



China Medium/Small Wind Industry

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1. China Small Wind industry

1) Historical development of China Wind Power

- Since 1980', very small capacity (100s to few kW)
- Made significant contributions on remote and island rural electrification, farmers and herdsman, while solar PV was very expensive

China electrification rate

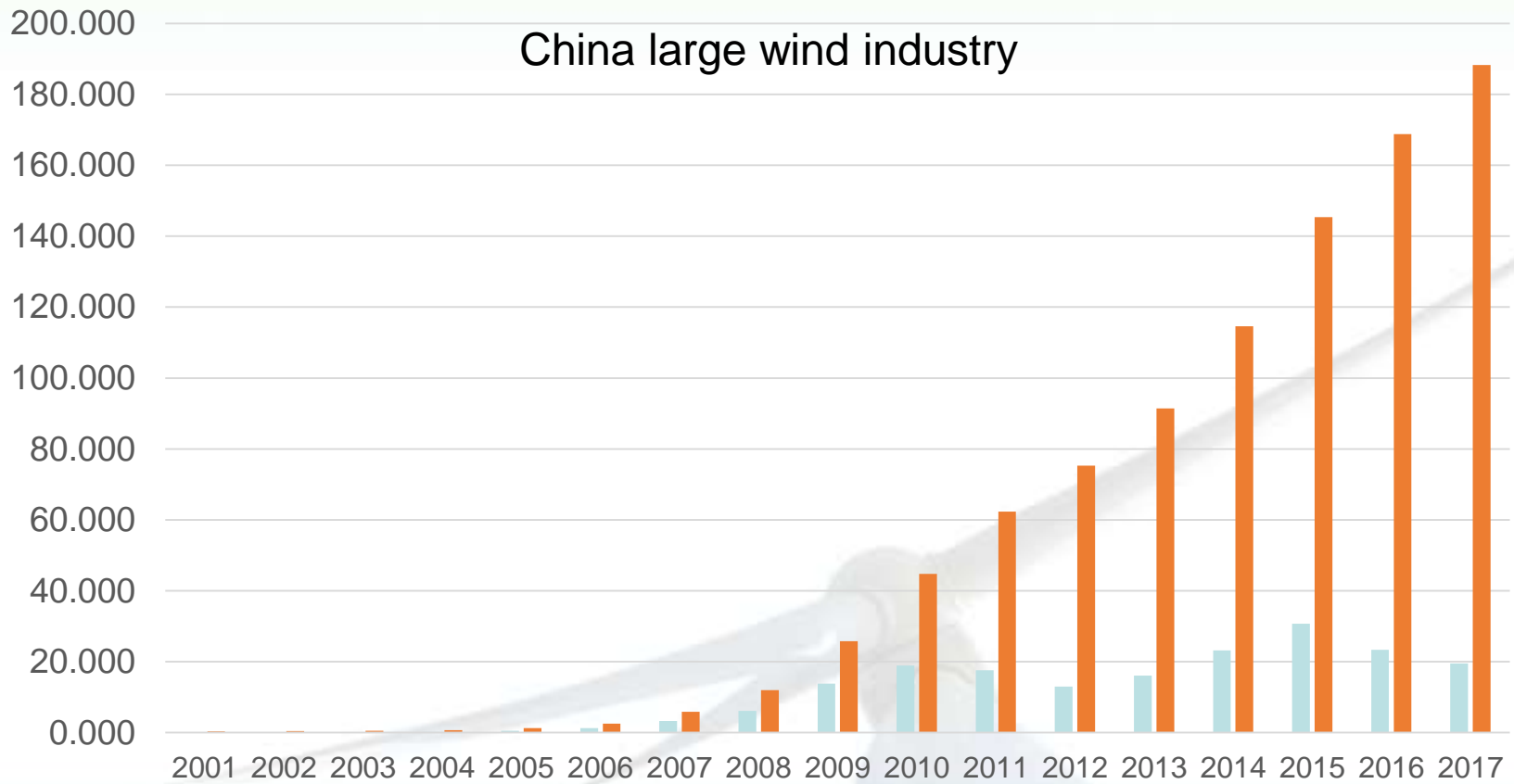
Year	Total pop (Million)	Un-electrified rate	Un-electrified pop (Million)
1980	987	35%	346
2000	1267	1.4%	17.7
2012	1354	0.2%	2.73
2013	1361	0.13%	1.73
2014	1369	0.0145%	0.2
2015	1375	0	0



1. China Small Wind industry

1) Historical development of China Wind Power (2)

- Large wind (Utility scale wind farm started from 2005)



*2017 +19.5GW, Total 188.235GW

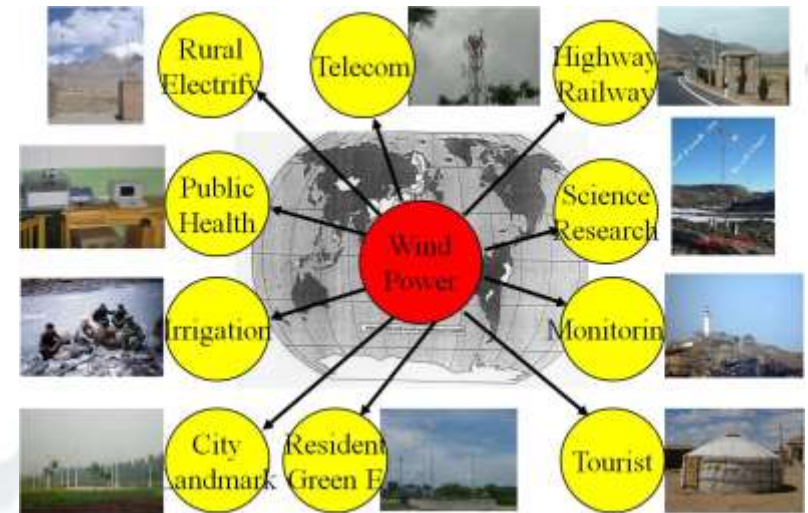


1. China Small Wind industry



2) Major applications (Off-grid)

- Rural electrification
- Telecom remote transmission station
- Residential or public house
- Urban traffic control
- Meteorological/environment protection service
- Petroleum field
- Agriculture
- Ocean traffic control
- Military booth
- Scientific research



Market for SW is shrinking!



1. China Small Wind industry

3) Major products

100W ~100KW. Horizontal and Vertical.

Horizontal 100W~100kW



100W



1kW



5kW



10kW



20kW

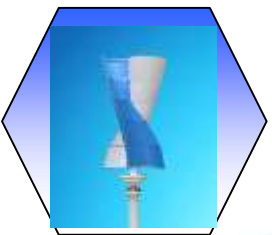


50kW



100kW

Vertical 10W~5kW





1. China Small Wind industry

4) Example (1) – China/UNDP

Cover 4 villages and 1 tourist facility. 500+ families, 2400+ pop, and government, clinic, school, TV transferring station, etc. Significantly improving local resident's life and economy.





1. China Small Wind industry

4) Example (2) – Pakistan/ADB





2. Statistics of China SWI 2017



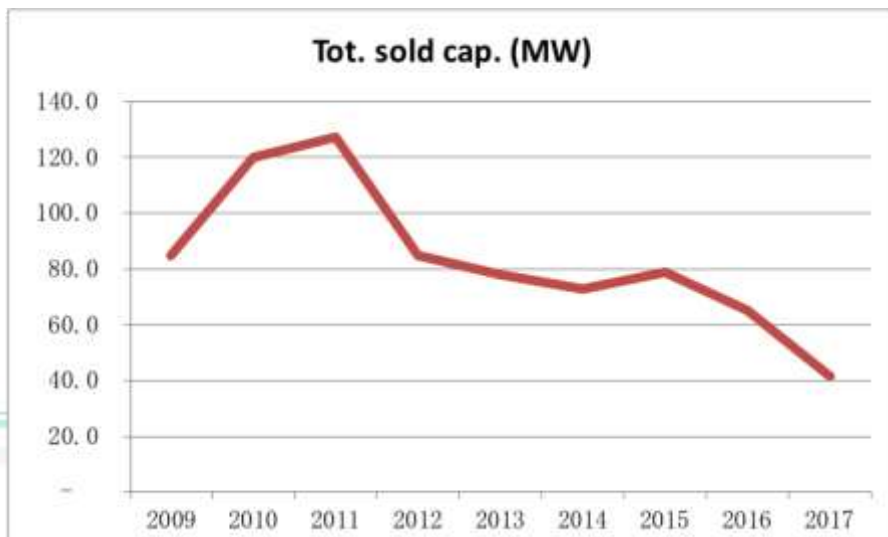
Items	2016	2017	+/- (%)
Delivered units (x1000)	78.1	62.6	-19.9
Delivered capacity (MW)	65.16	41.7	-36
sales (US\$M)	127.9	86.0	-32.8
Export units (x1000)	4.8	5.1	6.4
Export capacity (MW)	20.2	14.0	-30.7
Export sales (US\$M)	40.90	32.79	-19.8



3. China SWI Historic Trend (1)



Total Annual
Delivered
Units, Cap
and Sales

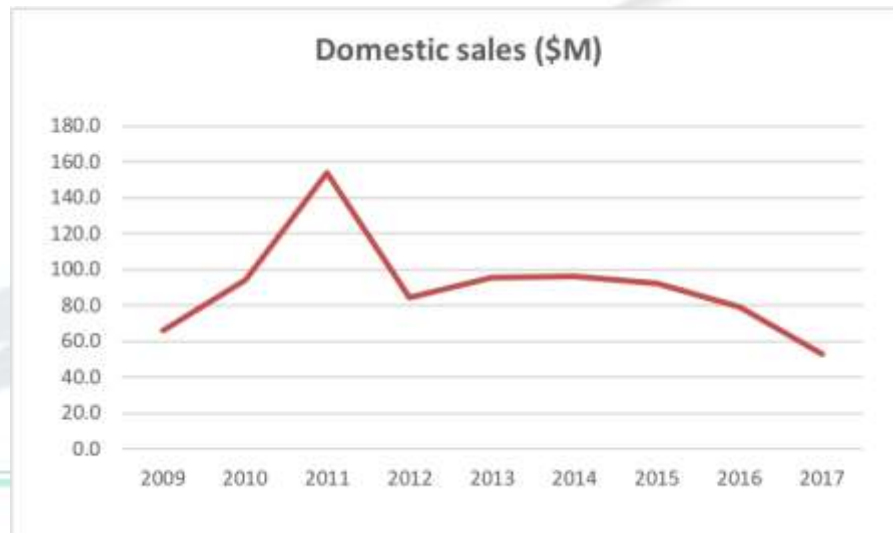
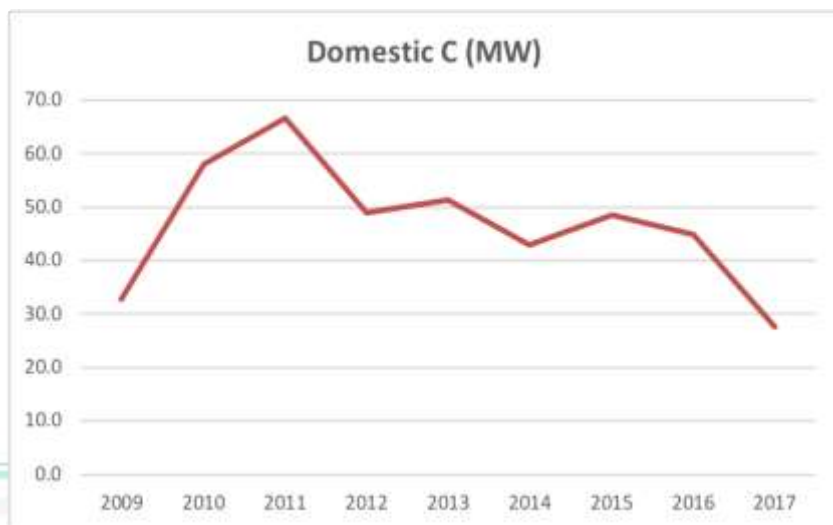
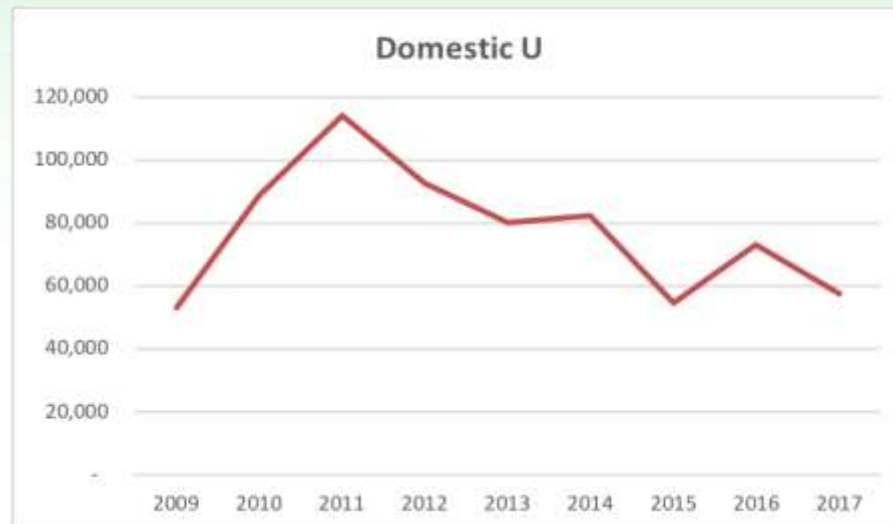




3. China SWI Historic Trend (1)



Annual Domestic
Delivered Units,
cap and Sales

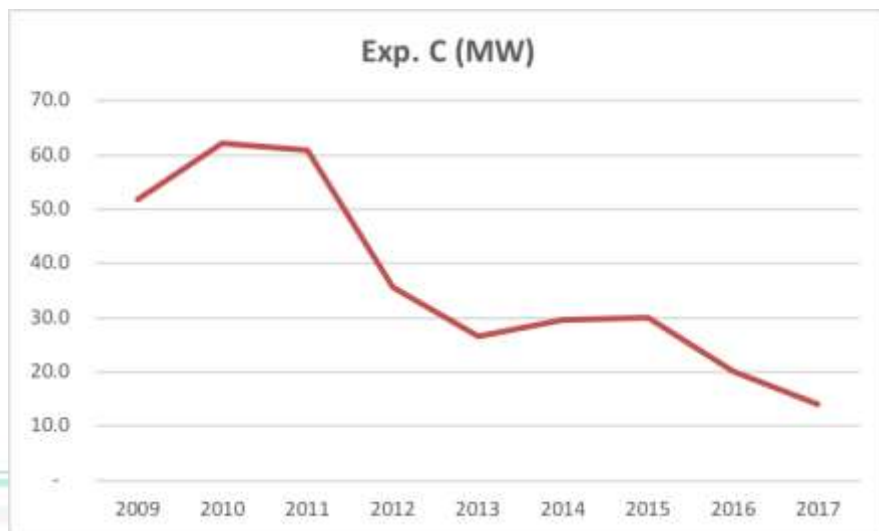
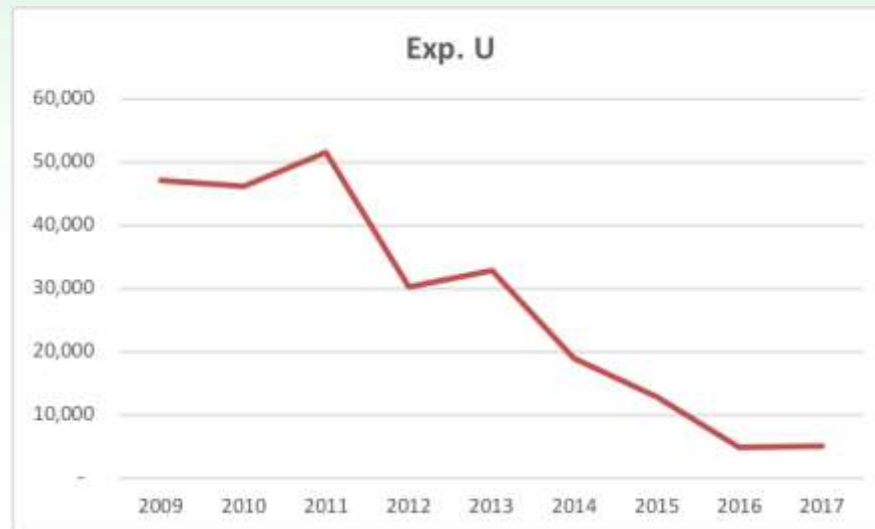




3. China SWI Historic Trend (1)



Annual Export
Delivered Units,
cap and Sales





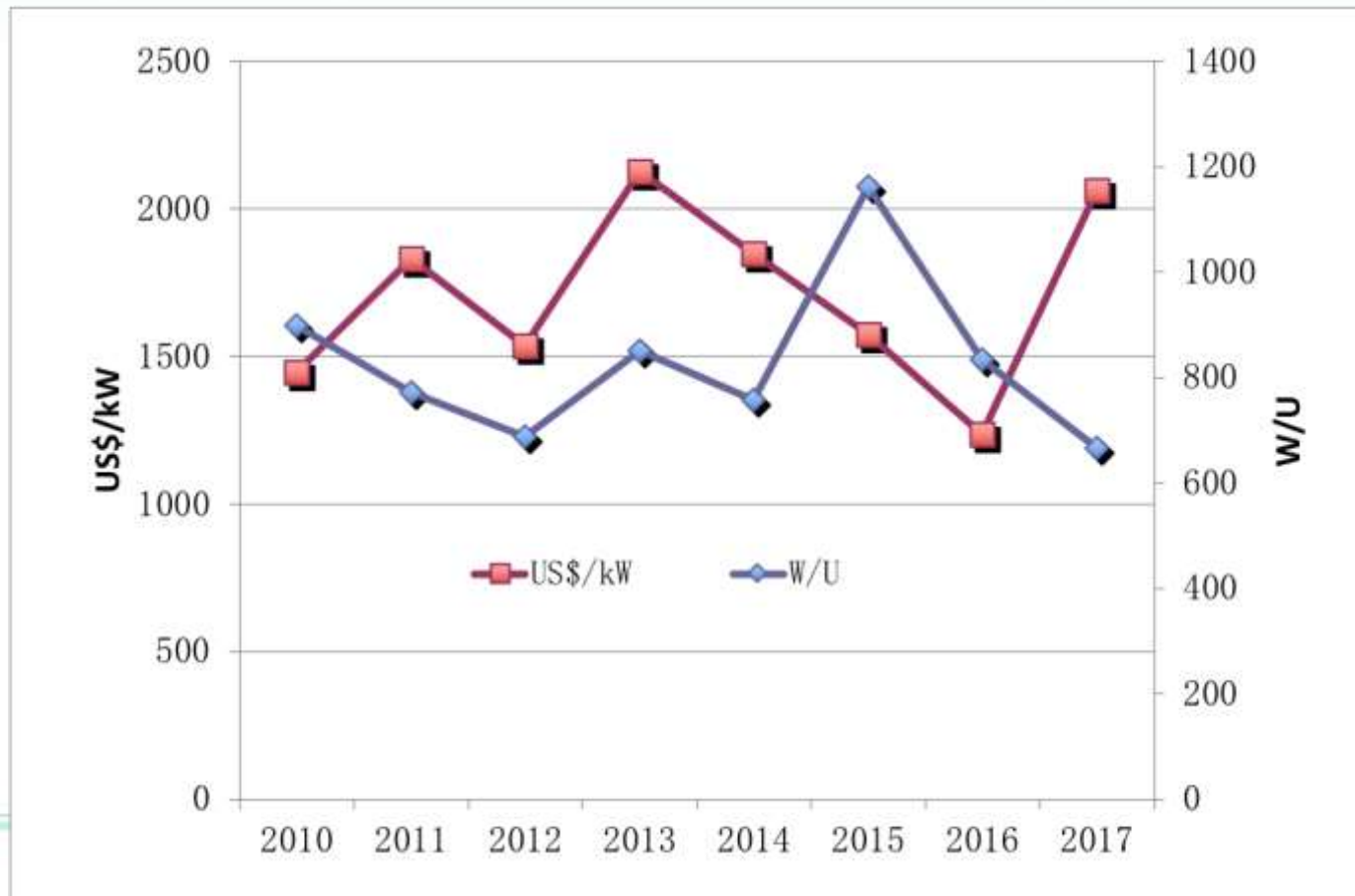
3. China SWI Historic Trend

Average capacity per unit 2017

- 666 Watts

Price per KW 2017

- US\$ 2,063



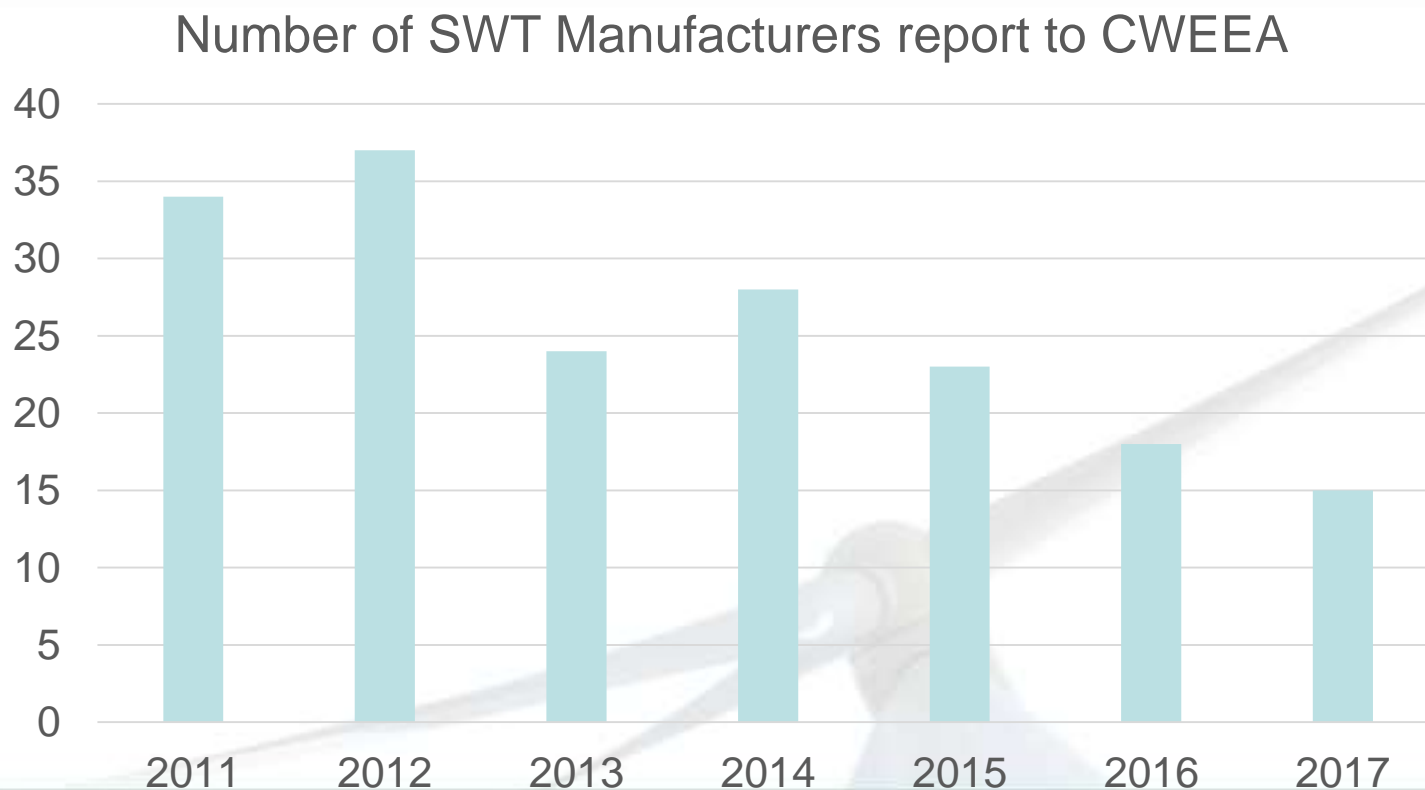


3. China SWI Historic Trend



Number of SWT manufacturers

By 2017, 15 SWT manufacturers. (was 100+)

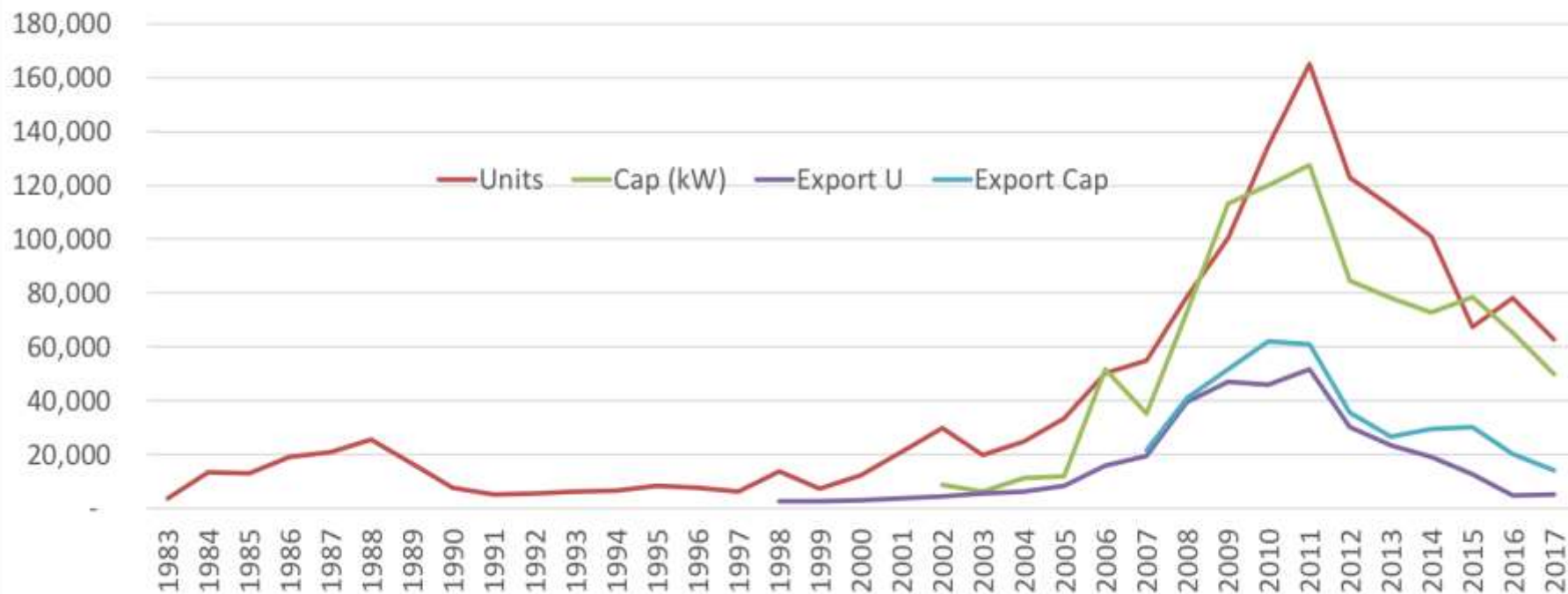


* 15 manufacturers in 2017, with 4 parts suppliers



4. Overall historic data

China SWI historic information



By the end of 2015, the estimated operating medium and small size wind turbines in China is 650,000 units, about 540 MW*.

* Report to IRENA



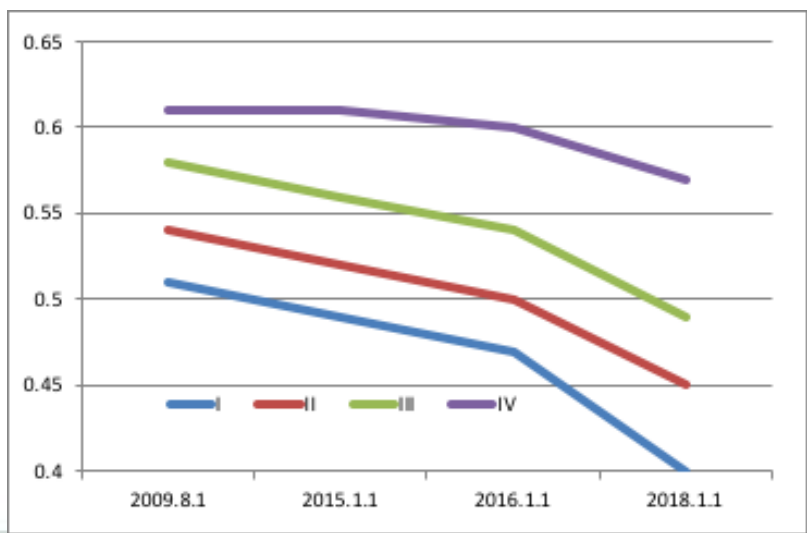
5. Government Policy and incentives

FiT for RE

- **Utility-scale Wind**

On shore

Start fr	I	II	III	IV
2009. 8. 1	0. 51	0. 54	0. 58	0. 61
2015. 1. 1	0. 49	0. 52	0. 56	0. 61
2016. 1. 1	0. 47	0. 5	0. 54	0. 6
2018. 1. 1	0. 40	0. 45	0. 49	0. 57



Off-shore

Start fr	Near coast	intertidal
Current	0. 85	0. 75
2018. 1. 1	0. 8	0. 7



5. Government Policy and incentives



FiT for RE

- PV

光伏发电上网电价表

资源区/类别		2016	2017	2018
I		0.80	0.65	0.55
II		0.88	0.75	0.65
III		0.98	0.85	0.75
分布式	自发自用	0.42	0.42	0.37
	全额上网	按所在资源区标准		
扶贫	村级电站 (<0.5MW)	I类:0.80	I类:0.65	I类:0.65
		II类:0.88	II类:0.75	II类:0.75
		III类:0.98	III类:0.85	III类:0.85
户用分布式		0.42	0.42	0.42

Unit: RMB/kWh, 资料来源：中国国家能源局；PV InfoLink整理

*西藏自治区标杆电价为RMB 1.05/kWh

**2018电价补贴适用者：1. 2018.01.01后纳入之光伏项目

2. 2018前纳入项目·但未於2018.06.30前投运者

3. 2018.01.01后投运之分布式光伏发电项目



- SWT No!!!



6. Market status

- 1. Very strong competition from PV sector: Example of PV bidding price on Nov. 16, 2017, Monocrystal US\$0.417/Wp (2.63元/瓦), Polycrystal US\$0.394/Wp (多晶最低2.48元/瓦);**
- 2. The market is getting worse and worse since 2012, 2017 was even worse than 2016;**
- 3. Delivered units and capacity was continue dropping;**
- 4. Few manufacturers are getting stronger, while many of others were out of business;**
- 5. May have some hopes from distributed generation applications, some demonstrations have been developed;**
- 6. Market in telecom remote stations is still existing, but demands are reducing;**
- 7. Awareness of the importance of international standards and certification are increasing to meet the requirements of international market.**



Thank you!

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