.5%	69.1%
Hydro	26.1%	24.0%	24.8%	22.7%	22.2%	21.8%	21.7%	22.4%



# China's power generation breakdown by source



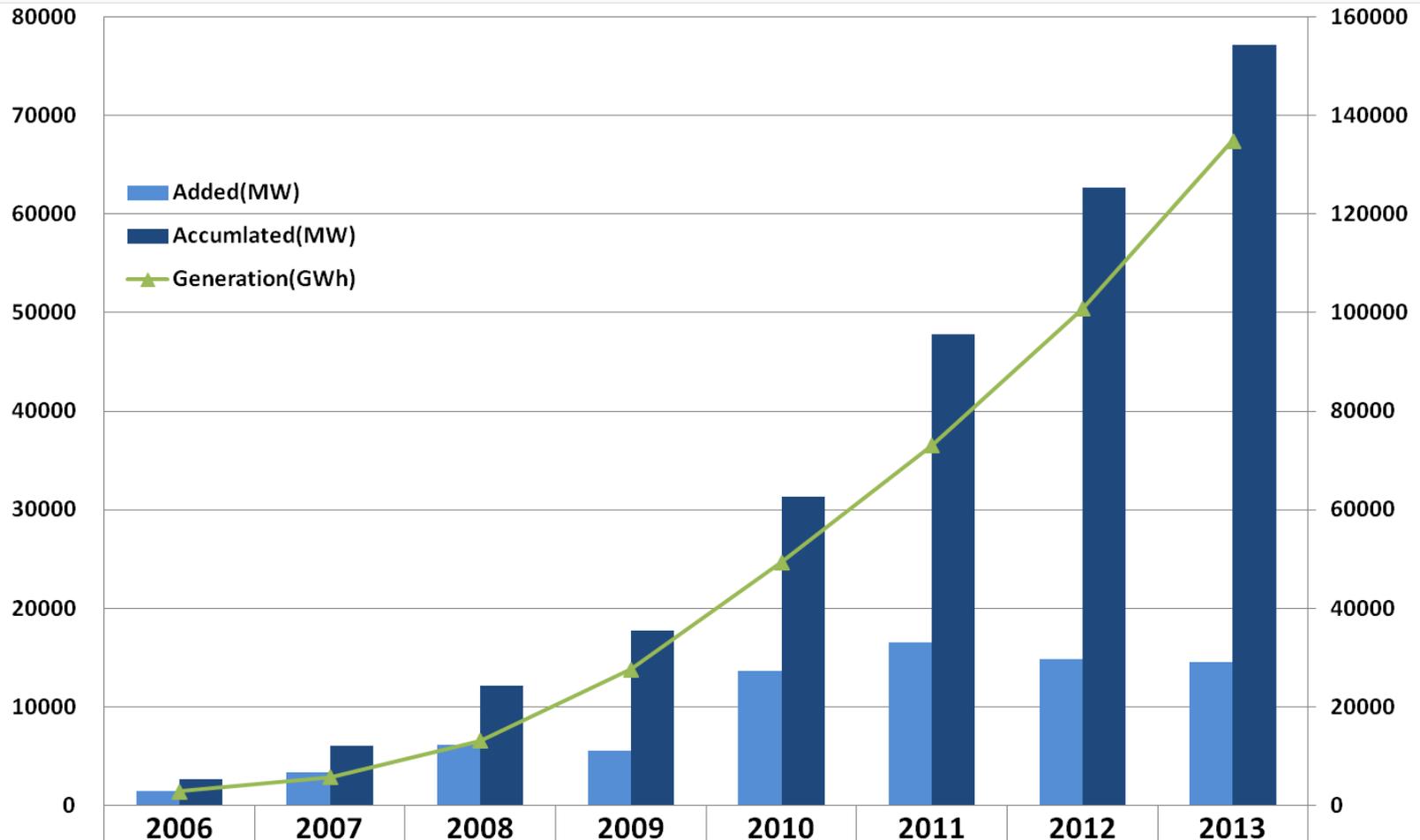
	1990	1995	2000	2005	2010	2011	2012	2013
Others	0.0%	0.0%	0.1%	0.2%	0.2%	0.3%	0.7%	0.7%
nuclear	0.0%	1.3%	1.2%	2.1%	1.8%	1.9%	2.0%	2.1%
Thermal	79.7%	80.2%	81.0%	81.8%	80.8%	82.5%	78.6%	78.4%
Hydro	20.3%	18.6%	17.8%	15.9%	16.2%	14.0%	17.4%	16.8%

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# Wind installation and generation in China

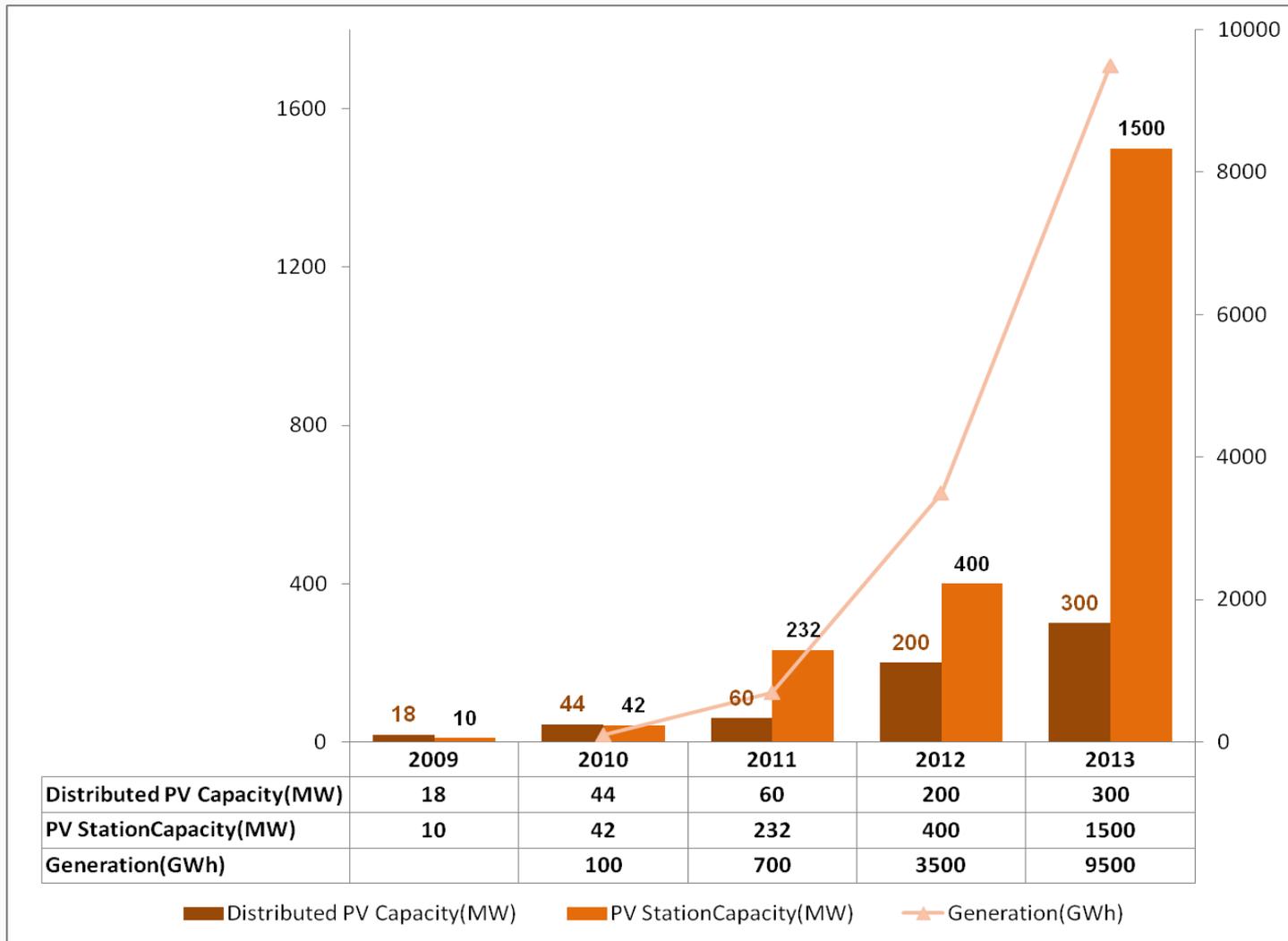


Added(MW)	1391	3360	6140	5491	13640	16521	14821	14490
Accumulated(MW)	2661	6021	12170	17670	31310	47831	62660	77160
Generation(GWh)	2800	5700	13100	27600	49400	73101	100800	134900



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# PV Installation and Generation

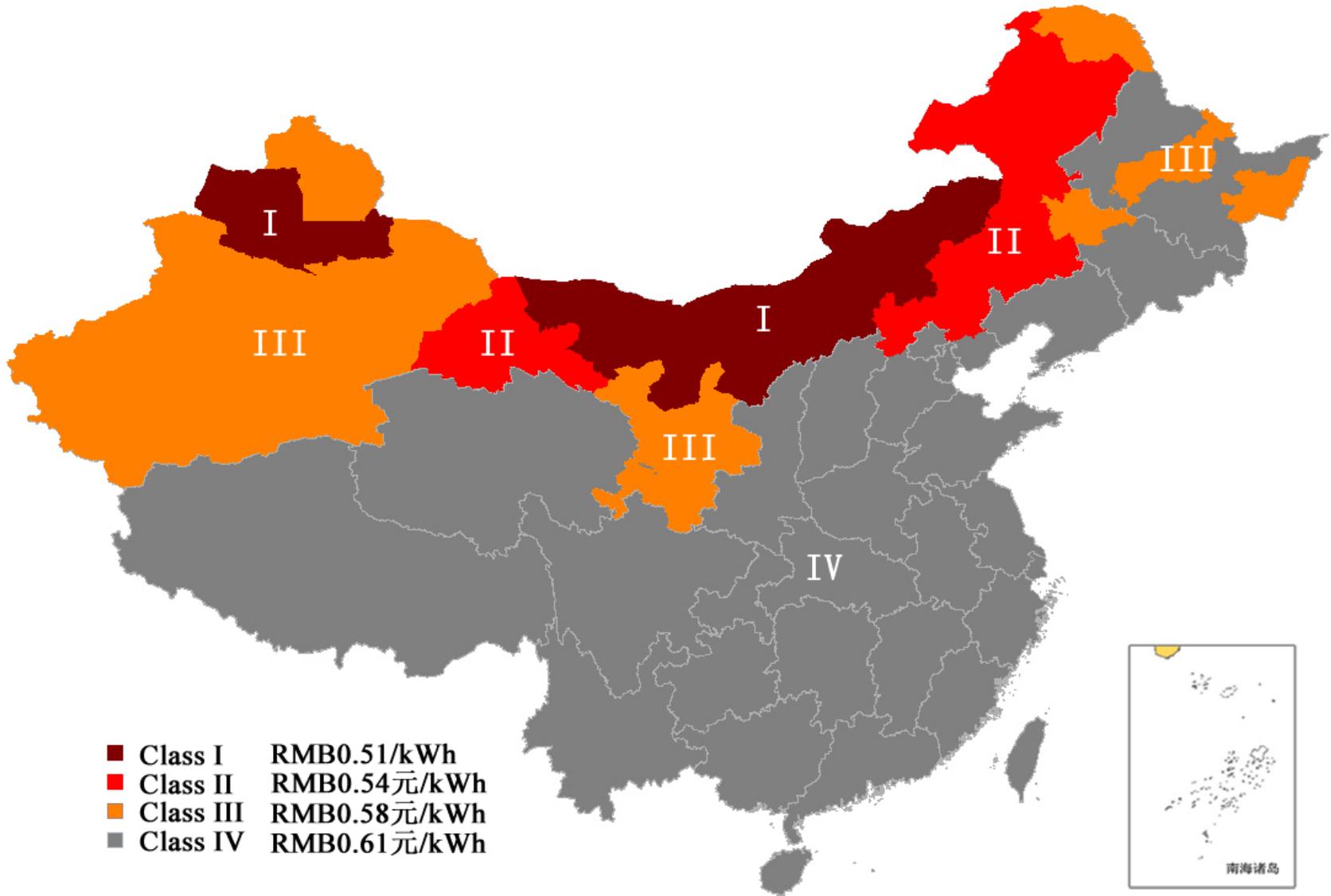


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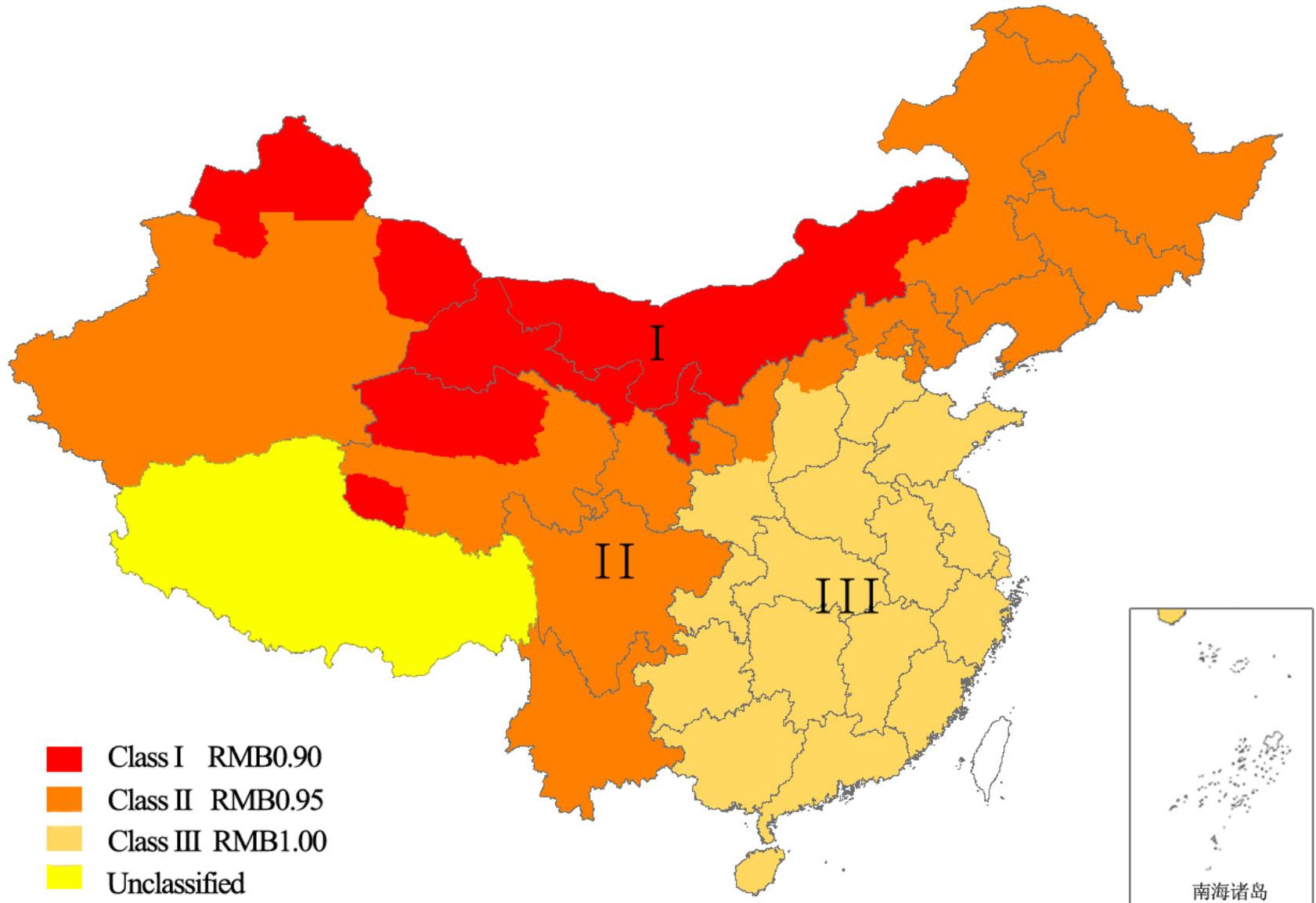
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# Wind power feed-in tariff



# PV feed-in tariff



- Class I RMB0.90
- Class II RMB0.95
- Class III RMB1.00
- Unclassified

南海诸岛



# Chinese continent benchmark tariff ( yuan/kWh) by Province



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# Target of China's energy development

## Detail Targets:

Proportion of non-fossil energy in total primary energy consumption in 2015 : 11.4%;

Energy consumption intensity during 2010-2015: -16%;

CO<sub>2</sub> emission intensity during 2010-2015: -17 %

Energy consumption in 2015: 4 Gtce.



## 2. Opportunities of Electricity Interconnection in Northeast Asia

- Market: the resource and market complementary, Russia and Mongolia are rich of resources, included hydro power, coal, natural gas and wind power, they will be the supplier; the electricity demand in China, Korea and Japan are huge, they will be the users.
- Environment: electricity sources mainly are hydropower and renewable electricity, they are beneficial to protect air and eco environment and to response to climate change.
- Present situation of electricity interconnection : Chinese grids have interconnected with Russian, DPRK, and has electricity trade with the countries.



# 3. Barriers of Electricity Interconnection in Northeast Asia

- Political factor: political trust among the members in NEA.
- Market and supply security: load curve of electricity demand and supply is inconsistent; the seasonal electricity. Proportion of the renewable energy?
- Cost: it will be higher than the benchmark tariff in user's area, the negotiation will be difficulty.
- Technology: There is no precedent in submarine cable of UHV DC transmission. How to unify electric standards ?
- Implementation: Which international or countries will lead or push the progress?



# Conclusion

**There are some uncertainties in electricity interconnection in NEA, we should study thorough in the aspects included electricity balance, security, load characteristics, technologies, cost, environmental impact etc.**

**The prospect is very beautiful, very long road!**





**Thank you for your kind attentions !**



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