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# 零碳村镇建设理念与乡村振兴

## Zero Carbon Village Development Concept and Rural Revitalization

全球环境基金-联合国开发计划署-农业农村部

GEF-UNDP-MARA

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# 以史为鉴可以知兴替—中国农村能源建设历程

## China's rural energy development history

1950-  
1980

- 三十年的自发探索和积累，只为解决农村普遍缺柴3-4个月的问题
- 30 years explore and self-accumulation to cover rural firewood shortage in winter.

1980-  
1990

- 全国规模的省柴灶升级改造行动，热效率提高了一倍以上
- national-scale upgrade and transformation of firewood stoves, doubled thermal efficiency.

Adaptation to local conditions, Multi-energy complementary  
Integrated utilization, Be pragmatic

1990-2000

- 以县为单元的农村能源综合建设，“十六字方针”，创新机制与模式
- County-level Comprehensive rural energy construction, innovative mechanism and model, following the principle: Adapt to local conditions, multi-complementary development,

因地制宜、多能互补  
综合利用、讲求实效

2000-  
2010

- 以村为单元的农村能源综合建设，实施生态家园富民计划
- Village-level rural energy comprehensive construction. Implement "enrichment and ecological home" project

2010-  
2020

- 以企业为龙头的农村能源建设，沼气转型升级，重点发展规模化沼气和生物天然气工程
- Led by private sectors, rural energy development, biogas upgrading and transformation, focusing on the development of large-scale biogas and biological natural gas projects.

**紧扣时代脉搏，从未停下脚步 Keep pace with time and never stop**

**持续的农村能源革命，不间断的自主减排行动 Sustained rural energy revolution, continuous independent emission reduction actions**

**时代需求是发展的最大动力源泉 Demand of the time is the greatest source of motivation for development**

# 历史性成就——三大产业 一个模式 一支队伍

## Historic Achievements: Three Industries, One Model and One Team



户用生物质炉具

### 造就了全球最大规模的清洁炉灶产业 Created the world's largest clean stove industry

总量2700万台，年销售250万台，标准热效率75%，最高热效率达83%

Total 27 million units, annual sales of 2.5 million units, standard thermal efficiency of 75%, maximum thermal efficiency of 83%.



### 造就了全球最大规模的太阳能热利用产业 Created the world's largest solar thermal industry

农村地区热水器4676万台，推广面积达8420万平方米；太阳房2529.76万平方米；太阳灶213.57万台

46.76 million units of water heaters in rural areas, promoting an area of 84.2 million square meters; 25,297,600 square meters of solar houses; 2,135,700 solar cookers



大型沼气工程

### 造就了全球最大规模的沼气和生物天然气产业 Created the world's largest biogas and biogas industry

户用沼气3907.67万户，在利用1265万户；沼气工程10.8万处，总池容2179万立方米；生物天然气总产能大概

达到5760万立方米 39,076,700 households use biogas, with 12.65 million households in use; 108,000 biogas projects with a total pool capacity of 21,790,000 m<sup>3</sup>; total biogas production capacity reaches 57,600,000 m<sup>3</sup>.



### 造就了全球最成功的光伏产业扶贫模式 Created the world's most successful photovoltaic industry poverty alleviation model

累计建成光伏扶贫电站2636万千瓦，惠及415万户，其中8.3万座村级电站，覆盖9.23万个村，其中5.98万个建档立卡贫困村。A total of 26.36 million KW of PV power stations for poverty alleviation have been built, benefiting 4.15 million households, including 83,000 village-level power stations covering 92,300 villages, of which 59,800 are poor villages.

### 造就了一支全球最大规模能打硬仗、服务乡村发展的农村能源行业队伍 Created one of the world's largest rural energy industry teams capable of fighting tough battles and serving rural development

2018年乡村能源服务站共计9.71万个，服务人员15.64万人，服务农户2832万户。In 2018, there were a total of 97,100 rural energy service stations, with 156,400 service personnel and 28.32 million households served.



# 新时代 新形势 新机遇 New Era, New Situation, New Opportunity



2020年9月22日，习总书记在第七十五届联合国大会一般性辩论上讲话：应对气候变化《巴黎协定》代表了全球绿色低碳转型的大方向，是保护地球家园需要采取的最低限度行动，各国必须迈出决定性步伐。中国将提高国家自主贡献力度，采取更加有力的政策和措施，二氧化碳排放力争于2030年前达到峰值，努力争取2060年前实现碳中和。

Statement by H.E. Xi Jinping, President of the People's Republic of China, at the General Debate of the 75th Session of the United Nations General Assembly, Beijing, 22 September 2020.

The Paris Agreement on climate change charts the course for the world to transition to green and low-carbon development. It outlines the minimum steps to be taken to protect the Earth, our shared homeland, and all countries must take decisive steps to honor this Agreement. China will scale up its Intended Nationally Determined Contributions by adopting more vigorous policies and measures. We aim to have CO2 emissions peak before 2030 and achieve carbon neutrality before 2060.

**新的时代背景：“双碳” + 乡村振兴**

**New era: Carbon peaking and carbon naturality + Rural revitalization**

**勇于承担责任，敢于中流击水**

**Have the courage to take responsibility and westruck waves in mid-stream**

# 新时期农村能源建设的战略任务 Strategic task of rural construction

- **服务并支撑农业农村版块双碳战略目标的实现** Contribute to and support to achieve carbon peak and neutrality targets in agriculture and rural areas
  - 低碳/零碳村镇 Low/Zero Villages
  - 气候智慧型农业——固碳 减排 稳粮 增收 Climate Smart Agriculture – carbon sequestration, Emission Reduction, Grain Safeguards, Livelihood Improvements
- **服务并推动乡村生态振兴** Contribute to and promote rural ecological revitalization
  - 生态宜居：建筑节能、生活用能清洁化、环境整治、厨房革命、厕所革命 Ecological livability: building energy saving, clean living energy, environmental improvement, kitchen revolution, toilet revolution
  - 绿色循环：农业废弃物资源化利用、生态农场创建  
“The green cycle”: utilization of available feasible renewable energy resources, establishing Ecological Farm
- **服务并推进乡村产业振兴** Contribute to and promote rural industry revitalization
  - 培育可持续的符合双碳目标导向和乡村生态振兴目标的农村能源新产业 Develop sustainable new energy industries in rural areas in line to achieve the carbon peak and neutrality targets and rural ecological revitalization goals
- **探索出一条具有中国特色的低碳、零碳、负碳的农村能源发展路径**  
**Explore a China specific low/zero/negative rural energy development path**

## 低碳村镇建设 Establishment of low carbon villages

### ➤ 农业废弃物资源化高值高质利用

#### Efficient utilization of Agri-waste

- 秸秆能源化利用 Energy utilization of straw
- 畜禽粪污沼气化处理 Methanation of livestock and poultry manure

### ➤ 农村地区太阳能光热光伏开发利用

#### Development and utilization of solar thermal PV in rural areas

- 光伏 photovoltaic
- 光热 photothermal

### ➤ 农村生活用能可再生能源替代

#### Rural living alternative energy source – renewable energy

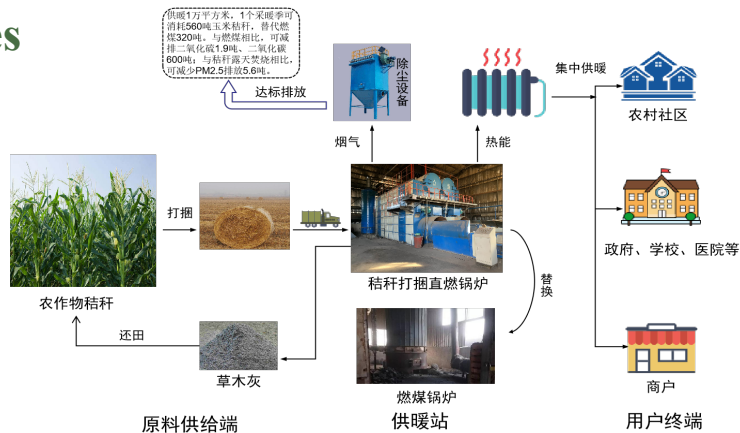
- 北方地区农村清洁取暖 rural area in north region clean heating
- 厨房革命 kitchen revolution

### ➤ 农村建筑节能与能效提升

#### energy-saving farmhouses and energy efficiency improvement

### ➤ 探索建立农村能源行业碳交易的政策技术体系

#### Explore and establishment of a policy and technical system for carbon trading in rural energy sector

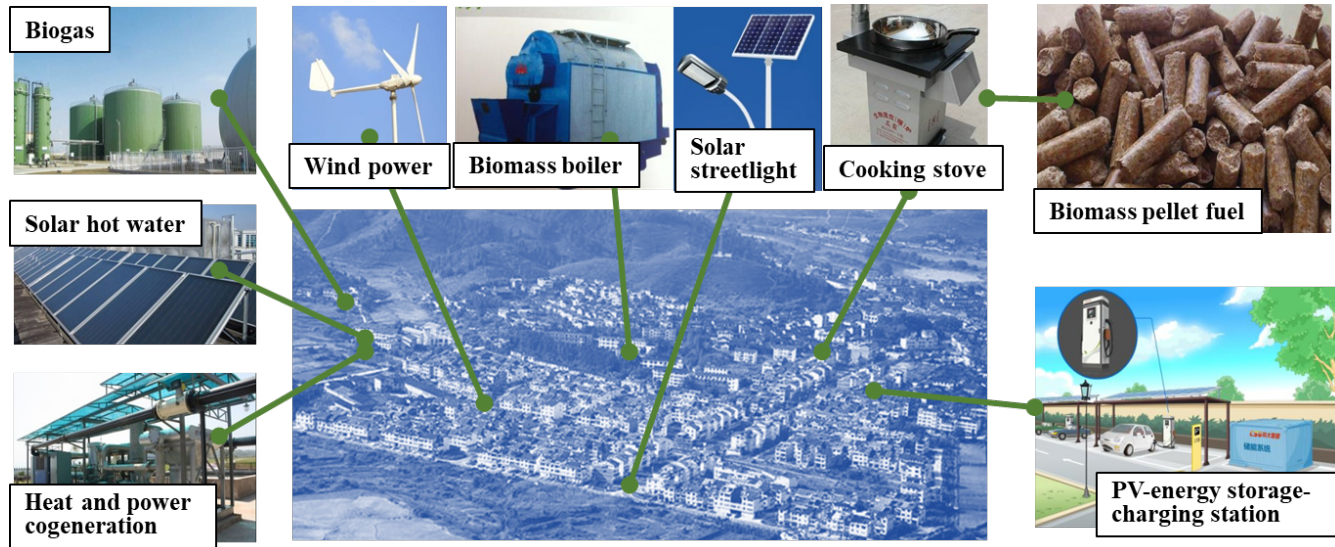




# 碳中和目标下农村能源发展方向—零碳村镇建设 The direction of rural energy development under the carbon neutrality target - Zero carbon village construction

以村镇为建设单元，因地制宜开发、利用农村可再生能源资源，通过采用先进的节能、储能技术和能源综合管理模式，实现区域绿色能源的充分可持续供给，达成区域内碳的零排放目标。

Taking villages and towns as construction units, rural renewable energy resources will be developed and utilized according to local conditions. Through the adoption of advanced energy-saving and energy-storage technologies and integrated energy management modes, we will achieve a sufficient and sustainable supply of regional green energy and reach the goal of zero carbon emission in the region.



# 零碳村镇建设目标 Construction Goals of Zero Carbon Towns and Village

加快中国农村零碳转型与绿色发展，引领中国乡村振兴战略“生态宜居”建设，促进中国国家自主减排目标（NDCs）实现，为实现全球气候变化减缓、联合国可持续发展目标（SDGs）做贡献。

Acceleration of zero-carbon transformation in China's rural area, and improvement of the "ecological livability" in China's rural revitalization strategy to contribute to global climate change mitigation and the achievement of China's National Determined Contributions (NDCs) targets under the Paris Agreement and the United Nations sustainable development goals (SDGs).

## 中国农村零碳村镇能源开发、应用的政策制定和制度支持

Policy Formulation and Institutional Mechanisms on Zero Carbon Town and Village Development

## 零碳村镇可再生能源技术集成与应用示范

Integrated Renewable Energy and Energy Efficiency Technologies Applications for Zero Carbon Town and Village Development

## 农村零碳生活方式与知识宣传普及

Facilitating Rural Zero Carbon Development and Lifestyle Popularization and Knowledge Dissemination

## 中国农村分布式可再生能源发展可持续发展能力提升

China's Rural Distributed Renewable Energy Development and Sustainable Development Capacity Improvement



# 零碳村镇建设原则 Principles: Construction of Zero Carbon Towns and Villages

因地制宜、多能互补 Adapt to local conditions,  
multi-complementary development

三能并重、节能优先 RE EE EC, EC priority

系统设计、综合管理 System design and  
integrated management

政府主导、市场运营 Government-led and  
market-operate

示范引领、分步建设 Start with demonstration,  
then develop systematically

# 零碳村镇建设内容 Zero Carbon Towns and Villages Construction Content

## Zero Carbon Towns and Villages

零碳村镇

**Energy transition and distributed energy support system establishment**  
能源转型与分布式能源支撑体系建立

**Research on Distributed Energy Policy and Green Compensation Mechanism and Marketization**

分布式能源政策和绿色补偿机制及市场化研究

可再生能源产业 **Renewable Energy Industry**

储能技术 **Energy Storage Technology**

**Building a Zero Carbon Rural Society**  
农村零碳社会建设

农村教育与素质提升 **Rural Education and Quality Improvement**

零碳社会科普宣传 **Zero Carbon Social Science Promotion**

零碳社会制度建设 **Zero Carbon Society System Building**

零碳社会机制构建 **Zero carbon society mechanism construction**

**Energy conservation and energy efficiency improvement**  
节能与能效提升

生活节能

**Energy conservation for life**

住房节能

**Energy conservation for housing**

# 农村分布式能源综合管理系统

## Integrated Rural Distributed Energy Management System

应用大数据、云计算、物联网等技术，建立区域能源综合控制中心和服务平台，将电力系统、热力管网、燃气管网、交通网络进行互联互通，构成区域内的综合能源系统，实现多种能源互联互通、源网荷储深度融合，实现清洁低碳、安全可靠、智慧灵活、经济高效等目标。

Apply big data, cloud computing, IoT and other technologies to establish a comprehensive regional energy control center and service platform, which interconnect the electric power system, heat pipe network, gas pipe network, and transportation network to constitute a comprehensive energy system in the region. The system realizes multiple energy interconnection and mutual benefit, deep integration of source, network, load and storage, and achieve the goals of clean and low-carbon, safe and reliable, intelligent and flexible, economic and efficient.

提供区域能源一体化解决方案，横向实现“电、热、冷、气、水”能源多品种之间，纵向实现“源、网、荷、储”能源多供给环节之间的协同以及能源生产与消费之间的互动。

The system provides regional energy integration solutions to realize the synergy between multiple types of energy (electricity, heat, cooling, gas and water) and energy multi supply chain (source, network, load and storage), as well as the interaction between energy production and consumption.

**用双碳战略思想、现代能源技术  
引领零碳村镇建设，服务乡村振兴大局**

Leading the construction of zero-carbon villages and towns with “carbon peak and carbon neutrality” strategic thinking and modern energy technology to serve the situation of rural revitalization

**创新发展 时不我待  
国家需要 行业责任**

The time and tide of innovation and development wait for no man, and it is the national needs and industry responsibility.