

China's photovoltaics poverty alleviation initiative: Can renewable energy be pro-poor?

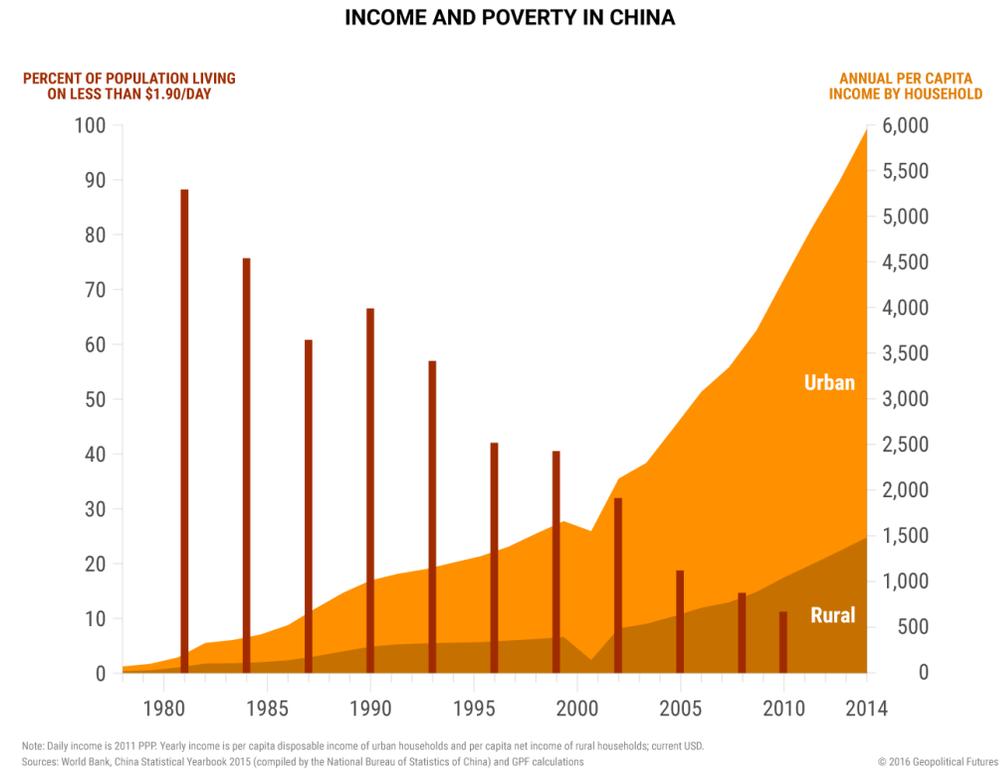
Kevin Lo, Assistant Professor
Department of Geography
Hong Kong Baptist University



香港浸會大學
HONG KONG BAPTIST UNIVERSITY

Poverty problems in China

- Poverty remains framed as a rural issue. Urban poverty has not been recognized sufficiently.
- China has a long-history of poverty alleviation, but rural China is still poor.
- Still over 50 million impoverished people living below the government's official poverty line of CNY 2,300 (\$340).



13th FYP poverty alleviation ambitions

Indicator	2015	2020	Type
Impoverished population	56,300,000	0	Binding
Poverty villages	12,800	0	Binding
Poverty county	832	0	Binding

Targeted poverty alleviation (精准扶贫)

- A new initiative in 2014.
- Identification and tracking of poverty households based on more “scientific” methods.
- Recognizes the diverse causes of poverty. Targeted assistance projects implemented based on local conditions and needs.

台村贫困户公示牌



China's plan to fight poverty

Rural economic development

Shifting rural employment

Resettlement

Education

Health

Ecological conservation

Social security

Agriculture and forestry

Tourism

E-commerce

Asset income

Photovoltaics

Large-hydro

Mini-hydro

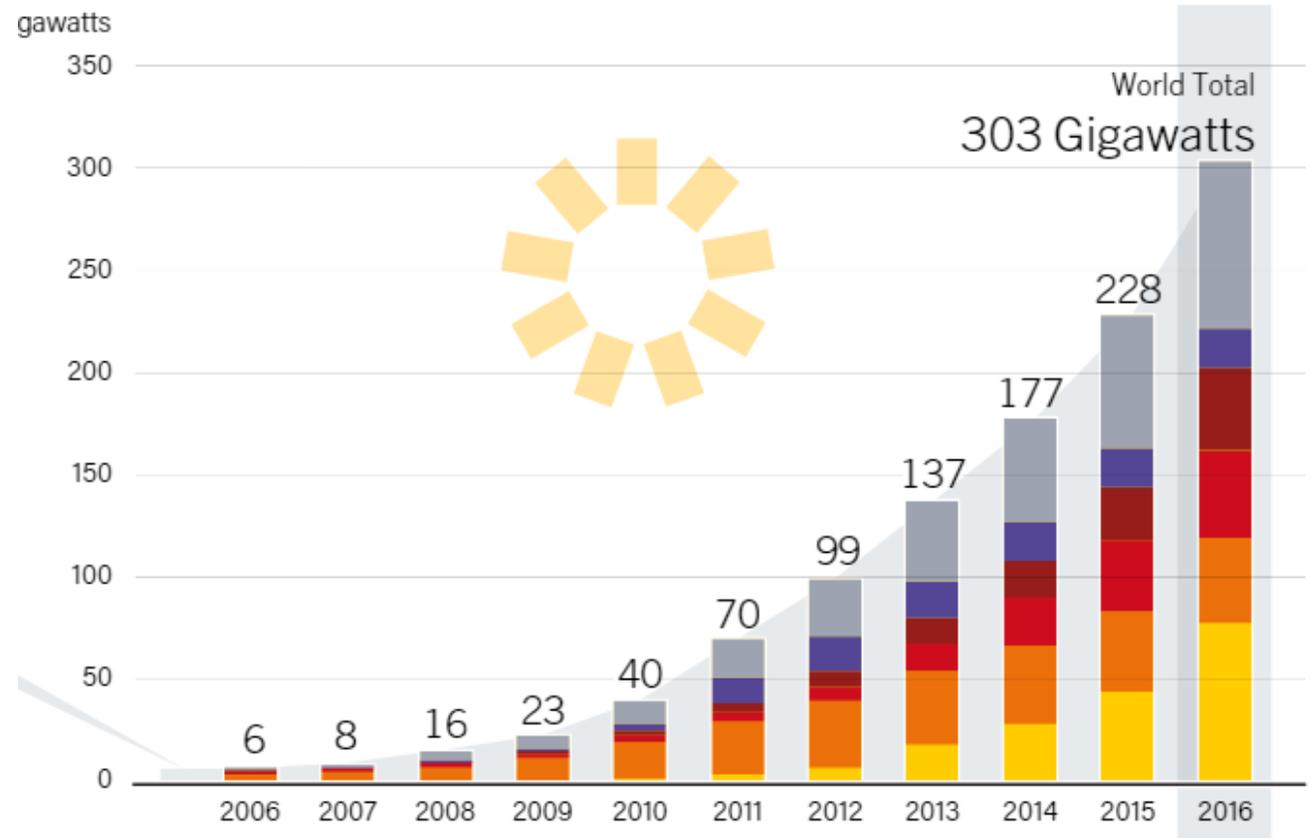


PV manufacturing in China

- According to the European Commission, the aggregate capacity of all Chinese module producers reached **108** GW in 2016.
- In 2016, **75** GW of PV was installed worldwide (REN 2017).
- This size of capacity and price are the main reasons behind EU's imposition of anti-dumping and anti-subsidy policy since 2013.
- AD duties range from 27.3% and 64.9% (e.g., 44.7% to Trina Solar modules, 51.5% to JA Solar, 41.2% to Jinko Solar and 35.5% to Yingli)
- AS duties range between 3.5% (Yingli) and 11.5% (LDK Solar).

PV deployment in China

- In 2016, China added 34.5 GW, increasing its total capacity to 77.4 GW.
- Up 11-fold since the end of 2012.
- Driven by low-cost and generous feed-in tariffs.
- 2020 PV deployment target was recently reduced from 150GW to 110GW.



Rural electrification in China

- Discussion on pro-poor RE typically frame by energy poverty.
- Grid access in rural China reached 100% in 2015. So China does not need renewable energy to address rural electricity access problems.
- It allows China to experiment with other roles of RE in poverty alleviation.



Photovoltaics poverty alleviation (PVPA)

- A joint initiative of and co-governed by the State Council Leading Group Office of Poverty Alleviation and Development (扶贫办) and the National Energy Administration (国家能源局)
- Since the NEA has the technical expertise and regulatory responsibility over the implementation bodies (e.g., grid companies, PV corporations), the poverty office plays very little role in PVPA other than supportive roles (e.g., identifying poverty villages and households).
- NEA announced that in some provinces no large-scale PV systems will be approved unless it has poverty alleviation element.

Kicked off in late 2014 as a pilot in 30 counties across 6 provinces.



Expanded to a national program in 2016.



Latest target (Dec 2016): 50,000 poverty villages. To provide an annual income of CNY 3000 to 2.8 million households for 25 years.

From pilot to a national policy



Political endorsement

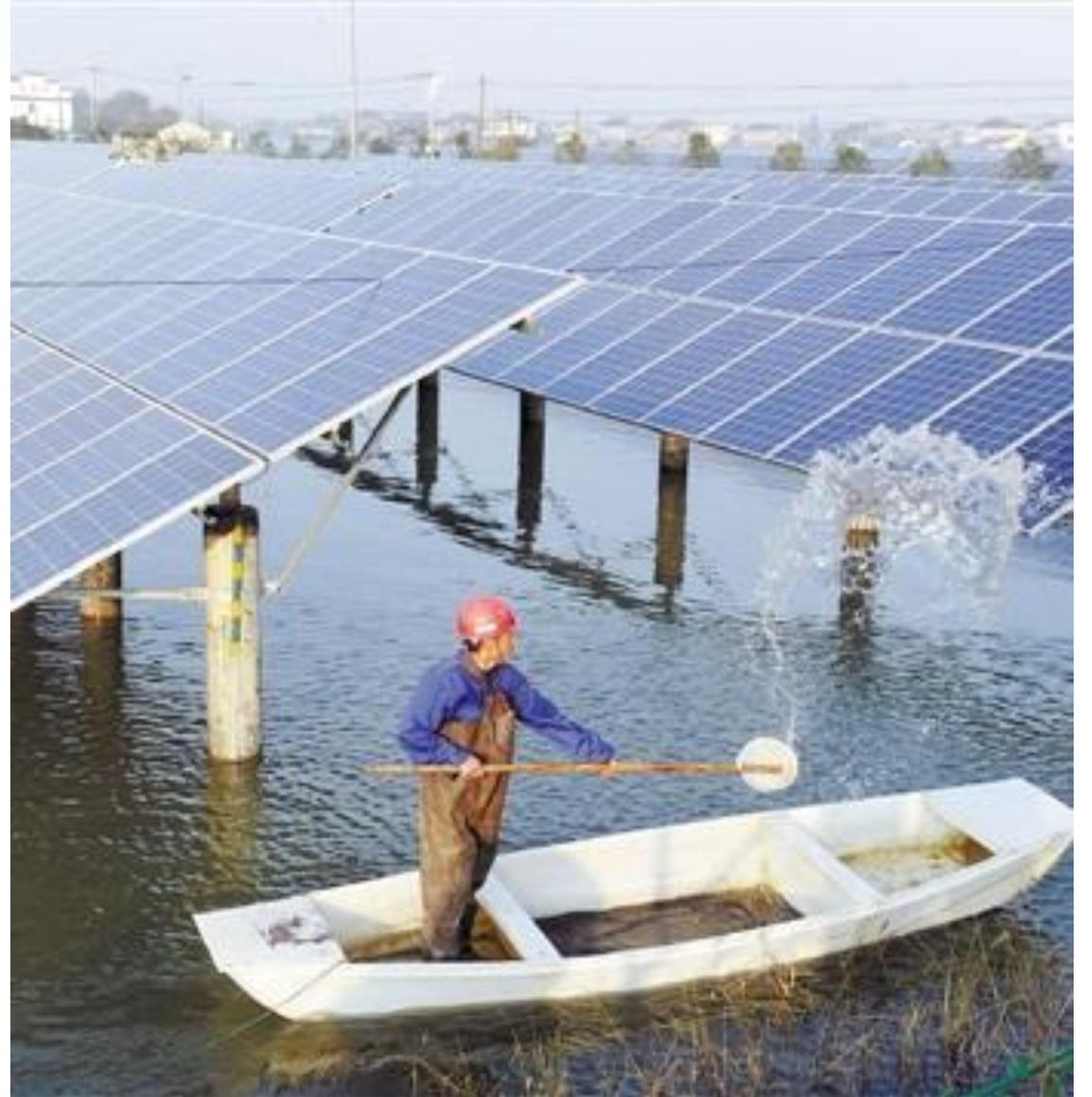
1st batch projects approved in late 2016

- Large-scale PVPA stations: 2.98 GW approved so far, support 125,000 households.
- Village-level PVPA stations: 2.18 GW approved, support 431,000 households.
- Household-level PV systems: No approval needed. Not very common.

Large-scale PVPA stations

- Typically >1 MW
- Commercial: usually invested by profit-seeking firms.
- All generated electricity sold to the grid.
- Not allowed to use productive farmland.
- Should have some agricultural benefits (农光互补).





Village-level PVPA stations

- 100-500 kW
- Non-commercial: the villages have ownership of the PV systems.
- Typically relying on bank loans.
- Designated by the central government as the best approach.



Will it work? Challenges

- The lack of policy details over investment, maintenance, and income distribution make PVPA vulnerable to mis-implementation and corruption.
- Finding suitable space is increasingly difficult especially for large-scale projects. This may push future development towards rooftop systems, but the poor quality of houses can be a major limitation/hazard.

Challenges

- Feed-in tariff continually decline, which directly affects the ability of PVPA to generate income if installation cost cannot decrease as rapidly.

China's PV feed-in tariff

Region	2015	2016	2017
Type 1	0.9	0.8	0.65
Type 2	0.95	0.88	0.75
Type 3	1	0.98	0.85

Challenges

- The problem with renewable energy curtailment is severe in Northeast and Northwest China, where renewable energies are abundant.

Table 7
Estimation of China's CEE from 2008 to 2013.

	Wind power			Solar power			Hydropower		
	Installed capacity (GW)	Power generation (billion kW h)	CEE estimation (billion kW h)	Installed capacity (GW)	Power generation (billion kW h)	CEE estimation (billion kW h)	Installed capacity (GW)	Power generation (billion kW h)	CEE estimation (billion kW h)
2008	12.121	13.1	–	0.14	0.2	0.06	172.60	585.2	170.79
2009	25.853	27.6	0.91	0.3	0.4	0.15	196.29	615.6	244.15
2010	44.781	44.6	1.96	0.8	0.9	0.56	216.06	722.2	224.14
2011	62.412	70.3	12.30	3.3	3.0	3.02	232.98	698.9	321.55
2012	75.372	96.0	20.80	7.0	6.2	6.58	248.90	872.1	218.08
2013	91.460	131.9	16.20	18.3	11.9	21.49	260.00	911.6	227.2

Thank you!

Contacts:

Kevin Lo

lokevin@hkbu.edu.hk