# Solar Lights the Planet: China Story

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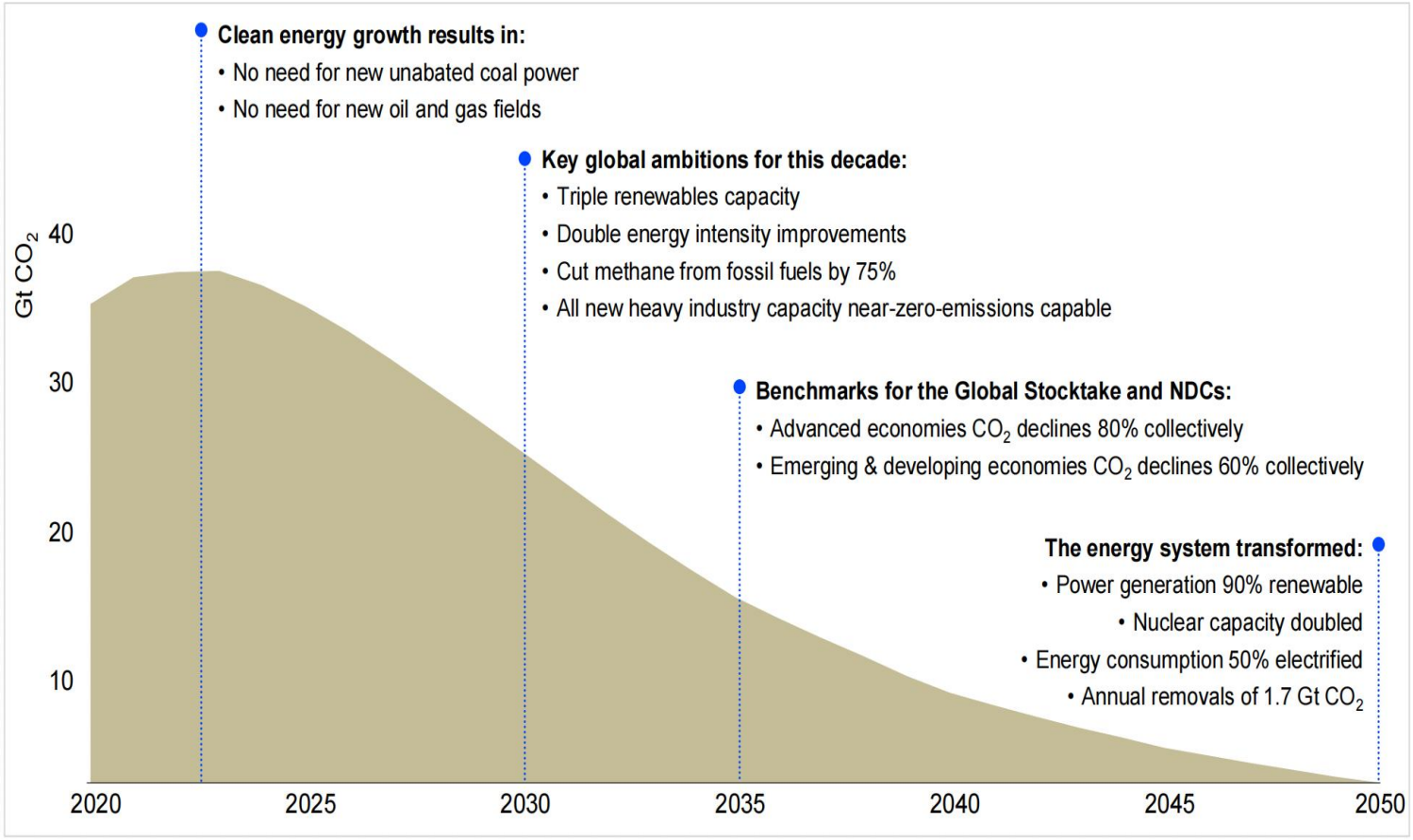
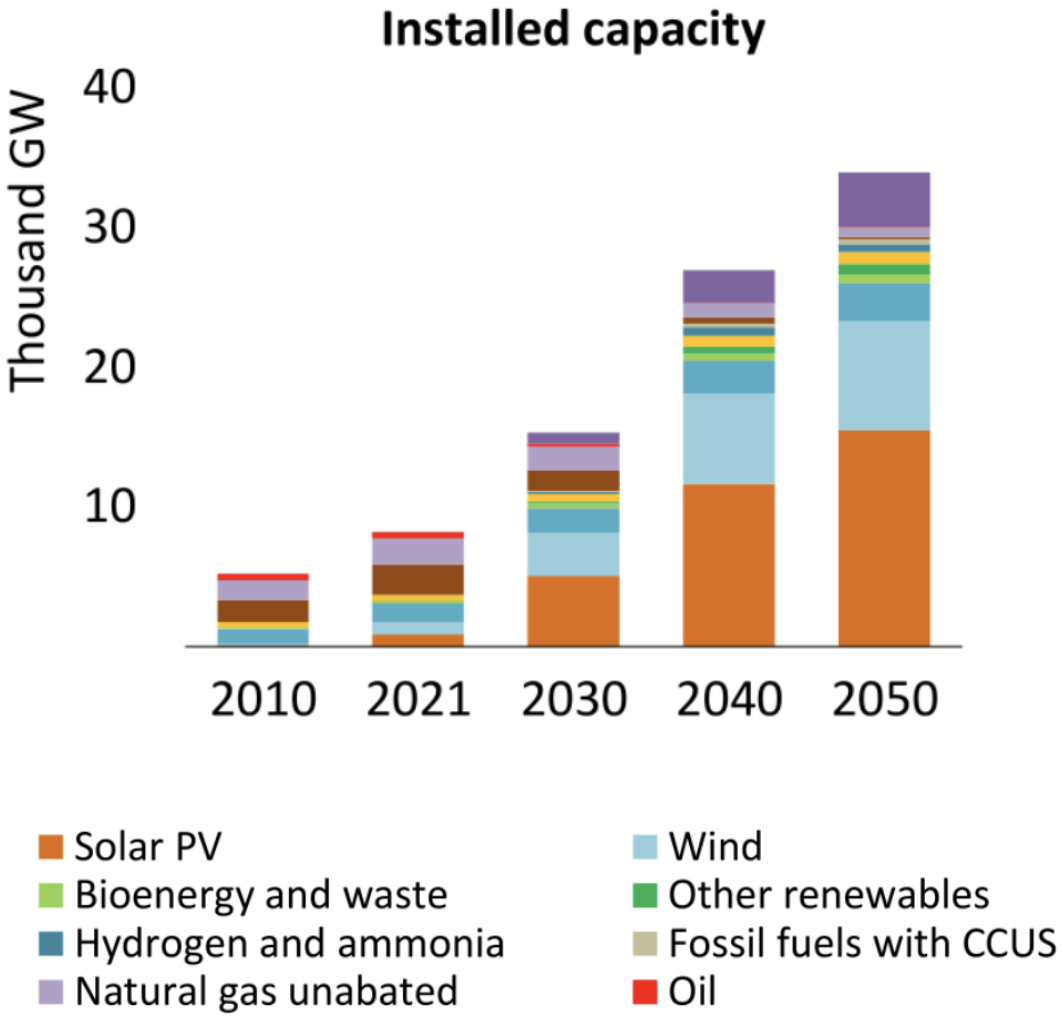
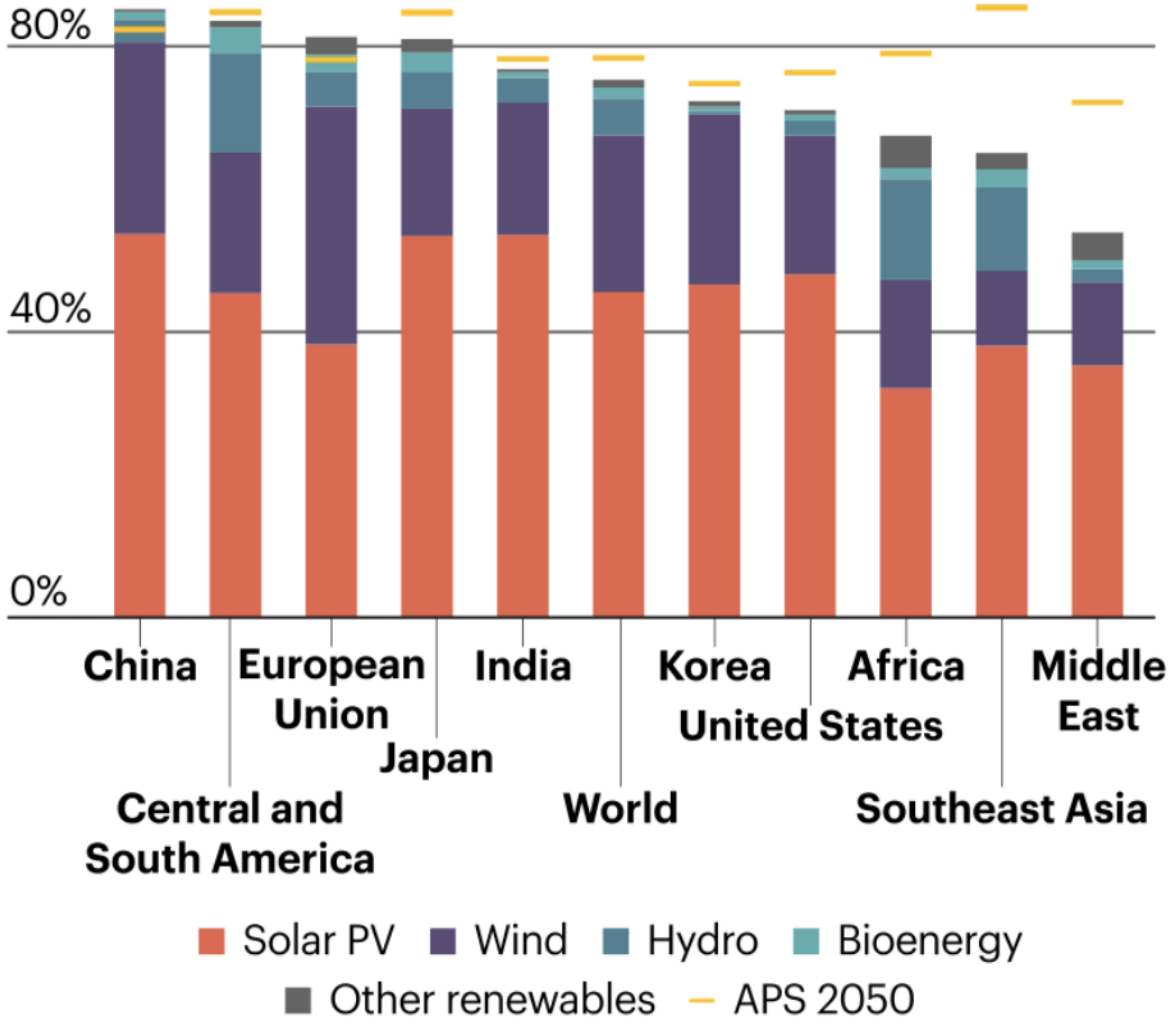
# A Roadmap to net zero by 2050




- In 2021, the IEA published its report Net Zero by 2050: A Roadmap for the Global Energy Sector.
- Between 2021 and 2030, low emissions sources of supply grow by around 125 EJ in the NZE Scenario.
- Over the period 2050, the largest growth in low-emissions energy supply comes from solar and wind.

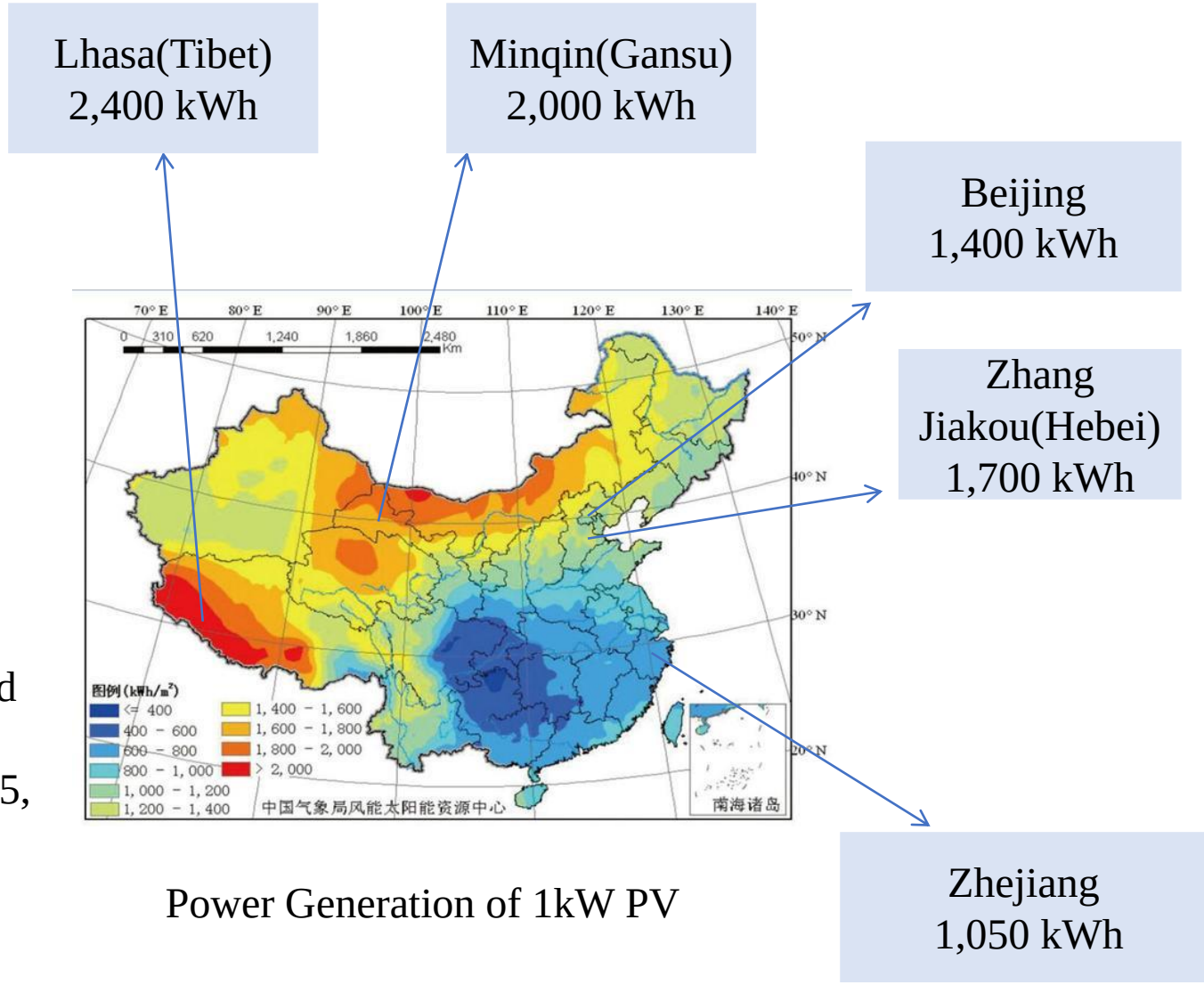
# Global solar PV installed capacity



# China’s solar PV installation speed


In 2022, China’s solar capacity increased by 87 GW.
From January to August 2023, China’s PV capacity increased by 113 GW. It would increase 180GW this year.
If China's new PV installed capacity exceeds 250 GW in 2025, carbon emissions will reach the peak.
China's PV installed capacity per capita may exceed 1 kW in 2030, and we believe it will be ahead of schedule.



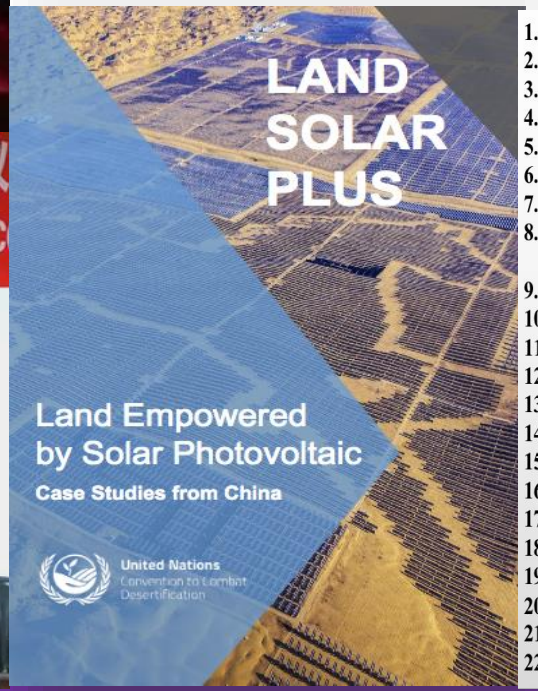

Power Generation of 1kW PV

# The 2030 Agenda for Sustainable Development


Goal 7. Ensure access to affordable, reliable, sustainable and **modern energy** for all.

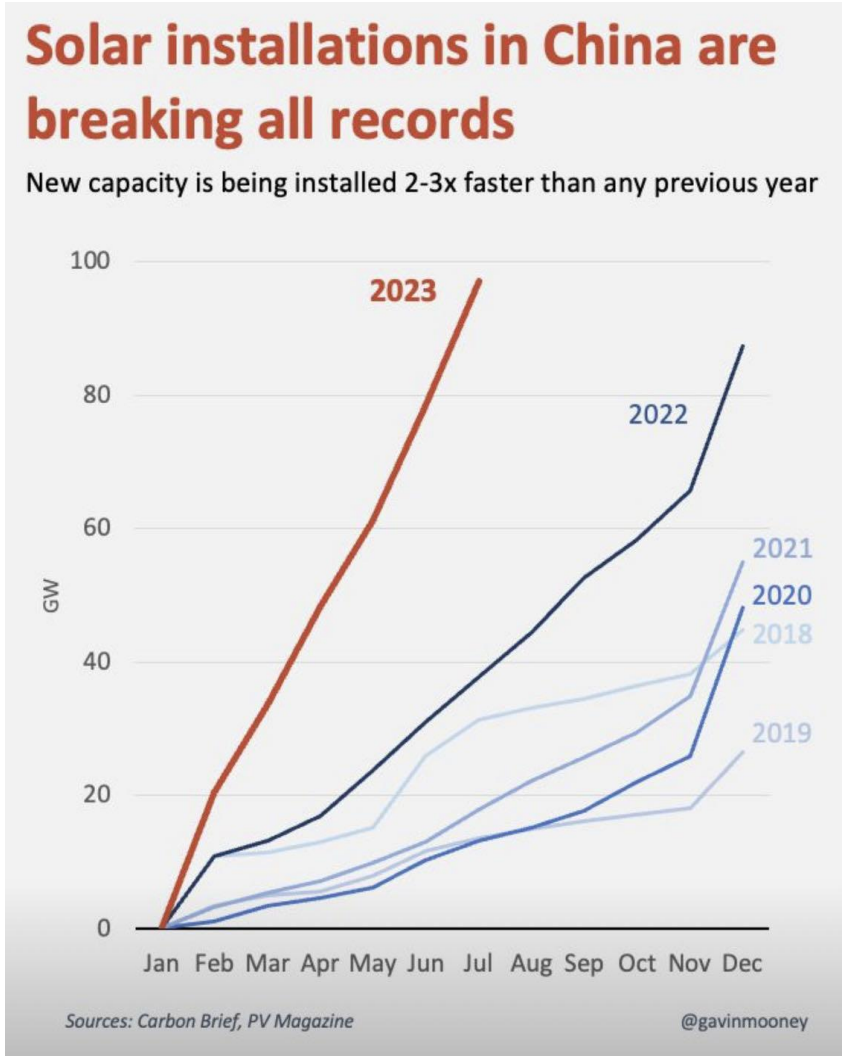
# Tsinghua University and global initiative of 1 kW PV per capita


- In April 2019, the Research Center for Energy Transition and Social Development, School of Social Sciences of Tsinghua University was estabilised.
- We've launched global initiative of 1 kW solar PV per capita.
- Policy recommendations: Our center put forward 42 suggestions for the 14th Five-Year Plan renewable energy development plan. In 2021, Our center proposed 24 policy suggestions to the National People's Congress and received responses from the Ministry of Natural Resources.




1. 关于制订一人一千瓦光伏发展规划研究的建议
2. 关于发起与欧洲各国开展人均一千瓦光伏竞赛倡议的建议
3. 关于开展城市屋顶分布式光伏装机资源评估的建议
4. 对于东部沿海省份开展退化土地资源总量评估
5. 开展路侧光伏政策研究
6. 关于开展城市停车场光伏装机资源评估的建议
7. 关于编制《光伏电站生态效应评估规范》行业标准的建议
8. 关于与欧洲方面合作开展光伏电站全生命周期生态足迹评估规范的建议
9. 关于光伏+生态修复建议
10. 关于开展蜂光一体电站试点的建议
11. 关于在“一带一路”国家开展光伏+生态修复合作的建议
12. 关于光伏电站建设开展生态招标制的建议
13. 关于采集扶贫电站土地性质和生态数据的建议
14. 关于采集扶贫电站土地性质和生态数据的建议
15. 关于建立光伏组件生产全产业链碳含量数据采集体系的建议
16. 鼓励光伏与建筑能效协同的创新政策
17. 关于漂浮式光伏电站建设的政策建议
18. 在农业用地上开展光伏建设的研究
19. 关于建设人均10千瓦光伏村镇的建议
20. 关于实施人人光伏发展战略，推进能源革命的建议
21. 关于尽快发布各省配电价格，推动电力体制改革的建议
22. 关于开展光伏净计量法的建议
23. 新能源产业融资创新的建议
24. 关于户用分布式光伏继续保持补贴政策的建议
25. 关于开展2050、2060年光伏发展远期情景研究的建议
26. 关于国家能源主管部门牵头建立统一口径的可再生能源项目数据库的建议
27. 关于建立可再生能源数据库以及制作中国城市能源地图集的建议
28. 关于与欧洲可再生能源机构加强能源学术交流的建议
29. 关于新能源基础设施采用自主可控的人工智能技术建议
30. 建议开展氢能炼钢试点的建议
31. 关于清洁供暖大力推进“煤改生”的建议
32. 用国内可再生能源替代石油进口，保障国家能源安全
33. 考虑2050年可再生能源占比100%可能性的建议
34. 十四五期间可再生能源目标至少达到20%
35. 2030年我国非化石能源占比的目标，至少应该从20%提高到25%
36. 略微调高弃风弃光比例，相应提高可再生能源发展目标的建议
37. 《能源法》要为零碳排放和可再生能源发展设定路线图
38. 发展可再生能源，每年增加1亿吨油当量的能源供应
39. 战略性地选择少发展化石能源，多发展可再生能源
40. 每年新增可再生能源装机不低于9000万千瓦
41. 关于完善《能源法》的建议
42. “沼气票”政策推动国内生物质能源沼气产业发展

# China pilot campaign: 1 kW PV Per Capita by 2030




**Co-lead:** the Research Center for Energy Transition and Social Development（RCETSD), School of Social Sciences, Tsinghua University

**Co-lead:** The Blue Map, www.ipe.org.cn

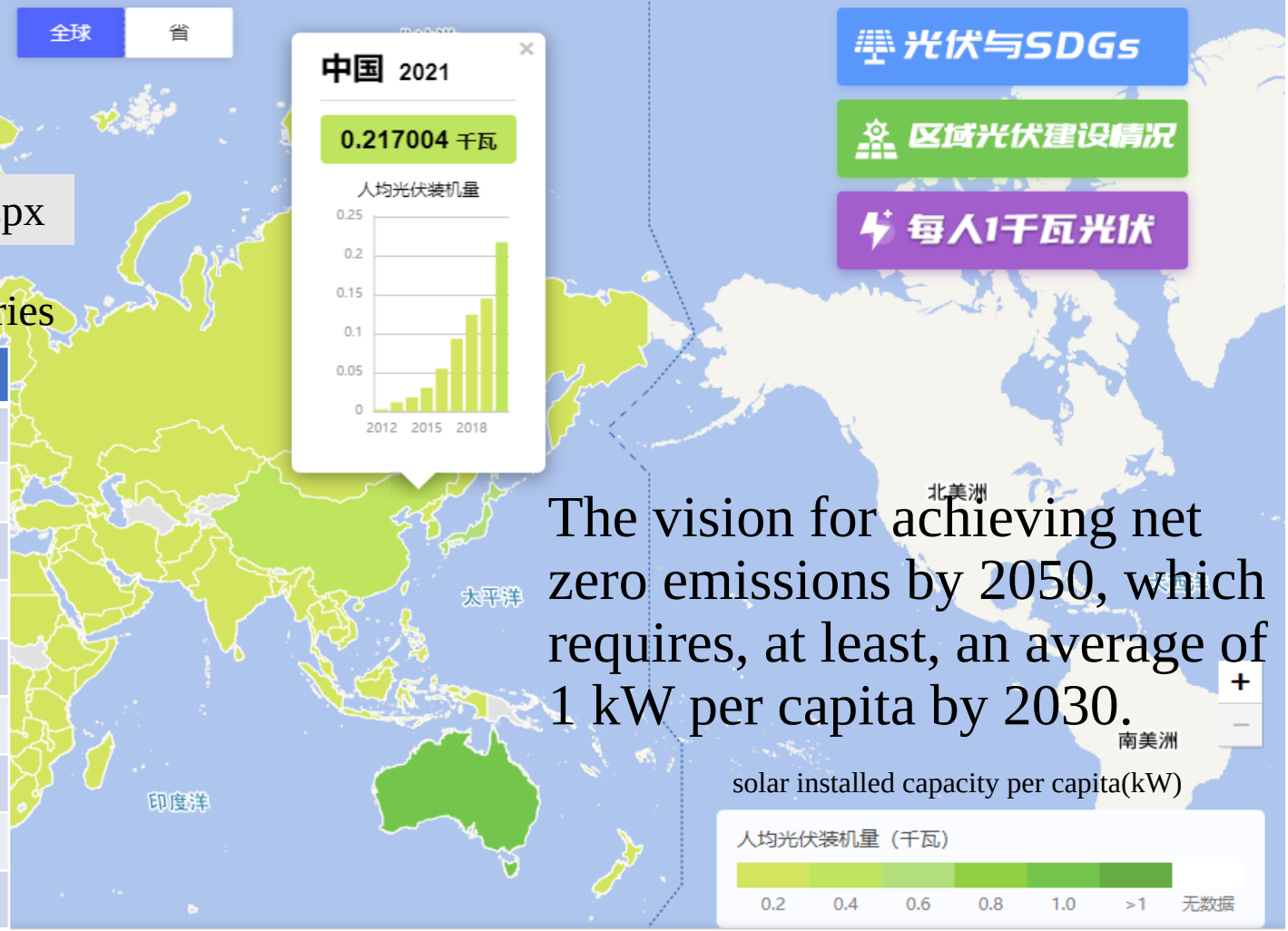

| Jun Ma | Jijiang He | Changhua Wu |
|---|---|---|
| Founder of Blue Map | RCETSD's executive deputy director | China Director, Office of Jeremy Rifkin |

# China pilot campaign: 1 kW PV Per Capita by 2030


https://www.ipe.org.cn/MapPowerStation/PowerStation.aspx

Solar PV Installed Capacity Per Capita in Different Countries

| | Capacity(GW) | Population(million) | Per capita（W) |
|---|---|---|---|
| | 2022 | 2021 | |
| Australia | 29.7 | 25.69 | 1,156 |
| Netherlands | 19.143 | 17.53 | 1,092 |
| Germany | 67 | 83.2 | 805 |
| Japan | 78.8 | 125.7 | 627 |
| Denmark | 3.25 | 5.86 | 555 |
| Switzerland | 4.65 | 8.7 | 534 |
| Hungary | 4 | 9.71 | 412 |
| China | 392 | 1,400 | 280 |




The vision for achieving net zero emissions by 2050, which requires, at least, an average of 1 kW per capita by 2030.

# China pilot campaign: 1 kW PV per capita by 2030

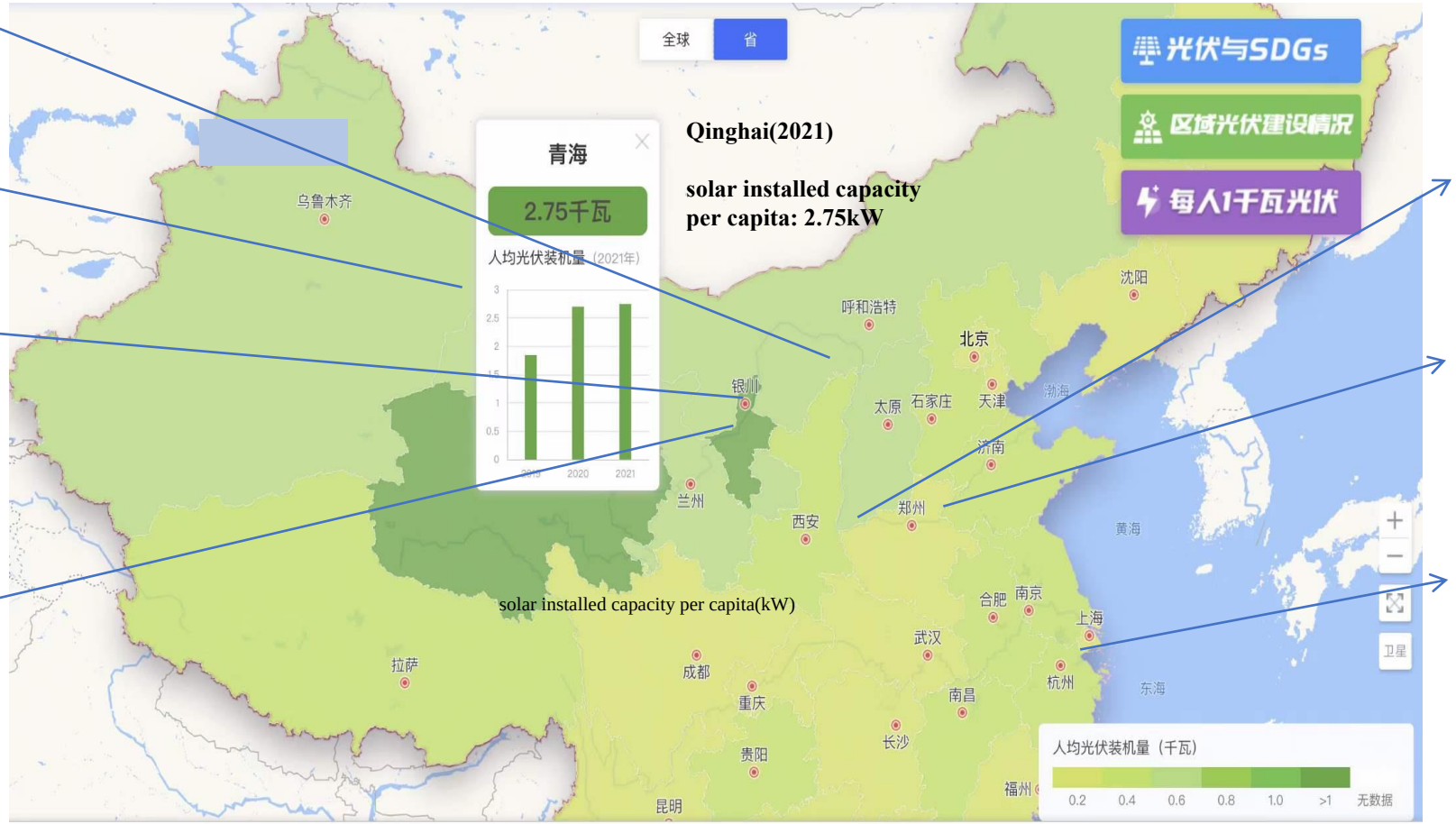
## Counties that have been lighted

Ordos
(Inner Mongolia)

Hami
(Xinjiang province)

Ningdong
(Ningxia province)

Zhongwei
(Ningxia province)




Ruicheng
(Jiangxi province)

Lankao
(Henan province)

Haining
(Zhejiang province)

The map include installed capacity, power generation and per capita data each case.

# China pilot campaign: 1 kW PV per capita by 2030

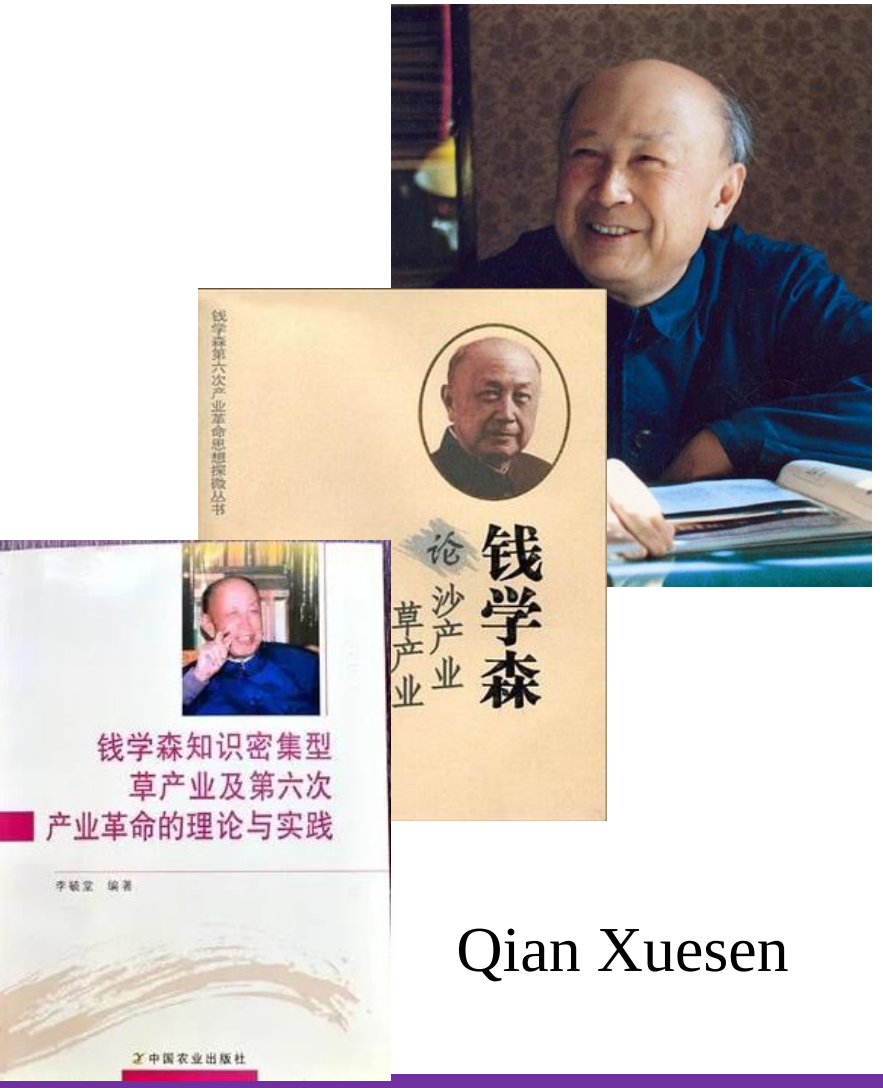
| | |
|---|---|
| **Global goal** | over 1 kW solar installations per capita |
| **China goal** | over 1 kW solar installations per capita |
| **Pioneer area** | A group of counties, towns and villages will achieve 1 kW solar installations per capita by 2025 |

**Make it possible for everyone to participate in PV**

Build 1 kW PV　　Invest in 1 kW PV

Demonstrate 1 kW PV　　Donate 1 kW PV

# Project 1: Qian Xuesen sand industrial innovation demonstration base




Qian Xuesen

## Sand industry theory

- more sunlight
- less water
- new technology
- high efficiency


Minqin laboratory

# Qian Xuesen sand industrial innovation demonstration base --Minqin laboratory

## Solar and desertification control demonstration plot

Land: 100 acres
PV: 3MW
**Case:** Minqin County

## Highly water-efficient agriculture demonstration plot

**Case:** Pepino Melon planting base

## Zero carbon village demonstration plot

**Case**: Changcheng zero carbon village

Off-grid zero carbon residence in Changcheng village

## Education demonstration zone

Botanical garden in desert station

PV and desert control park

# Qian Xuesen sand industrial science demonstration base planning









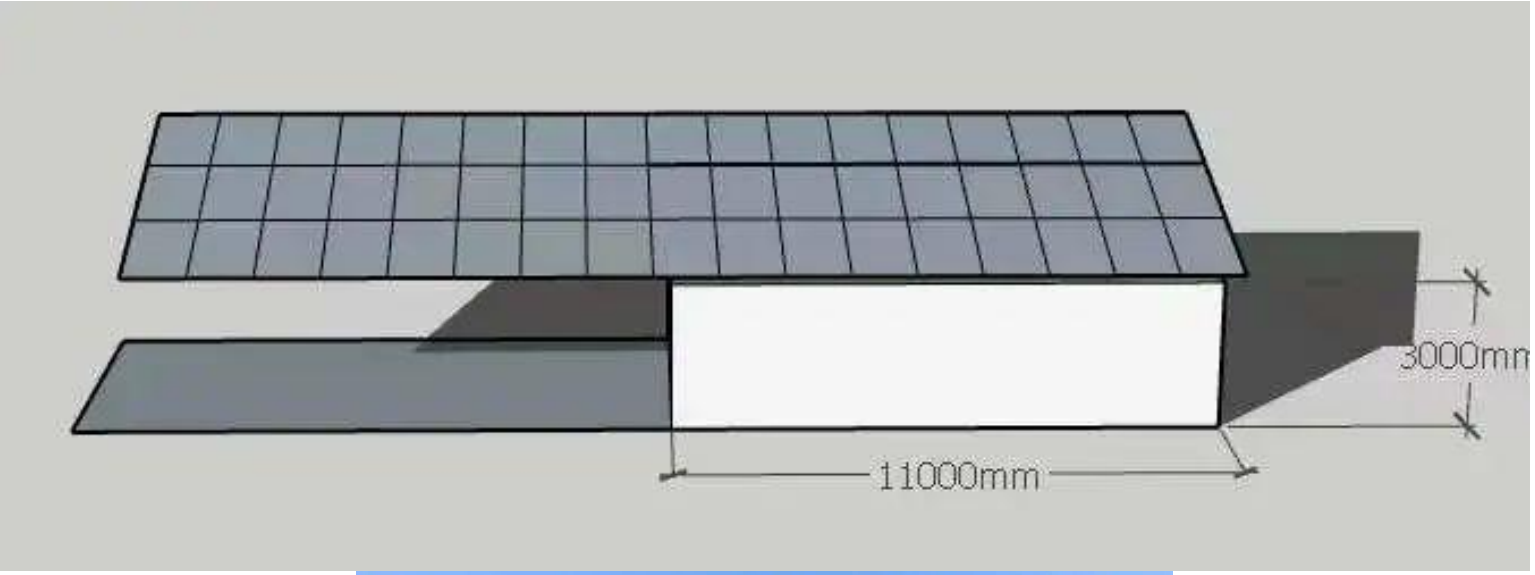


# Ecological and geological disaster avoidance and relocation project in Changcheng village

Changcheng Village is located in Minqin County, Gansu Province. The village covers an area of 7.7 square kilometers and has 273 households with 1,052 people. There are Ming Great Wall and Liuhu Dun ruins, and the desert botanical garden.


According to the livable rural house construction standards of "modern functions, rustic style, economical cost, and safety", the project covers an area of 182 acres and will be built with 141 residential houses, each covering an area of 330 square meters, The front yard is the residential area, and the backyard is material storage area.

# Zero carbon residence




**Solar solution:**

- Rooftop solar installation: 18 or 36 kW.
- The east is rooftop PV, and the west is a PV awning.
- It is not connected to the grid within three months. It is equipped with  storage inverter and phase change heat storage to realize off-grid zero carbon farming.
- After three to six months , it can be connected to the grid.

# Zero carbon new village

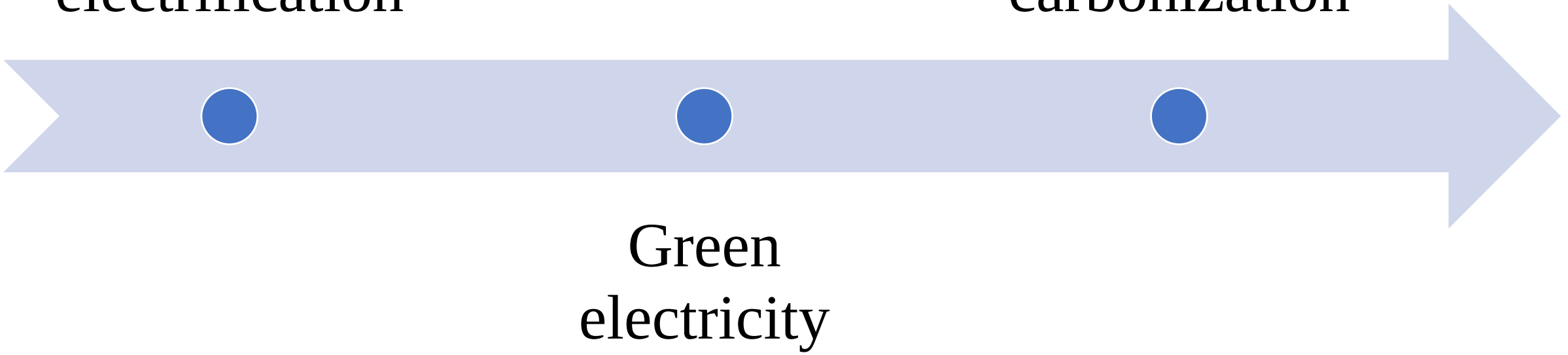

Zero carbon new village = PV & electric heating & electric kitchen & electric transportation

There are 141 households in the village, the total capacity of PV is about 2.8 MW( 20 kW/household *141 & public buildings rooftop such as the village committee).

This project plans to install three transformers (each with a capacity of 200 kVA).

First stage:  24 households will install PV.

# Project 2: 1 kW PV per capita and rural energy transition



# Zero carbon village experimental station( more than 20)

1: Weidian Village, Bohai Town, Huairou District

2: Huairou District New Energy High-tech Popularization and Development Center

3: Yukou Village, Qiaozi Town, Huairou District

4: Xu Fengzhuang, Zhuzhai Village, Zhuzhai Town, Pei County

5: Zhanghong Village, Guanshan Town, Suining County 6: Wangyu Village, Qiuji Town, Suining County

7: Shuoxian Village, Guanhu Town, Pizhou City 8

8: Yongfeng No. 1 Village, Haye Hutong Town, Jiuyuan District, Baotou City

9: Houping Village, Guilong Town, Wujiang District, Shaoguan City

10: Bostan Village, Wubao Town, Yizhou District, Hami City, Xinjiang

11: Xingfu Village, Taojiagong Town, Yizhou District, Hami City, Xinjiang

12: Donghong Village, Xingzi Town, Lianzhou City, Qingyuan City

13: Panshui Village, Fengyang Town, Lianzhou City, Qingyuan City

14: Xinma Village, Yuantan Town, Qingcheng District, Qingyuan City

15: Longwan, Xiamao Town, Sihui, Zhaoqing City

16: Hongshan Village, Timian Town, Huadu District, Guangzhou City

17: Lianma Village, Lutian Village, Conghua City, Guangzhou City

18: Wenchun Village, Taishan City, Jiangmen City

19: Dong'an Village, Doumen District, Zhuhai City

20: Baishan Community, Tonghe Street, Baiyun District, Guangzhou City

.....

# The main paths to zero carbon in village

- **Zero carbon electricity**

  40 kW 200 square meters

  generate electricity: 48,000kWh

- **Zero carbon heating**

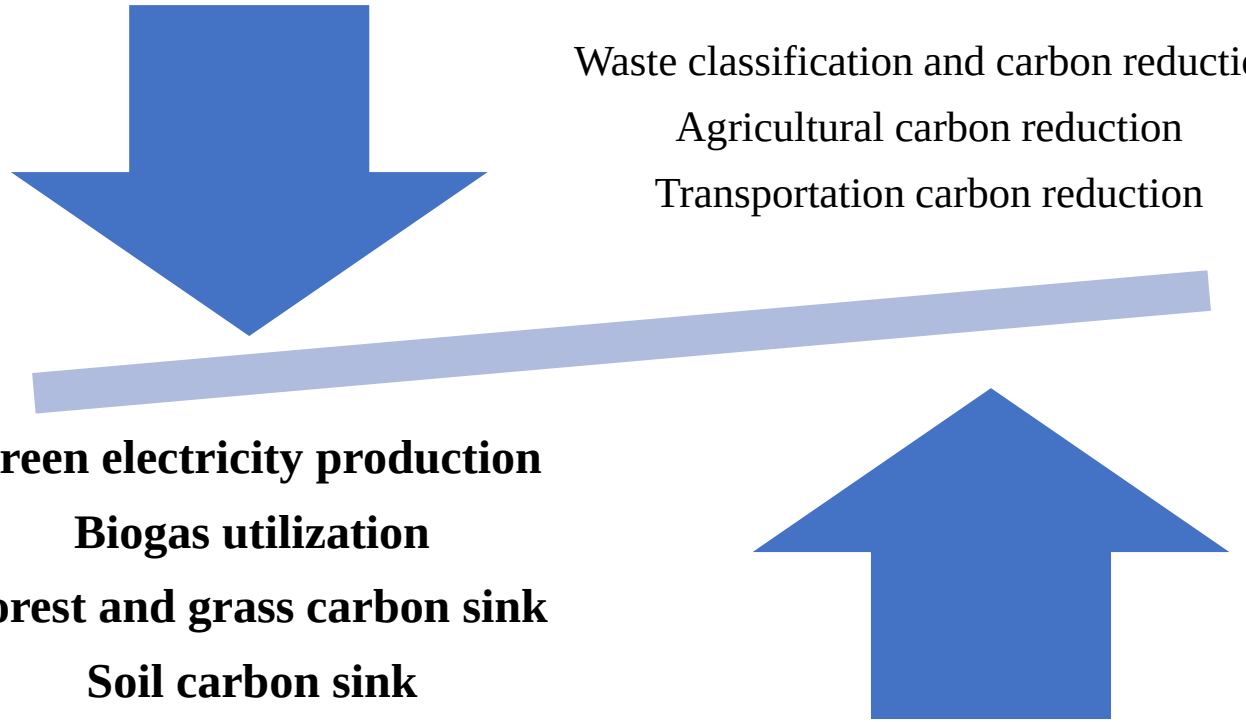
  heat pump, smart heating, direct electric heating

- **Zero carbon transportation**

  electric transportation, e-bike

- **Zero carbon cooking**

- **Zero carbon agricultural production**




For a typical village, when its green electricity production is 20%-50% greater than its usage, it will generally achieve carbon neutrality.

# Residential Solar: 20 kW per 100 square meters

Shijiazhuang 36.18KW
**Hebei province**

Baoding 19.44KW
**Hebei province**

Zaozhuang 24.84KW
**Shandong province**

Zaozhuang 32.4KW
**Shandong province**

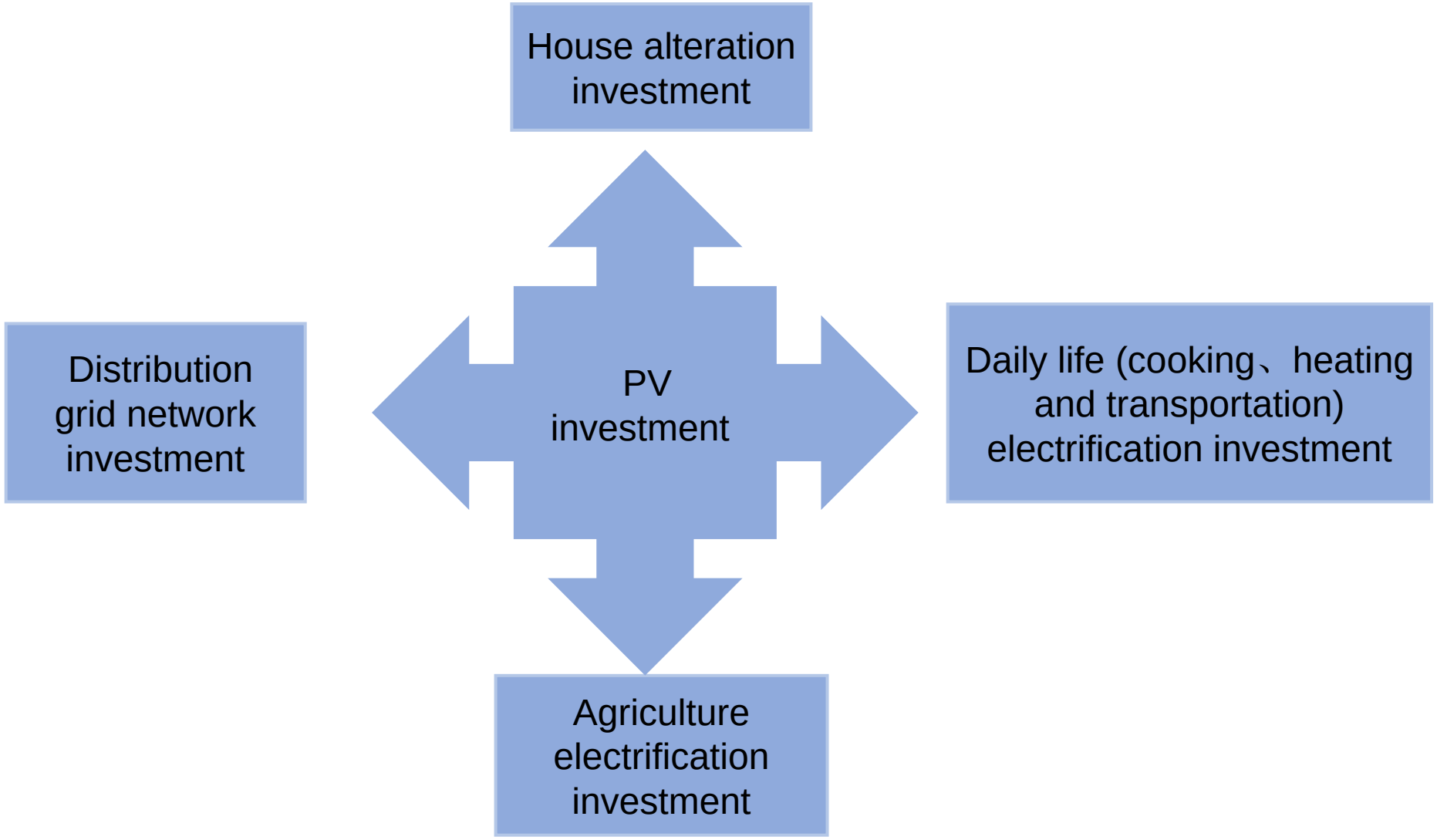
Panjin 95.4KW
**Liaoning province**

Liaocheng 21.06KW
**Shandong province**

# Solar PV and residential electrification

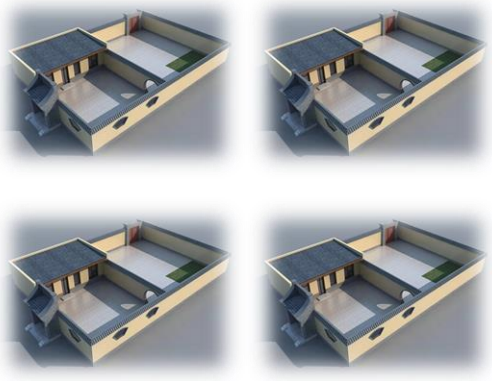
# Solar PV improve building's function


# Future investment in village



# 1,000 zero carbon village experimental stations around the world

3MW PV in village public area



3 MW residential distributed PV

Village electrification

Upgrading of distribution network infrastructure

Agriculture electrification

Total investment: 4.5M$ (30 million RMB) for one village

# Race towards 1kW PV per capita

## Zero carbon village design race

Mobilize local governments to launch design race

## Zero carbon village experimental station

Relying on local government and the State Grid to build  zero carbon village experimental station

## Zero carbon village demonstration station

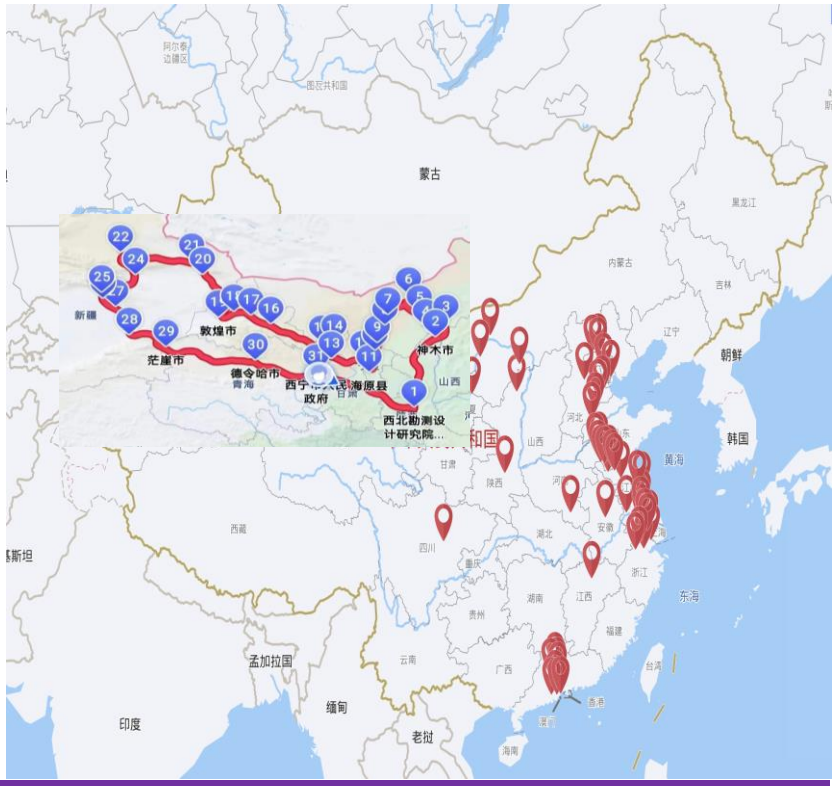
When the zero carbon index of the experimental station reaches the standard, it can become a demonstration station.

# Our footprints





Let’s have a race to build the zero carbon rural experimental station, and light more counties with PV, and complete 1 kW per capita by 2030. This will advance the spread of carbon neutral technologies in rural areas. And the final winner will be the environment.

# Actor 1: Women




Villagers

Researchers

College Students

Solar developers

Government officials

State gird staff

Solar engineering designer

# Actor 2: Young-generation



Investigate solar PV installation scenarios in rural China

Paint the wall


Live commerce

Look forward to our partnership!
Together, “Solar Lights the Planet”!
(www.ipe.org.cn)

# Thank You!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