NEW ENERGY NEXUS China

CASEBOOK

Small Money, Big Change

A Casebook on Rural Revitalization Through Solar Poverty Alleviation, Village Collectives' Wind Power Investment, and Youth and Women Empowerment

Author: Green & Inclusive Finance team, New Energy Nexus China

NEW ENERGY NEXUS China

ABOUT US

New Energy Nexus (NEX), as a world-leading clean energy accelerator, has been dedicated to advancing the global energy transition. Over the past two decades, we have supported numerous startups and entrepreneurs through a series of initiatives. Together, we have fostered a clean energy ecosystem, and have taken concrete actions to accelerate the global response to climate change.

As the extension of this mission in China, NEX China is deeply rooted locally, providing tailored business matchmaking and consulting services to local governments, industrial parks, universities, and enterprises of all sizes. By leveraging technological innovation, it aims to drive energy transition and achieve carbon neutrality goals. NEX China identifies and evaluates scalable energy transition solutions, integrates resources, and builds both online and offline collaboration platforms to facilitate deeper interactions and cooperation among energy companies, research institutions, sub-national governments, and investors.

PREFACE

This casebook tackles some deceptively simple yet vital questions: Why is renewable energy a key lever for China's rural revitalization? Where does the money come from? Can China's model inspire the Global South?

On one hand, rural China faces energy transition challenges, yet government money alone cannot fill an annual funding gap of roughly 2 trillion RMB. On the other hand, rural areas not only bear the brunt of climate impacts, but also can be an integral part of the climate solution because they hold enormous potential that has long been overlooked.

The casebook demonstrates that when deployed smartly, small money can lever far larger capital flows —through innovative financing models that combine policy-driven, market-driven, and philanthropic & social capital. Well-designed and built on grassroots participation and trust, they boost household and collective income, reduce emissions, improve living standards, and create inclusive new industries. The cases offer replicable lessons not only for other Chinese villages, but also for the Global South. They show how small seed funds, through innovative structures, can generate systemic impact in communities often marginalized by the clean energy transition.

Case Overview

TCL Foundation –Solar-Powered Low-Carbon Campus

- 1.6 MW solar capacity was installed across 27 schools, cutting 40,000 tons CO_2 and generating 17.4 million RMB in returns, proving philanthropic capital can fund sustainable infrastructure.

Tencent SSV – Solar Trust

- A dual "charitable + capital" trust funded rooftop PV, providing households with rents while surplus revenues financed healthcare and education, piloting a "finance + philanthropy + industry" model.

Trina Solar × MYbank – Green Supply Chain Finance

- Fintech-driven AI risk models cut loan rates by 21% for small solar distributors. With zero defaults, this expanded household PV coverage in counties.

Dalad Banner, Inner Mongolia –Village Collectives' Wind Project

- Village collectives co-invested with government and banks in a 75.6m RMB wind farm. 132 collectives became shareholders, each receiving guaranteed dividends of 50,000 RMB annually, ensuring true local benefit.

Tianmen, Hubei – Women Drone Pilots

- A 30,000 RMB seed money trained 2,000+ women as agri-drone pilots. Now servicing over 1 million mu of farmland annually, they cut pesticide use and pollution, and created new income. One trainee, having earned 70,000 RMB in six months, thus escaped poverty.

Tieniu Village, Chengdu – “New Villagers”

- Returning youth and social enterprises combined eco-farming and tourism, creating new opportunities for low-carbon energy use in the countryside. Revenues were reinvested into soil restoration, forming a positive cycle.

Fengma Philanthropy – Warm Classrooms on Plateau

- Corporate donations and crowdfunding replaced coal with clean heating in a plateau boarding school, providing 270+ students 30 extra learning days per year and cutting 167–194 tons of CO_2 annually.

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WHAT QUESTIONS ARE WE ADDRESSING?

01

What Questions Are We Addressing?

In China, one of the most pressing challenges in leveraging new energy for rural revitalization is three-fold: where does the money come from, how does it reach the rural area, and how can it genuinely benefit rural residents? The green transition of rural China is not only vital to the country's own development, but also carries major implications for global climate goals.

“Climate change affects the rural area not only through the natural environment, but also through the economy and daily life.”

Why is this issue so urgent? Because climate change is intensifying the vulnerabilities of rural areas.

Ecological impacts

Climate disruptions are undermining the natural foundations of rural livelihoods. Floods and droughts threaten people’s livelihoods. Soil erosion, land degradation, and biodiversity loss not only weaken agricultural sustainability, but also drive up costs of ecological restoration. Rising temperatures accelerate pest reproduction cycles, increasing the cost of pest control and adding further ecological and financial burdens.

Income impacts

Rural households and migrant workers face heightened economic vulnerability. Extreme weather events damage crops on a large scale within short periods, not only affecting that year’s harvest but also risk disrupting subsequent planting seasons. Meanwhile, the contraction of carbon intensive industries (such as coal and steel) has left a large number of rural migrant workers unemployed. Although the renewable energy sector is growing, it often requires higher levels of education and technical skills, making the transition uncertain and risky.

Living impacts

Rural households face a dual burden of energy and health. While the shift from coal and firewood to cleaner fuels like natural gas or electricity (e.g., electric heating) has improved the environment, it also increased household energy expenditures. Many families fall into “energy poverty”, where a single extreme weather event or surge in energy costs can push them back into a cycle of poverty.

“In advancing the green transition in rural areas, the greatest challenge lies in the lack of sustained attention and investment.”

Yet the actual flow of capital into rural China remains limited

From a macro perspective, rural revitalization depends heavily on public funding. While the central government has already allocated substantial funds through mechanisms such as the rural revitalization funds, resources that actually reach villages and grassroots projects remain insufficient. Estimates suggest that total funding gap for rural revitalization from 2018 to 2035 could exceed 35 trillion RMB. That implies the need to channel at least an additional 2 trillion RMB each year into rural revitalization projects[1].

From a micro perspective, the “downward penetration dilemma” of the financial system makes the problem more complex. In recent years, large state-owned banks and commercial banks, under policy pressure, have indeed scaled up inclusive finance initiatives at the grassroots level, even pushing capital into rural areas through low-interest “price wars”. Yet this model is often unsustainable: **once policy incentives diminish, will the big banks exit from grassroot markets?**[2] More importantly, such short-term competition, while crowding out small local banks and microfinance companies, also force big banks to invest heavily to build up financial trust with villagers. By contrast, local small financial institutions possess irreplaceable advantages in serving villagers and supporting rural green transition—thanks to their long-established trust bonds and in-depth understanding of local networks.

Furthermore, in practice, between capital being **“available”** and “**accessible,**” there remain obstacles such as poor adaptability of financial products, challenging risk control, and lack of data transparency that theoretically have funding support still struggle to secure the money they need on the ground. The real question is not simply “is there money,” but “through what appropriate mechanisms can money stay in the countryside and translate into lasting momentum for green transition.”

[1] China Academy of Financial Inclusion, Renmin University of China. (2022). Unleashing potential: Social responsibility investment empowers rural revitalization. Social responsibility Investment research series, No.CAFI20220624.
[2] Bei, Duoguang. (2025). On inclusive finance and rural revitalization in China.

In practice, renewable energy is an excellent lever for transition.

On the one hand, villages play a dual role in the energy system: they are both frontline scenes for energy consumption and transition (agricultural production and household energy use are places where clean alternatives quickly show concrete benefits), and important testing ground for distributed energy production — for example, solar and wind projects that make use of village rooftops and land resources.

On the other hand, the rapid growth of the renewable industry brings new opportunities to rural areas—it can serve as an industrial pillar on the energy production side, creating income for village collectives and households, while also driving low-carbon transformation in energy use on the consumption side. In short, renewable-energy companies and related stakeholders are not only providers of green energy, but also drivers and partners in the transformation of rural energy consumption patterns.

Equally important, rural development is highly complex: projects implementation requires not only funding, but also strong trust mechanisms and multi-stakeholder collaboration. Local governments, platform companies, financial institutions, village collectives, non-profit organizations, and renewable energy enterprises all play indispensable roles. Only through mutual trust and cooperation can funding be turned into sustained tangible change.

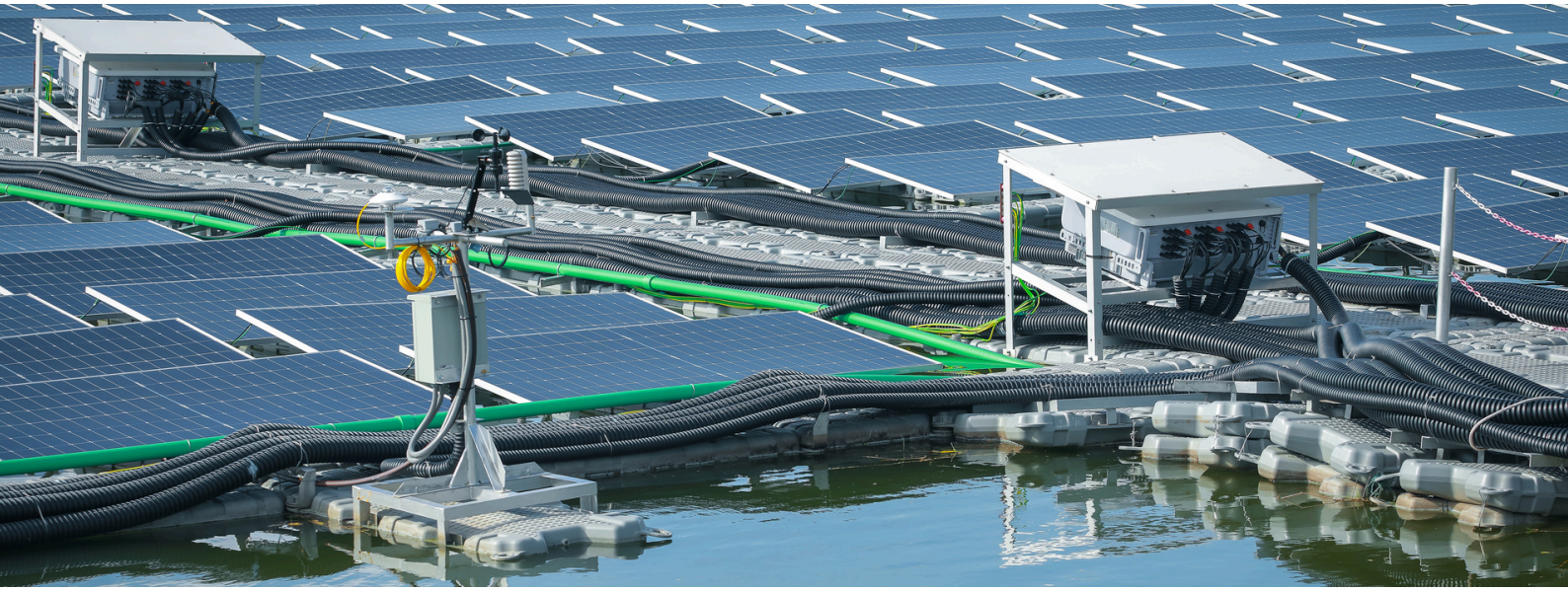
“How to fill the financing gap under current conditions?”

In the context of relatively limited financial resources, innovative financial tools are playing an increasingly critical role in driving the transformation of rural energy production and consumption. In some villages, inspiring practices are already emerging—**“small yet smart investment”** has leveraged large-scale public and market capital, creating visible and transformative changes.

The case studies in this casebook—such as solar PV poverty alleviation projects, village collective investment in wind power, and youth and women-led green entrepreneurship—show that by flexible financing models and active participation from diverse stakeholders can effectively channel public, market, and philanthropic capital into rural areas, filling the gaps left by traditional financing.

It should be noted that this collection is not an academic study, but rather an attempt to present real stories of people-centered rural practices in China’s energy transition. In Part Three, **“Where Does the Money Come From? How Is It Used?”**, we analyze and compare the roles, incentives, and collaboration challenges of different funding sources—policy-driven, market-driven, and social capital—to help readers understand the logic and tensions behind the flow of money.

These cases provide replicable experience for rural China, but also offer inspiration for other countries, especially the Global South, exploring low-cost, community-based energy transition pathways. We hope this can encourage more international dialogue and resource exchange, demonstrating how renewables — both in generation and application— weave into rural development and foster a more inclusive, flexible rural green financial system—one that ensures the benefits stay with the local communities.



WHY IS RENEWABLE ENERGY A KEY LEVER FOR RURAL REVITALIZATION?

02

Why Is Renewable Energy a Key Lever for Rural Revitalization?

In the process of rural revitalization, the transition to green and low-carbon development has become an unquestionable foundation.

Rural areas, with their vast land, sparse population and abundant natural resources, are ideal for developing renewable energy. Expansive farmland, ponds, rooftops, and hillsides offer space for solar farms; rich wind and biomass (e.g., crop straw and animal manure) await further exploitation. This not only solves siting issues for renewable projects, but also achieves compound and efficient use of land and resources, creating a multi-income model of “power generation on panels, farming & breeding under panels”.

Policy Evolution: Combining Rural Revitalization with "Dual Carbon" Goals

Since the **"dual carbon" goals** (peaking carbon emissions before 2030 and achieving carbon neutrality before 2060) were set, rural areas have increasingly been integrated into China's national low-carbon strategy:

- **2016 – Opinions on the Implementation of Photovoltaic Power Generation for Poverty Alleviation** highlighted solar PV as a key tool for asset-based poverty alleviation.[3]
- **2018 – Rural Revitalization Strategic Plan (2018–2022)** for the first time, introduced new models of low-carbon rural development.[4]
- **2021 – Opinions on Comprehensively Promoting Rural Revitalization and Accelerating the Modernization of Agriculture and Rural Areas** formally integrated agriculture into the national carbon reduction framework.[5]
- **2022 – Implementation Plan for Agricultural and Rural Emission Reduction and Carbon Sequestration** detailed ten major actions for rural carbon reduction.[6]
- **2025 – Opinions on Further Deepening Rural Reform and Solidly Advancing Comprehensive Rural Revitalization(Central Document No. 1)** (Central Document No. 1): further emphasized green, low-carbon transition and distributed renewable energy in rural areas.[7]

This progression shows how rural revitalization and the dual-carbon target have become deeply integrated, creating a policy trajectory that keeps widening the space for on-the-ground action.

[3]www.gov.cn/xinwen/2016-04/02/content_5060857.htm.
[4]https://www.gov.cn/zhengce/2018-09/26/content_5325534.htm
[5]https://www.gov.cn/zhengce/2021-02/21/content_5588098.htm
[6]https://www.moa.gov.cn/govpublic/KJJYS/202206/t20220630_6403715.htm
[7]https://www.gov.cn/zhengce/202502/content_7005158.htm

What Is Solar Poverty Alleviation?

Solar poverty alleviation is a flagship model in China that combines renewable energy with poverty reduction, and stimulate economic development with solar projects. The standard approach: a PV plant is built on village-owned land, rooftops, or barren hills in poor areas. The government provides up-front capital or policy support. Once the plant gets connected to the grid, the electricity revenue is paid back regularly to the village collective or registered poor households.

- For **village collectives**, this generates long-term, steady revenue to improve public services and infrastructure.
- For **poor households**, it offers dividends, rental income, or wage labor opportunities.

At the same time, in some regions, the electricity generated by solar PV is also directly used for village-level public facilities or households' daily consumption, thereby reducing their own electricity expenses.

Unlike distributed household PV donations or purely commercial models seen in other countries, China's approach emphasizes a triple synergy of "**government guidance + market operation + household benefit", enabling rapid scale-up and strong policy alignment.** Its biggest strength compared to traditional poverty reduction models is the "self-generating" nature of income: once built, a PV plant provides 20+ years of steady returns—avoiding the pitfalls of one-off aid and giving communities a real stake in the energy transition.

In addition to financial returns, rural renewable energy projects generate comprehensive **economic, social**, and **environmental benefits.**

Economic Benefits: Increasing Income and Accelerating Industrial Development

With the acceleration of urbanization, China's rural population now accounts for less than one-third of the national total[8], and agricultural income represents less than one-third of overall rural income[9]. Relying solely on traditional agriculture is no longer sufficient to sustain rural development.

Against this backdrop, renewable energy has emerged as an important "second paycheck." It generates land lease fees and new tax income for local governments, creates new non-agricultural income channels for village collectives and households through mechanisms such as equity shares and dividend schemes. At the same time, it raises yields and incomes of traditional agriculture through tech empowerment.

[8]https://www.gov.cn/yaowen/liebiao/202401/content_6926548.htm?utm_source=chatgpt.com
[9]https://zgncjj.ajcass.com/UploadFile/Issue/201606270007/2021/7//20210726013537WU_FILE_0.pdf

New Channels for Non-Agricultural Income

Beyond macro-level taxes and investment, new-energy projects give villages and households direct cash benefits, for example:

- **Village collectives** secure long-term and steady dividends by holding equity stakes in PV plants;
- **Villagers** earn steady rental income and dividends through rooftop leasing, land transfer, or joining village cooperatives.

Unlike the seasonal ups and downs of farming, these income sources provide more stable and long-term cash flows. Over time, they are becoming an important “second paycheck” for both households and the collectives.

Tech-enabled agriculture: higher yields, higher incomes

The complementary integration of renewable energy with agriculture, forestry, animal husbandry, and fisheries does not crowd out crops—they raise output through tech upgrades.

This is driving the emergence of **climate-smart agriculture**, such as **Agri-Solar** and **Fish-Solar.** By breaking the constraints of single land use, these models enable “one land, multiple uses”, efficiently combining PV power generation with traditional farming or aquaculture to generate multiple revenues for rural areas.

By layering together revenues from PV power generation, land rental, crop or fish sales and local jobs, these innovative models generate powerful economic synergies. This additional income beyond agriculture is gradually reshaping the income structure and development trajectory of rural communities.

China is not alone. Agri-Solar has already emerged as a new approach to enhance land productivity in countries like Germany, Japan and the U.S. Fish-Solar is deployed on ponds and reservoirs in Japan, Korea and India to ease simultaneous shortages of energy and land. Similar to these international cases, China’s Agri-Solar projects shades crops and cuts evaporation. At present, this model is mainly suitable for shade-loving crops, such as tea and medicinal herbs. Meanwhile, Fish-Solar installations generate power above ponds or lakes, while creating a stable ecological environment for aquaculture below.

Social Benefits: Improved Living Standards and Public Services

Beyond more incomes, renewables are decarbonising village energy, cutting reliance on dirty fuels and improving the living environment and overall quality of life.

In terms of daily living conditions, Solar PV and biomass heaters have gradually replaced the use of scattered coal and firewood, providing cleaner, safer winter warmth and reducing smoke-related illness. Biogas digesters turn farm waste into clean cooking fuel, solving disposal problems and keeping stoves running.

In terms of public services, renewable energy projects have driven an upgrade of rural infrastructure. Distributed PV and small-scale wind power have brought reliable electricity to village schools, clinics, and cultural centers, improving teaching and medical conditions. At the same time, green mobility facilities such as electric buses and charging piles are being introduced, making travel easier. In some areas, renewable energy microgrids have made remote mountain villages self-sufficient in electricity, ending chronic shortages. On Sanmen Island in Huizhou, Guangdong, for instance, a renewable microgrid project cut household electricity costs from nearly 3 RMB/kWh to just 0.62 RMB/kWh , transforming a “diesel island” into a “zero-carbon island.” It is a vivid example of how renewable energy can fundamentally change life quality in hard-to-reach places.[10]

Project construction and O&M are also creating jobs and new skills. During the construction phase, civil works, equipment installation, and logistics provided villagers with immediate jobs. Once operating, the day-to-day running of plants requires long-term and stable positions for system monitoring, equipment maintenance, and facilities cleaning. Over time, training programmes are turning villagers into certified electrical and O&M technicians, raising incomes and widening future career options. The growing renewable energy value chain further diversifies opportunities: Agri-solar cropping, component manufacturing, logistics, eco-tourism. Young people in rural areas are finding new paths of development through these emerging sectors.

In this sense, renewables bring far more than electricity—it is a form of empowerment for rural life. It allows children to study under bright lights, keeps vaccines safely refrigerated in village clinics, makes women feel safer walking at night, and enables e-commerce livestreaming as well as distance learning. These changes, at their core, help narrow the urban-rural divide, sustain vitality in villages, and light up a sustainable, inclusive, and resilient path toward development.

[10] https://www.caas.cn/xwzx/nkyw/ea92fe38c71a46d9aa208cb555076711.htm

Environmental Benefits: Emission Reduction and Sustainable Development

The energy transition in China's rural areas is an important component of achieving the "dual carbon" goals. According to the National Energy Administration, rural areas and agriculture account for about 15% of the national CO_2 emissions. Near half comes from rural household energy use, with coal still dominating heating and cooking.[11]

In terms of emission reduction, new energy projects directly displace fossil fuels. PV and wind replace coal-fired power generation, effectively reducing the emissions of CO_2, SO_2, NO_x, and other greenhouse gases and pollutants.

The Report on the Sustainable Development of Photovoltaics in Chinese Rural Households (2024), jointly released by the Energy Foundation and the Asian Infrastructure Investment Bank (AIIB), points out that the theoretical installed capacity of rural household PV is close to 2,000 GW, with an annual power generation potential of more than 2.5 trillion kWh—five times the total rural electricity consumption in 2022. Fully utilized, this could reduce CO_2 emissions by about 2.44 billion tons annually, accounting for 23.2% of the country's total energy-related CO_2 emissions in 2022. This scenario rests on 2.73 billion square meters of rural roof area—and requires no large-scale occupation of prime farmland.[12]

Li'ao Village is a vivid example of that potential. As the "No.1 PV village in China", Li'ao Village, located in Longguan Township, Zhejiang Province, has installed PV panels on the rooftops of all 362 households, forming a mature model of "top-down coordination, extensive participation, and shared benefits". Its plant generates 600 MWh of electricity, saving 216 tons of standard coal and reducing 598 tons of CO_2 emissions each year, providing a replicable model for rural China.[13]

[11]https://www.caas.cn/xwzx/nkyw/ea92fe38c71a46d9aa208cb555076711.htm
[12]https://www.efchina.org/Reports-zh/report-lceg-20241015-zh
[13]https://zjjcmspublic.oss-cn-hangzhou-zwynet-d01-a.internet.cloud.zj.gov.cn/jcms_files/jcms1/web3185/site/attach/0/405eccf89d3d4692b205f689d2d9102b.pdf

Environmental Benefits: Emission Reduction and Sustainable Development

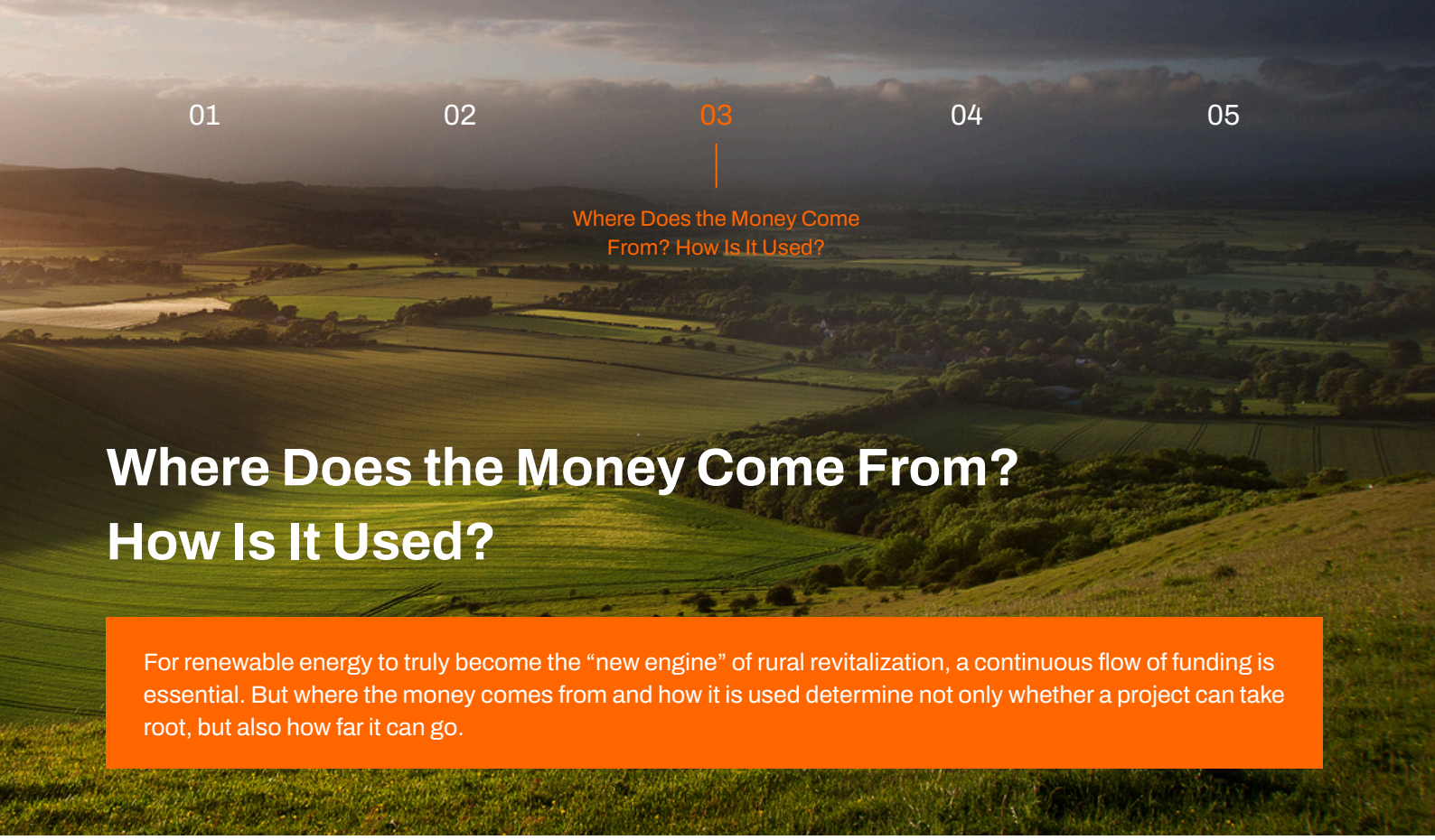
In terms of ecological protection, new energy projects help ease pressure on natural resources. Mountain microgrids cut the use of diesel gensets, lowering the risk of soil and water pollution. At the same time, the promotion of biogas projects reduces straw burning and the direct discharge of livestock and poultry manure, cutting the release of harmful gases such as methane and improving local air quality. In addition, new energy powers eco-restoration facilities such as drip-irrigation pumps and environmental sensors, thereby promoting a virtuous ecological cycle.

In promoting sustainable development in rural areas, new energy drives a systemic green transformation. It fosters resource recycling, converting agricultural waste into wealth. It promotes a low-carbon lifestyle, with applications such as electric machinery and clean heaters gradually reaching rural households. These changes not only protect the rural landscape of clear waters and green mountains but also strengthen climate resilience of the community. New energy is reshaping the relationship between rural communities and the environment, turning villages from energy consumers into green producers, and providing a practical pathway to achieving ecological livability and sustainable development.

Deployed in villages, renewables deliver more than extra income; they reshape governance, upgrade public services and improve ecosystems, forging coordinated economic, social and environmental progress. It provides not only clean power but also a powerful lever to unlock endogenous momentum toward a "green, inclusive, sustainable, and common prosperity" for rural China. These explorations fully prove that green development is not a costly burden—it is a readily accessible pathway that creates multiple wins.

WHERE DOES THE MONEY COME FROM? HOW IS IT USED?

03



Where Does the Money Come From? How Is It Used?

For renewable energy to truly become the “new engine” of rural revitalization, a continuous flow of funding is essential. But where the money comes from and how it is used determine not only whether a project can take root, but also how far it can go.

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Current practice shows that rural green finance in China broadly draws from three sources:

- **Policy-driven capital** – providing institutional guarantees and credit enhancement.
- **Market-driven capital** – delivering scalable, sustainable investment.
- **Philanthropic and social capital** – filling financial gaps for public-interest projects and mobilizing community participation.

Policy-driven capital

- Central and Local Governments
- Central State-owned Enterprises
- Local State-owned Enterprises
- Policy Banks
- International Development Institutions (mainly multilateral banks)
- State-owned Commercial Banks

Market-driven capital

- Commercial Banks
- Non-bank Financial Institutions (securities firms, insurers, leasing companies, asset managers)
- Internet Banks and Fintech Platforms
- Local Financial Organizations
- Private Enterprises
- Village Collectives (self-raised, with public attributes)

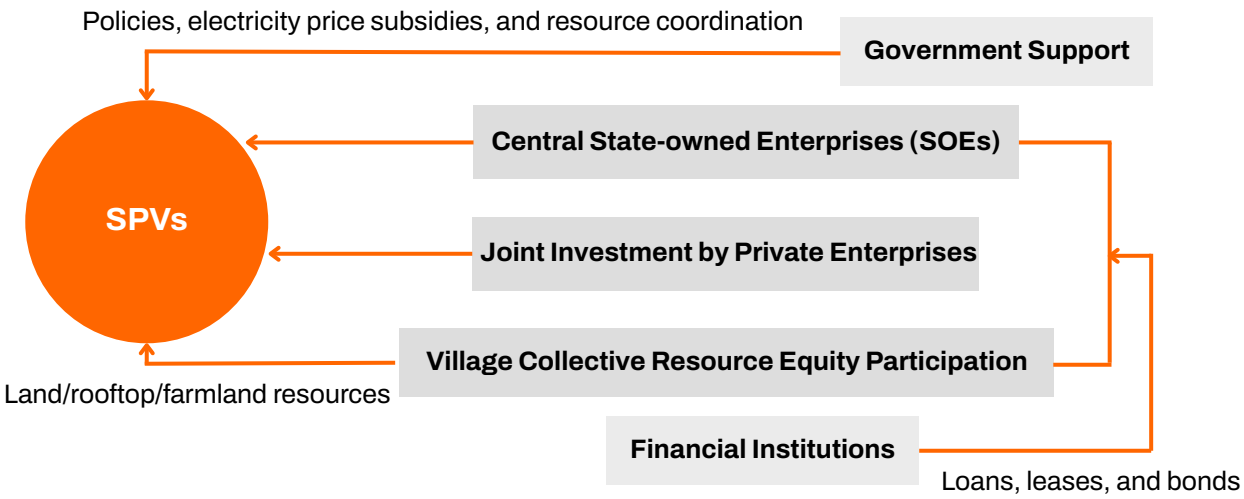
Philanthropic and social capital

- Domestic and International Foundations and Nonprofits

Each differs in objectives, mechanisms, and risk appetite. Yet together they form the capital ecosystem for rural new-energy development. Understanding their features and roles is the first step toward building replicable and sustainable financing models.

Special Purpose Vehicles (SPVs)

In practice, many rural renewable projects are operated through special purpose vehicles (SPVs). These entities handle capital flows, equity structures, and guarantee responsibilities, making it easier for financial institutions to participate. SPVs can be set up jointly by the actors listed above and serve as the core implementing and financing body for projects.



Policy-driven Capital

The Three-tier Structure of Policy-driven Capital
Policy-driven capital mainly has a three-tier structure: government subsidies, government investment, and policy-based financial support.

Government subsidies & incentives

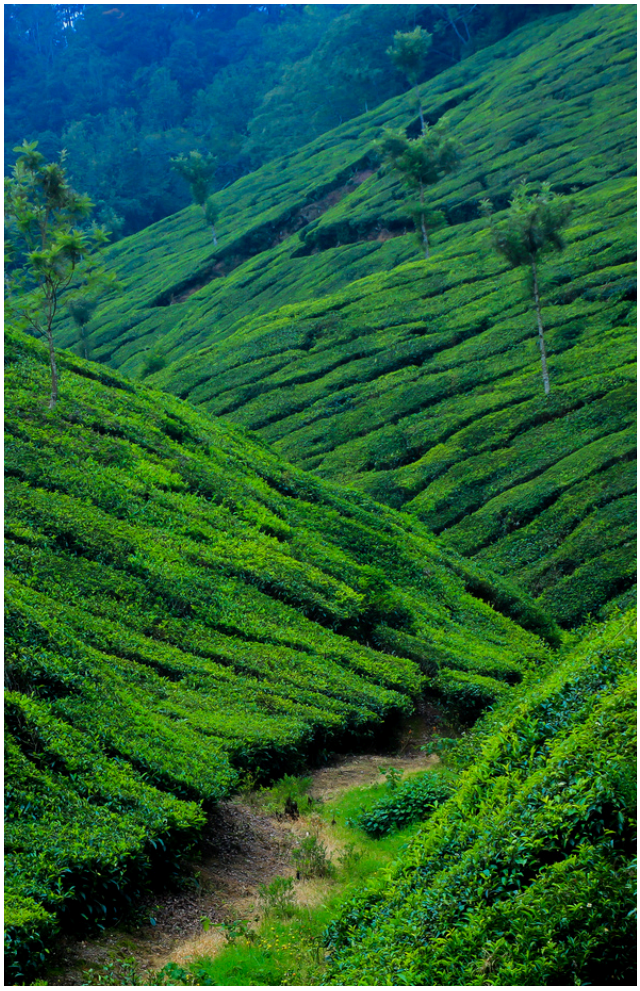
Main actors: Central and local governments

- **Role:**
  - At the central level, subsidies include feed-in tariff premiums, priority grid connection policies, and earmarked funds (such as the Renewable Energy Development Fund), which provide a “safety net” for rural renewable energy projects.
  - Local governments design region-specific subsidies, such as PV poverty alleviation subsidies, feed-in tariff add-ons for distributed wind power, and rooftop-use incentives.
- **Funding characteristics:** Subsidies are often one-time or short-term, aimed at solving early-stage cash flow pressures. However, their durability and stability depend on fiscal conditions and policy direction.

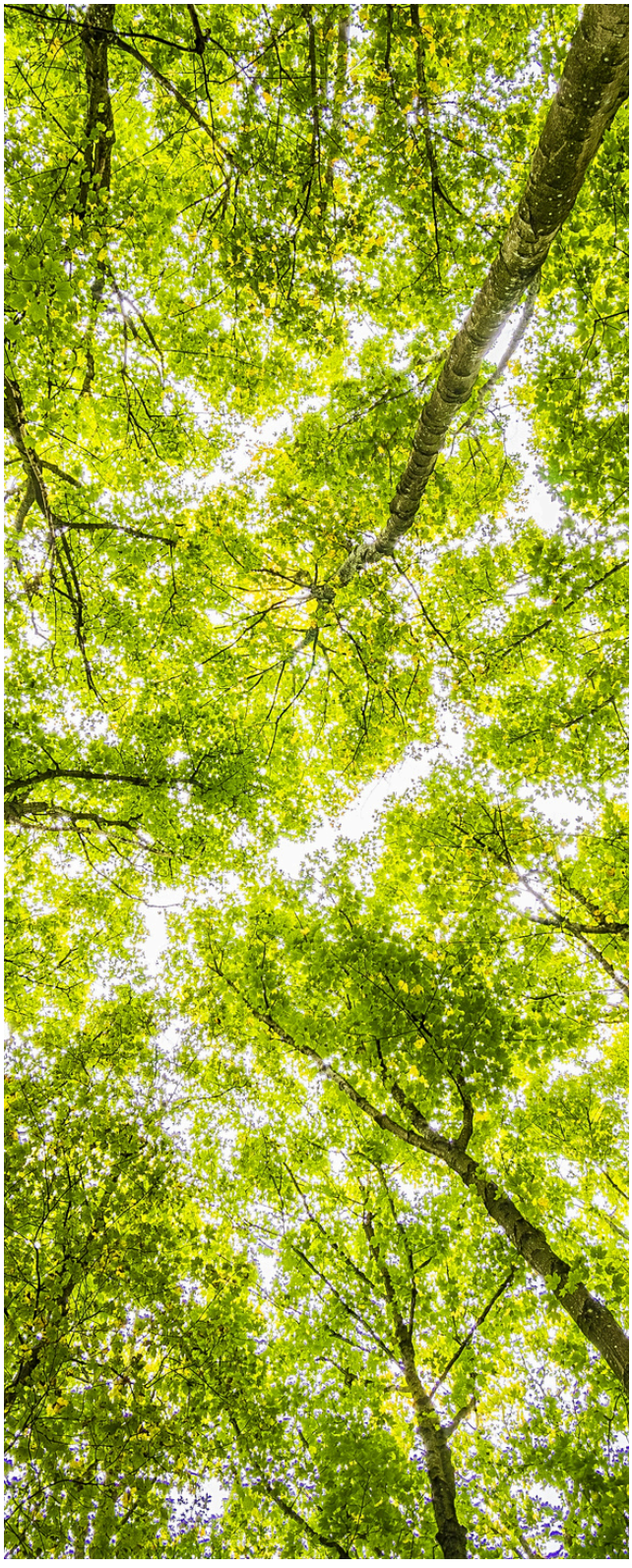
In recent years, policy tools have gradually diversified. Beyond traditional subsidies, several new types of “public funds” have emerged:

- The central bank’s carbon-reduction facility, which, through relending, enables commercial banks to lend to renewable energy projects at lower interest rates, in effect subsidizing financing costs.
- Rural revitalization funds, originally focused on agriculture and poverty alleviation, are now in many places being linked to distributed PV and clean heating. This not only increases village collectives' income but also gives new energy projects extra policy support.

In this way, “subsidies” are no longer simply fiscal handouts but rather a toolbox of fiscal, financial, and industrial policies that is more flexible and better at steering long-term capital into the rural area.



Government direct investment & equity participation



Main actors: Central SOEs (state-owned enterprises directly supervised by the State-owned Assets Supervision and Administration Commission of the State Council) and local SOEs (state-owned enterprises managed by provincial, municipal, or county-level SASACs or related authorities).

- **Role:**
  - **Central SOEs** leverage advantages in "capital + technology + credit" to invest in large-scale rural renewable energy projects (wind, solar, storage integration). As pillars of the national economy, central SOEs often undertake demonstrative and strategic investment missions. For example, China Three Gorges Corporation, in cooperation with local governments, invested in distributed PV poverty alleviation projects in Liangshan Yi Autonomous Prefecture, Sichuan, achieving shared income for village collectives and farmers through project company operations.
  - **Local SOEs** focus more on regional development and localized project construction, acting as "investment magnet + local implementer" and often establishing joint ventures with central SOEs and private enterprises.
- **Funding characteristics:** Mainly equity capital, emphasizing long-term holding and stable returns. In renewable energy projects, government investment often plays the role of "seed funding" or "guiding capital," making the first move to attract follow-up investment from private capital. In the Chinese context, investment from state-owned or centrally owned enterprises is not only a key form of government investment but also has "natural" advantages in renewable energy financing: backed by strong assets and government support on one hand ,and by their long-standing creditworthiness on the other, they more easily secure bank loans and capital market support, delivering a significant leverage effect in both project advancement and capital mobilization.

Policy-based financing

Main actors: Policy banks (China Development Bank, Agricultural Development Bank of China), state-owned commercial banks (Postal Savings Bank of China), policy guarantee companies, and policy-based insurance institutions.

- **Role:**
  - **Policy banks:** provide long-term, low-cost loans, taking on development and policy-oriented functions, with a focus on supporting renewable energy infrastructure construction. For example, the Agricultural Development Bank has supported the "PV + Agriculture" model nationwide, offering long-term loans to secure project cash flows.
  - **State-owned commercial banks:** create dedicated green-loan quotas under green-finance mandates to support rural renewable energy project financing. For instance, Postal Savings Bank provides loans for small-to-medium-sized PV plants within its rural inclusive finance system, easing funding shortages for villagers and village collectives.
  - **Policy guarantee companies** are government-established or government-controlled guarantee or re-guarantee companies, often funded by fiscal capital and offering risk-sharing. Their guarantee fees are lower than market rates, providing accessible and affordable financing for SMEs or green projects.
  - **Policy-based insurance** is often argi[14] . or green-insurance pilots with premium subsidies from government finance). These insurance products essentially combine "policy-driven capital and market-based operations."
- **Funding characteristics：** Primarily debt financing, emphasizing "policy orientation + risk control", and often working in tandem with fiscal subsidies or government investment in a "policy combo".

In June 2025, the People's Bank of China, the National Financial Regulatory Administration, and the China Securities Regulatory Commission jointly issued *the Green Finance Supported Project Catalogue (2025 Edition)*, which, for the first time, unified the eligibility criteria for green credit and green bonds. By integrating *the Green Bond Endorsed Project Catalogue (2021 Edition)* and *the Green and Low-Carbon Industry Guidance Catalogue (2024 Edition)*, it solved the problem of "regulatory arbitrage" caused by inconsistent standards among different green financial products, significantly reducing compliance costs for financial institutions. This catalogue provides clearer and more unified criteria for policy-based financial support, offering a standardized framework for green credit extending and green bond issuing by policy banks and commercial banks. Financial institutions can use the catalogue to more precisely identify and support eligible rural renewable energy projects, ensuring that funds are truly directed to the green and low-carbon sector. The catalogue will officially take effect on October 1, 2025.[15]

Overall, the characteristics of policy-driven capital are clear: government subsidies address short-term cash flow needs; government investment provides equity "ballast"; and policy-based financing ensures a long-term, sustainable supply of debt capital. Actors complement each other well: central and local governments focus more on policies and subsidies, central and local SOEs provide equity and demonstrative investment, while policy-based financial institutions provide long-term credit and risk mitigation.

Another key actor in this category that cannot be overlooked is **international development institutions**, represented by multilateral development banks. Although not Chinese entities, their development-oriented approach aligns closely with Chinese priorities. By bringing in international experience, concessional funding, and a global perspective, they have become deeply involved in China's rural renewable energy projects, serving as a crucial supplement to domestic finance and acting as "innovation catalysts".

[14]Agri-insurance: A policy-driven system, heavily subsidized and guided by government.
[15]https://www.gov.cn/zhengce/zhengceku/202507/content_7032004.htm

International development institutions (mainly multilateral banks)

Main actors: World Bank, Asian Development Bank (ADB), Asian Infrastructure Investment Bank (AIIB)

- **Roles:**
  - Provide concessional loans, grants, and technical assistance to support pilot projects in China's rural renewable energy sector. Their core role is to introduce international best practices, help establish standards and frameworks (such as carbon accounting methodologies), and build local capacity, thereby reducing the risks and costs of exploring new models. Acting as "patient capital" and as a "credible third party," their involvement gives projects international creditworthiness, making it easier to attract and mobilize international private capital into China's rural green transition.
- **Funding characteristics:**
  - Financing that combines concessional terms (low interest, long maturity) with a developmental mandate. They are often willing to take bear the first-loss and do not prioritize profit as their main objective.
  - Highly professionalized operations, with strict requirements on environmental and social benefits, as well as governance transparency.

Their role is usually catalytic and time-bound: once pilots succeed and mechanisms are proven, they gradually step back, leaving domestic policy-driven capital and market forces to take over scaling.

Synergy with domestic systems: The financial and technical support of multilateral institutions links seamlessly with China's three tiers of policy-driven capital, together forming a "pilot–adaptation–scale-up" cycle: multilateral institutions fund early-stage demonstrations, while domestic policy banks and government funds then scale them up. This collaboration helps mature the rural renewable energy ecosystem. However, at present, the scale of multilateral bank financing in China is shrinking.

Challenges

However, policy-driven capital is not a "magic bullet". In practice, it faces several unavoidable challenges.

First, the long-term balance and sustainability of subsidy mechanisms. In the early stage of rapid industry growth, subsidy policies effectively stimulated market vitality but also imposed a persistent fiscal burden. Governments often find it difficult to maintain high levels of subsidies over a long period, creating inherent risks to sustainability. In some cases, subsidy payments have been delayed beyond expectations, tightening the cash flow of renewable energy enterprises—making it hard to repay loans, maintain daily operations, or invest in new projects. In certain villages, uncertainty about the timely disbursement of subsidies has even directly affected the confidence of farmers and collectives.

Second, the balance between central SOE-led models and community participation. In project implementation, while the scale and resource advantages of central SOEs are key to rapid project rollout, an overreliance on them risks weakening local community participation and autonomy, potentially turning renewable energy projects into "central SOE projects in rural areas" rather than "villages' own projects."

Finally, financial and adaptability of financial tools. While traditional low-interest loans remain important, financial tools require more innovation given the scattered, long-cycle, and multi-actor characteristics of rural renewable energy projects. Without mature long-term mechanisms, funding supply remains volatile and mis-matched to construction timelines.

In short, policy-driven capital is the "first pot of gold" for kick-starting rural renewable energy, but it cannot fully transform into a continuous flow of resources unless these three hurdles, namely subsidy disbursement delays, limited local capital, and insufficient financial innovation, are cleared.

Exploration of Public Capital: In recent years, a clear trend has emerged in which the central and local governments, together with central SOEs and local platform companies, are deliberately moving away from "relying solely on subsidies", instead adopting more market-oriented methods to guide capital inflows into rural renewable energy.

- On the government side, the focus has shifted from subsidies to "guiding investments". For example, some provinces have set up rural revitalization industrial funds, with government capital as subordinated equity to attract private capital to co-invest in renewable energy projects. This approach reduces risks for private investors and makes project financing easier to close.
- Local SOEs and platform companies have also begun exploring market-oriented tools. Rather than relying solely on fiscal allocations, they are experimenting with green bonds, green ABS[16], and even green REITs[17] to raise funds. For example, some county-level platform companies in Zhejiang and Jiangsu Province have already financed distributed PV and biomass heat projects through green bonds, unlocking both asset liquidity and a longer-term capital-market access.
- Innovation in policy-based financial instruments has also gradually become a key driver for market-oriented funding. New policy-driven capital emphasizes the combination of market mechanisms and fiscal backing, leveraging risk-sharing, revenue guarantees, and institutional frameworks to attract private capital. For example, green REITs pilot programs provide exit mechanisms for investors of renewable energy and eco-infrastructure (which is good for creating a healthy financing cycle), the carbon emission reduction facility channels central bank funds toward low-carbon projects, and rural revitalization funds are increasingly being tied to green energy and emission reduction goals, forming a "policy + market" dual-wheel drive.

For example, in Huzhou City, the local government built *the Green Credit Link* platform, which functions as a large "credit supermarket". It integrates data from the Zhejiang Provincial Big Data Development Administration, Huzhou Big Data Development Administration, and third parties to create a comprehensive enterprise credit database. The platform aggregates 297 credit products and related information from all banks in Huzhou, enabling the coordination of services across departments and financial institutions to provide integrated financial services for small and micro enterprises.[18]

[16] ABS (Asset-Backed Securities) are securities backed by a pool of assets that generate stable cash flows (such as loans, receivables, rents). In essence, they "securitize future cash flows", giving investors early claim on returns. Green ABS follow the same structure but require the underlying assets to be green.

[17] REITs (Real Estate Investment Trusts) are funds that invest in real estate (such as commercial properties, industrial parks, infrastructure), raise money through public share offerings, and distribute returns to investors. Their main advantage is turning large, long-term, illiquid real estate assets into smaller, tradable investment products. Green REITs channel capital into green real estate or infrastructure projects. For example, clean energy plants, eco-parks, environmental facilities, or low-carbon transport hubs.

[18] https://town.zjol.com.cn/cstts/201901/t20190124_9320686.shtml

According to publicly available data from the platform, *Green Credit Link* has cumulatively helped more than 49,000 enterprises obtain over 640 billion yuan in bank credit.[19]

In addition, some localities are exploring the integration of carbon asset revenues into financing design. For example, the certified carbon reduction generated by PV and wind projects can be pledged or used as credit enhancement as part of expected future cash flows. This is inherently a market-based mechanism, reducing reliance on "hard subsidies" for project financing. In August 2025, the General Office of the CPC Central Committee and the General Office of the State Council issued *the Opinions on Promoting Green and Low-carbon Transition and Strengthening the National Carbon Market Construction*, explicitly proposing to "support banks and other financial institutions in conducting carbon pledge financing in a standardized manner".[20]

The effectiveness of this mechanism in practice has been uneven. On one hand, in some pilot cities (such as Huzhou and Quzhou), carbon pledge financing has already seen successful cases, offering new financing options for renewable energy projects. On the other hand, China's carbon market as a whole is still immature: standards, methodologies, and legal frameworks remain incomplete, and carbon prices are relatively low (far below those in European markets). This means that, in the short term, carbon assets have limited leverage in unlocking financing. Only when the market matures and methodologies are refined can the carbon reduction benefits tied to rural renewable energy assets truly become a new income stream.

The central and local governments have thus taken a step toward "letting the market play a decisive role", while central and local SOEs, through joint ventures and green financial tools, are placing rural renewable energy projects firmly on a more sustainable, market-oriented track.

[19]https://lvdt.huzldt.com/
[20]https://jrj.wuhan.gov.cn/ynzx_57/xwzx/202508/t20250826_2638739.shtml

Market-driven capital

Compared with policy-driven capital, market-oriented capital operates with greater autonomy and a stronger focus on returns. Its deployment is primarily guided by the balance between “risk and return”, rather than policy priorities.

In rural renewable energy, market-based financial institutions and private enterprises represent the most important sources of capital beyond policy finance. These actors can be grouped into three main categories: financial institutions (including national commercial banks, local commercial banks, non-bank financial institutions, internet banks and fintech platforms, as well as local financial organizations), private enterprises, and village collective funds.

Financial Institutions

1.National Commercial Banks

Main actors: Industrial and Commercial Bank of China (ICBC), Agricultural Bank of China (ABC), Bank of China (BOC), China Construction Bank (CCB), Postal Savings Bank of China (PSBC)

- **Role:**
  - Provide large-scale commercial loans to support utility-scale solar and wind projects, as well as county-level (“whole-county”) distributed solar projects.
- **Funding characteristics:**
  - Typically, they have advantages in terms of funding scale, operational efficiency, cost control and strict risk management requirements. They prefer projects with sufficient collateral and stable cash flow. They have internal green credit quotas under green finance mandates.
  - However, they also show structural biases—preferring urban and high-return sectors while showing limited interest in scattered, small-scale rural green projects.

2. Local Commercial Banks

Main actors: City commercial banks, rural commercial banks

- **Role**
  - Serve small and medium-sized local renewable energy projects, with better knowledge of regional conditions and grassroots needs.
  - For example, **Chengdu Rural Commercial Bank** has leveraged its dense local branch network to partner with local governments in launching a “financial assistant stationed in villages” programme. The bank sent over 100 financial specialists to rural areas for face-to-face service, established 14,000 economic profiles for farmers and agricultural entities, issued more than 600 million RMB in credit, and benefited over 100,000 residents. For green industries, it piloted credit products like **Loan for Rural Talents** and **Loan Backed by Agricultural Insurance** covering seed, grain processing, and other green agriculture sectors. It also allowed a moderately higher tolerance for non-performing loans in agriculture-related credit approvals.
- **Funding characteristics:**
  - Flexible decision-making, rapid response and close ties with local governments, yet higher funding costs and limited capacity for single project financing.

3.Non-bank Financial Institutions

Main actors: Securities firms, insurance companies, financial leasing companies, asset management companies

- **Role :**
  - Provide equity financing, financial leasing, asset securitization, and other innovative financial instruments.
- **Funding characteristics:**
  - Flexible and diverse tools that can match stages-specific needs; relatively higher risk appetite; strong specialization.

In recent years, with the growth of the green finance market, REITs have become an important channel to securitize mature project assets, allowing funds to be recycled and reinvested. Green ABS, on the other hand, enables developers to secure financing upfront by securitizing future revenues. Together, these tools are improving the capital liquidity and financing sustainability of rural renewable energy projects.

4.Internet Banks and Fintech Platforms

Main actors: MYBank, WeBank, and various digital finance platforms

- **Role :**
  - Leverage big data and online risk models to provide micro- and inclusive loans for distributed household PV, small-scale biogas, and similar projects.
- **Funding characteristics:**
  - Small loan amounts, fast approvals, credit-based without collateral; highly data-driven; strong outreach capacity to serve "long-tail" customers not covered by traditional banks.[21]

The above four categories of financial institutions possess certain advantages in funding scale, operational mechanisms, and risk management. However, they also display structural preferences—favoring "urban over rural" and "profitability over green impact".

5.Local Financial Organizations

Beyond these market-oriented financial institutions regulated by central financial authorities, another important complementary force exists at the local level—local financial organizations, primarily microfinance companies. While these entities cannot match banks in capital strength or scale, their highly flexible and grassroots-oriented approach allows them to play a unique "capillary" role in serving micro entities and projects that banks often cannot reach.

Main actors: Microfinance companies, financing guarantee companies

- **Role:**
  - As an important supplement to the traditional banking system, they penetrate deep into county and rural markets, offering "last-mile" short-term, small-amount, emergency financing to micro and small enterprises, individual businesses, and farmers who cannot access bank services. Their role is to provide urgent rather than complementary capital. For example, In more remote, financially inaccessible regions of Northeast and North China, Chongho Bridge embeds itself in new-energy use cases as a micro-loan institution.. It addresses the needs of villages and farmers directly—for example, financing rooftop solar for small shops, or energy-efficient equipment purchases—anchoring its risk control and post-loan management in stable electricity consumption scenarios. Under this model, solar power replaces grid electricity purchases, cutting household energy costs by 30–50%, while surplus electricity is sold back to the grid. Such projects typically pays back in 5–6 years. Using a mix of self-raised funds and bank-assisted loans, Chongho Bridge shares the upfront investment burden with rural operators, accelerating clean energy adoption. Beyond financing, Chongho Bridgealso advises villagers on installation and maintenance, offering "finance + technology" dual support. This strengthens loan repayment capacity while also reshaping the rural credit ecosystem around green assets.
- **Funding characteristics:**
  - Limited funding sources: rely mainly on shareholder capital, small amounts of bank financing, and donor funds; prohibited from public deposit-taking.
  - Flexible operations: fast loan approval, relatively relaxed collateral requirements, and greater emphasis on "soft information" (such as reputation within local social networks).
  - Risk and pricing: higher loan rates compared to banks due to riskier client base and higher funding costs.

[21] Internet banks and fintech platforms differ significantly from local commercial banks, even though both target "long-tail" customers. First, internet banks and fintech platforms rely heavily on big data and algorithms for risk assessment and credit decisions, representing a data-driven model. By contrast, local commercial banks rely more on trust built over time and their familiarity with local conditions—a relationship-driven model. Second, their scale and coverage differ. Iinternet banks and fintech platforms can reach users nationwide or even globally, while local banks are more focused on local or regional markets, with a more grassroot approach.

Challenges

Despite the large funding capacity of market-oriented financial institutions, several challenges persist for commercial finance to take part in rural renewable energy projects.

Risk-return mismatch

Rural renewable projects typically involve large upfront investment, long payback periods, and policy-dependent revenues—contradicting commercial finance's preference for short-term, stable returns.

- For utility-scale wind, PV plants, and green industrial park retrofits, commercial banks are more willing to lend, as such projects often have pledgeable assets (land, buildings), long-term power purchase agreements (PPAs), or government subsidies.
- In contrast, distributed household PV, small-scale biomass, and agricultural and forestry carbon sink projects often lack collateral, are small and dispersed, and face added risks such as uncertain grid integration and agricultural volatility. This results in high due diligence and post-loan management costs, leading banks to adopt cautious attitudes.

Collateral and guarantee constraints

- Farmers,village collectives, and SMEs generally lack traditional collateral (real estate, land). Although solar equipment, future tariff receivables, and carbon assets could in theory be pledged, their valuation, trading, and disposal mechanisms remain underdeveloped, limiting acceptance by banks.

Information asymmetry and high operating costs

- Rural projects are scattered and non-standardised. Financial institutions must conduct extensive on-site due diligence to assess their technical feasibility, owner creditworthiness, and operational capacity, raising per-loan costs significantly. For small, dispersed projects, these costs are difficult to amortize.
- Even banks with relatively high green credit ratios, such as Industrial Bank, still channel most funding into industrial efficiency, utility-scale renewable energy, and park retrofits. When they do touch rural distributed projects, they usually insist on government risk-sharing or policy-backed guarantees.

Additionally, rural green projects face three deeper institutional/systemic barriers

- Low weighting of green business in financial institutions' internal performance assessments, giving staff little incentive.
- Although the People's Bank of China has issued green taxonomies, frontline staff still face challenges in identifying eligible projects.
- Financial institutions lack mature risk control and evaluation tools.

Exploration

To overcome these challenges and obstacles, market-oriented financial institutions are actively exploring and experimenting in many directions.

Innovating risk control models and credit enhancement

- "Receivables pledge + equipment collateral": For example, Hanzhong Rural Commercial Bank issued an 18-year low-interest loan to finance the 411 kW distributed PV project in Jinhua Village, with future tariff receivables and the PV equipment serving as collateral.[22]

Strengthening collaboration with policy-driven capita

- As discussed earlier, policy-driven capital increasingly cooperate with market-oriented financial institutions under risk-sharing and complementary mechanisms.

Potential of carbon and insurance integration

- Insurance combined with renewable assets may represent a new frontier for financial innovation. Financial support for rural renewables is evolving from traditional equipment/property insurance toward insuring the environmental benefits (carbon assets).
- For example, China Continent Insurance, together with China Re P&C, introduced the country's first carbon asset loss insurance for a Asia's largest coal-fired Carbon Capture, Utilization and Storage (CCUS) project., the State Power Investment Corporation's Taizhou coal-fired plant in Jiangsu. The policy pays out if natural disasters or accidents damage capture equipment or if actual captured CO_2 volumes fall short of expectations. The insured amount is based on expected annual captured volume multiplied by an agreed carbon price
- This innovation provides stable risk mitigation for projects exceeding 500,000 tons/year of CO_2 capture, enhances creditworthiness of carbon assets, smooths financial volatility, and supports decarbonization in high-emission industries.

While this specific case targeted a large-scale project, its underlying risk models are highly relevant for rural renewable energy: For the first time, it brought "carbon assets" into the category of insurable assets, and through rights confirmation and pricing, laid a credit foundation for future carbon-asset-backed financing. This model demonstrates that environmental benefits can indeed be quantified, assessed, and incorporated into the insurance system.

[22]http://csjrw.cn/2025/0829/554087.html

Private Capital

Main actors： New energy companies (solar PV and wind power developers), new energy equipment manufacturers.

- **Roles**
  - Driven by policy incentives, they have become the main investors and constructors of rural renewable energy projects (such as developers, EPC contractors, PV module and wind turbine suppliers).
  - They fill the funding gap left by policy-driven capital and commercial finance.
  - They drive technological progress along the industry chain and promote business model innovation.
  - They actively expand into flexible scenarios such as distributed, household, and commercial/industrial rooftop PV, but remain disadvantaged compared with central SOEs in terms of financing capacity.

(Note: Foreign enterprises usually participate in rural renewable energy investments by forming joint ventures (SPVs) with Chinese partners and local governments.)

- **Funding characteristics**
  - Highly profit-driven.
  - Prefer large-scale, replicable projects with clear returns.

Debate on Marginalization

In Chinese public discourse, there has been a debate over whether private enterprises might be marginalized. A positive signal was sent in 2024 by the policy document titled "*Several Policy Measures on Further Stimulating Private Investment Vitality and Promoting Steady Economic Recovery*" - commonly referred to as the **Document No. 136 (2024)**:

- It explicitly calls for "optimizing the private investment environment and encouraging private enterprises to participate on an equal footing in major projects in energy, transportation, and water conservancy".
- It reinforces the state's institutional support for private investment.

Although the full transition of renewable energy power into a full market-based trading mechanism may deter some risk-averse enterprises in the short term, it will ultimately make the sector more standardized and transparent, thereby creating a healthier competitive landscape for high-quality private enterprises.

Typical practices: the double-edged experience

- **Trina Power** is a leader in the household solar PV market. Its "whole-county rooftop solar program" has significantly increased farmer participation in renewable energy. However, some projects have faced disputes with farmers due to unclear profit-sharing mechanisms, reflecting weaknesses of private enterprises in contract standardization and post-construction Operation & Management (O&M).
- **LONGi Green Energy** and **Tongwei,** both solar industry leaders, have actively invested in large-scale centralized solar power plants in western rural areas. Their projects have expanded clean energy development and created rental income and jobs for local village collectives and households. Yet, in some cases, critics argue that "project benefits bypass the locals", meaning that most profits remain at the corporate level, with insufficient benefits flowing back to village collectives.

Overall, these corporate practices have accelerated the deployment of rural renewable energy, while also exposing challenges in governance, regulatory compliance, and sustainable operations.

Challenges

Compared with central SOEs, private renewable energy companies face significant obstacles in project bankability (i.e., the ability of a project to gain recognition from financial institutions, secure financing, and reach implementation). The main challenges include thin creditworthiness, concerns over cash flow stability, policy delivery risks, and doubts about O&M capabilities.

Thin creditworthiness: Private companies, even if technologically capable, are often smaller in scale with weaker risk resilience, making them questioned by banks about their ability to fulfill commitments. Banks and insurers usually require private companies to provide higher collateral or deposits. Some small and medium-sized private enterprises, lacking a strong balance sheet, cannot independently take on projects and must exit through consortia or by selling projects.

Unsteady cash flow: Rural distributed renewable projects (solar, wind, storage) often face fluctuating returns, e.g., fragmented rooftop resources, high operation cost (due to distributed rural customers), and uncertainties in subsidies or feed-in tariffs. This makes financial institutions more cautious in assessing their future cash flows. As a result, banks prefer centralized, large-scale projects led by SOEs, while remaining conservative toward smaller distributed projects led by private firms.

Policy delivery risks: Many distributed solar or rural renewable projects rely on subsidies, tariff top-ups, or local government funding. If subsidies are not delivered on time, project IRR and cash flow decline sharply, triggering a high-risk flag from banks. Private companies, often lacking bargaining power to secure long-term PPAs or guarantees, face wider financing gaps.

O&M capacity doubts： Some financial institutions worry about the stability of private firms in equipment selection, O&M, and long-term project management, particularly among smaller companies. Without credible third-party assessments or a proven long-term O&M system, banks are hesitant to assume that projects can deliver consistent power output.

Exploration

Despite these bankability challenges, private renewable energy companies have not stood still. Instead, they are actively seeking breakthroughs through strategic adjustments and financial innovation.

On the one hand, they focus on more stable and predictable niche markets—such as commercial and industrial rooftops, agricultural greenhouses, Fish-Solar, or Agri-Solar projects—to improve the certainty of project returns. On the other hand, they pair with central/local SOEs through joint development, assets transfer, or split EPC/O&M contract to both strengthen the projects bankability and leverage the creditworthiness and resources of large SOEs to gain recognition from banks and investors.

In terms of the toolbox, some private firms are actively exploring green loans, carbon reduction facilities, financial leasing, and supply chain finance as ways to bypass the high thresholds of traditional lending. At the same time, many companies are experimenting with credit enhancement measures to build trust with banks—for example, bringing in guarantee companies and insurers, or relying on the backing of local government platform companies.

Leading private players such as Jinko and Chint have gone further, building their own financial arms or forging deep partnerships with local banks, gradually accumulating and demonstrating a solid track record of successful financing.

Others are also engaging in rural clean energy projects through philanthropic or Corporate Social Responsibility (CSR) programs. These efforts not only expand their market presence but also help ease the financial pressure of projects in their early stages. In Part Four, we will take a closer look at TCL and Tencent to see how they have supported rural clean energy development through such philanthropic channels.

Overall, private companies' strategies in rural markets showcase a multi-dimensional approach — **differentiated positioning, joint cooperation, financial innovation, and credit enhancement**. This represents both a response to current financing difficulties and a gradual process of building sustainable market-based development capabilities.

Village Collective Funds

Village collective funds have become an emerging force in financing rural renewable-energy projects. They typically come from collective economic income, proceeds from collective land transfers, and villagers' equity contributions. Modest in scale, these funds play a distinct role in financing village-level energy infrastructure and often act as a bridge between policy mandates, market operations, and social objectives.

Main actors: village collective economic organizations, cooperatives, and village shareholding enterprises.

Role

- Compared with market-oriented investors, village collective funds prioritize **public interest** and **social returns**, and are generally used to solve concrete community problems.

Funding characteristics

- These funds are not fully market-driven. Their mobilization often relies on government arrangements—such as land transfers, collective development funds, or fiscal top-ups—so the policy orientation is evident.
- Unlike money from the philanthropic channel, they pursue **returns that flow back to the community**, using the steady, long-term cash flows from renewable projects to support the collective and its residents.
- Characterized by small scale, targeted deployment, and moderate return expectations, these funds prioritize public welfare and long-term development over short-term financial gains. In some villages, self-raised funds are invested in small PV plants, and the proceeds go directly to public goods—road repairs, public lighting, or elderly care mutual-aid funds.

Challenges

Despite their importance, village collective funds face clear limits. Their scale is often too small to bankroll large projects on their own, so outside capital is usually needed. Management capacity and professional skills vary widely across villages, leading to inefficient fund use in some cases and, at times, lack of transparency. Most notably, when negotiating with financial institutions and private firms, village collectives frequently lack bargaining power. They often can only participate in a symbolic manner, and struggle to truly have a say in key parts of the project.

Exploration

Localities are actively piloting solutions. In some places, village collective funds serve as the seed funding in "villages + lenders + enterprise" partnerships, successfully leveraging bank loans and private investment to move projects from plan to implementation. Some local governments have set up dedicated village-level renewable-energy funds and topping them up with interest subsidies or guarantees to improve both the efficiency of fund use and the ability to bear risk. Elsewhere, villages have formed **villagers' shareholding cooperatives** that distribute dividends on a per-share basis. For example, in Shijia Town, Chongqing, three villages adopted a "PV + livestock" model and jointly invested in solar projects, locking in long-term dividends for each village. [23]

Overall, market-driven capital has emerged as the most active and expansive force within rural green finance. Its participation brings continuity and scale to funding flows. Yet, if such capital is to truly reach and take root in rural renewable energy projects, it must find closer alignment with policy-driven and social capital—through innovations in financial products, fairer mechanisms of risk-sharing, and project evaluation systems that genuinely capture the value of "green".

[23]https://www.qianjiang.gov.cn/bmjd/202508/t20250828_14944165.html

Philanthropic and social capital

In rural new-energy development, philanthropic foundations, social capital and overseas funds play gap-filling and innovation-driving roles, alongside policy-driven and market-driven capital. Unlike policy capital that "underwrites" or market capital that "hunts returns", philanthropic and social capital are more flexible and forward-looking, critical in both the "first mile" (pilot) and "last mile" (community uptake) of rural new-energy. Philanthropic and social capital —including foundations, international development agencies, impact investors, and corporate social responsibility (CSR) programs—provides non-commercial or semi-commercial funds that prioritize social and environmental value creation.

Domestic and International Foundations and Local Non-profit Organizations

Main actors: Bill & Melinda Gates Foundation, Energy Foundation, ClimateWorks Foundation, SEE Foundation

- **Role :** They fill the gaps, for example supporting small-scale, scattered projects, innovative pilots, or clean energy applications for vulnerable groups (such as solar poverty alleviation or the replacement of traditional stoves). Foundations and non-profit organizations are the key players in this category, primarily offering donations to back capacity building and grassroots pilots. Yet, the share of their overall funding that goes into green issues remains relatively limited.
- **Funding characteristics :** Philanthropic and social capital is guided less by financial returns and more by social value and positive externalities. It Is mission-driven, flexible, risk-tolerant, and able to reach communities that traditional finance cannot. These features make it especially well-suited to support early-stage green projects or initiatives in weak market areas.

One particular group worth highlighting is corporate foundations, whose role in rural green development is becoming increasingly visible. Corporate philanthropy can not only help fill the funding gap in green infrastructure but also leverage company resources and technical know-how to introduce more mature solutions.

Challenges

Despite their unique strengths, philanthropic and social capital face real limitations when it comes to project sustainability and scaling up:

- **Sustainability gap:** Most donations are one-off and rarely translate into long-term support.
- **Weak linkages with market**: Many pilots succeed at a small scale but fail to connect with follow-up policy or market-driven capital, leaving them short-lived.
- **Difficulty in scaling**: The volume of philanthropic capital is relatively small and cannot generate the multiplier effect of SOEs or financial institutions.
- **Lack of unified measurement**: There is no standardized system for evaluating social benefits or carbon reduction outcomes, leading to fragmented allocation of resources.

Exploration

- **Philanthropy + insurance + futures**: The "Dingxin" project, jointly initiated by the China Siyuan Foundation and Oulu Academy, covered the insurance premiums for apple farmers in Shaanxi affected by climate disasters, protecting their basic income.
- **Philanthropy + carbon markets:** Some foundations are experimenting with supporting agricultural and forestry carbon sink projects through donations, with the aim of channeling future carbon market revenues back to village collectives.
- **CSR + rural renewable energy:** Some large companies have integrated clean energy projects into their CSR strategies, meeting Internal decarbonization goals while contributing to rural development. Specific cases will be presented in the following chapter.
- **International cooperation pilots:** In some western rural areas, multilateral development institutions have worked together with local governments and non-profits to explore models such as "rural microgrids + digital platforms".

So, policy-driven capital points out direction, market-driven capital brings scale and efficiency, and philanthropic and social capital fills the gaps and mobilizes communities. Together, they form a complex but complementary ecosystem.

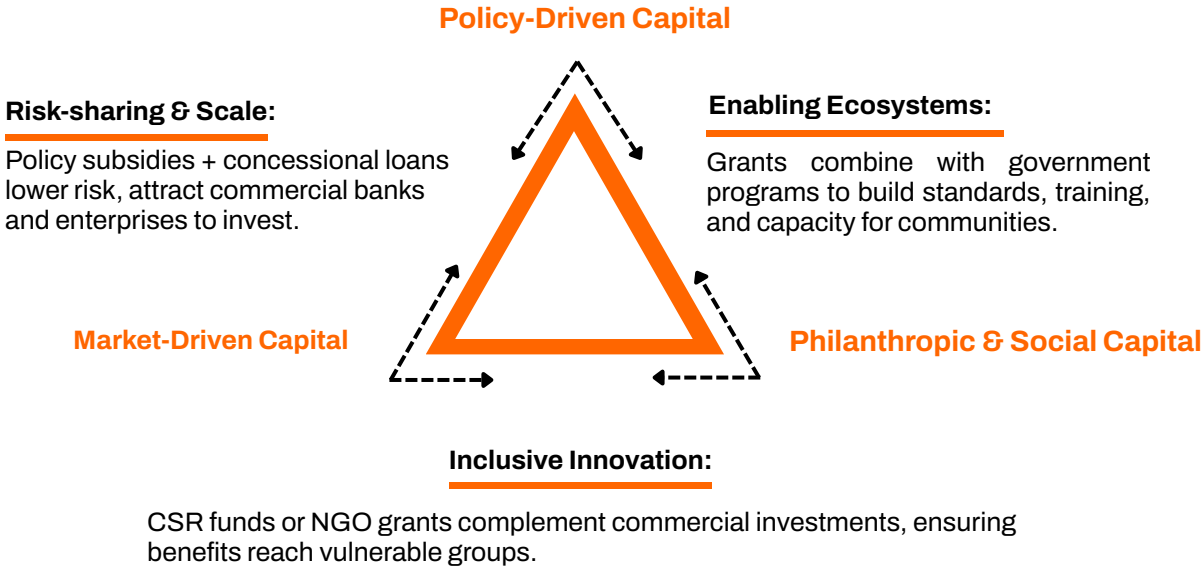
Taken together, philanthropic and social capital play an irreplaceable supplementary role in the rural low-carbon transition. They can bridge the gap between the "security-driven logic" of financial supply and the "public-good nature" of rural renewable energy projects - directing resources toward areas that may lack commercial appeal but deliver significant social benefits. At the same time, their flexibility and rootedness give them unique advantages in promoting community engagement, encouraging technology adoption, and piloting innovative models. Yet to achieve larger-scale and longer-term impact, institutional design must foster stronger coordination with market-driven and policy-driven capital, in order to enhance sustainability and create greater leverage.

Reflection

After looking at the main financing actors in rural renewable energy — policy-driven capital, market-driven capital, and philanthropic capital — and their respective characteristics, one problem stands out clearly: today, rural renewable energy is still funded in a relatively narrow way. Debt financing dominates, while equity, philanthropy, and blended finance — the more patient types of capital — remain underrepresented. Each form of capital has its own logic and preferences, and each plays a different role. The question then becomes: what financing mechanisms truly fit the rural context? How can policy, market, and philanthropic resources each play to their strengths while working together? Is there a way for them to jointly participate in financing and form a blended model that is both practical and suited to China's reality?

The answer is **YES.**

We can think of these three types of capital as three distinct but overlapping circles. Each has its own operating logic, but the real breakthroughs often happen in the overlap.



Policy-driven Capital + Philanthropic & Social Capital → Proof-of-Concept
When government earmarked funds combine with philanthropic capital, one-off goodwill turns into replicable models. Philanthropic capital tends to be more flexible and closer to the grassroots, while policy money has the power to scale good pilots into regional demonstrations. Together, they can produce standard operating manuals, systematic training, and early capacity-building at the community level — turning "do-able" projects into "sustainable" projects.

Policy-driven Capital + Market-driven Capital → Risk Sharing and Scaling Up
Policy subsidies, concessional loans, or fiscal guarantees are not just hand-outs, they can lower upfront risks and improving cash flow structures, making it easier for banks and enterprises to enter. In other words, policy-driven capital plays the role of "ballast" and "first-loss cushion", while commercial capital brings efficiency, scale, and operational know-how. Combined, they can bundle scattered village-level demand into investable products that meet institutional requirements — enabling replication at scale.

Market-driven Capital + Philanthropic & Social Capital → Inclusive Innovation
Enterprises and market investors contribute business logic and sustainability, while philanthropy brings human-centered perspectives and access to vulnerable groups. Together, they can create models that are both financially viable and socially inclusive. For example, philanthropic capital cover startup costs or absorb first losses, incentivizing companies to design innovative solutions that channel revenues to disadvantaged groups. Such partnerships balance efficiency and equity better than any single-source funding.

When All Three Work Together: Blended Finance in Practice

When all three types of capital join forces — aligning on institutional design, risk-sharing, and benefit distribution — a genuine blended financing ecosystem comes into being. To make this possible, projects must be designed from day one with clear roles and incentives: who takes on early risk, who manages operations, and how benefits are distributed. Only then can rural green transition be both scalable and meaningful.

What is Climate Blended Finance?

Globally, "climate blended financing" has been widely discussed and has spawned a range of proven tools and frameworks. Institutions such as the Organization for Economic Co-operation and Development (OECD) and the Global Innovation Lab for Climate Finance have issued guidelines on risk-sharing and catalytic capital design. In China, organizations like the Shanghai Jinsinan Institute of Finance and the China Academy of Financial Inclusion (CAFI) have also provided important theoretical support and policy advice for local pilots. In practice, the National Green Development Fund (jointly funded by central and local governments) reflects this logic: with a size of 88.5 billion RMB, it aims to lever several times more in social investment.

At its core, climate blended finance operates on a simple logic: by using public funds or philanthropic resources to provide concessional loans, credit guarantees, or grants, it becomes possible to attract and leverage much larger flows of private and commercial capital into green projects that are otherwise long-term and high-risk. Every 1 RMB of public or philanthropic funding can leverage 2–3 RMB or even more from private investors, using tools such as guarantee, subordinated equity, or concessional loan. In 2023, private sector contributions to blended climate financing surged by 200%, with an average leverage ratio of 1:2.65—showing the strong appeal of this model.[24]

China's Context vs. International Definition

That said, blended financing in China does not look exactly the same as in the international context. Globally, blended financing usually refers to different types of capital co-investing directly in projects. In China, however, the legal and regulatory frameworks mean that philanthropic foundations are often prevented from directly participating in market-based investing. If we simply apply the international definition, it can cause confusion —readers outside of China might assume that philanthropic funds in China can invest side by side with commercial capital, which is not the case. A definition more grounded in China's reality should therefore include not just equity or debt investments, but also its role in de-risking, enabling project implementation, and mobilizing participation.

What's So Special about Blended Financing in Renewable Energy?

When people hear "blended financing", they often think of health or education. In those fields, policy and philanthropic money dominate, while market-driven capital plays a smaller role. Rural renewable energy, however, has its own distinct features.

- **First, enterprises sit at the center.** Renewable energy enterprises are not just investors; they bring technology, equipment, and operation know-how essential for scale.
- **Second, policy capital carries more weight.** In rural renewable energy, government subsidies, feed-in tariffs, and concessional loans do not just reduce risk — they determine cash-flow and bankability. Policy-driven capital therefore plays a far stronger role in energy than in health or education.
- **Third, philanthropic and social capital acts as catalysts.** They often support pilot projects, mobilize communities, or ensure vulnerable groups benefit. While not as dominant as they are in health or education, they play an indispensable role in energy by acting as the "glue" at the overlapping area— the piece that makes the triangle hold together.

Taken together, rural renewable energy depends on a triangular interaction between enterprises, policy-driven capital, and philanthropic & social capital — with enterprises at the core. This sets it apart from other sectors and underscores why activating private sector engagement is absolutely vital for the energy transition. All three sides of the triangle are indispensable.

[24] https://mp.weixin.qq.com/s/fzAfjek837qOA_FidmvgsA

CASES

I.
WHEN COMPANIES GET INVOLVED IN RURAL RENEWABLES — HOW CAN SOLAR PHILANTHROPY TRULY DELIVER?

II.
HOW TECHNOLOGY IS RESHAPING RURAL FINANCE AND ENERGY NETWORKS

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04

Cases

To make capital willing to enter rural areas — and stay there — two things are essential: reducing risk and increasing the certainty of returns.

An ideal rural renewable energy project would look like this: policy-driven capital provid s security and anchoring, market-driven capital brings scale and financial services, philanthropic capital acts as catalyst and gap-filler,, while enterprises contribute technology and operational capacity. Such a system would both meet the real needs of villages and villagers, and offer investors clear and predictable returns.

Reality, however, looks quite different. Rural investment faces multiple challenges:

- **Slowing growth:** Renewable energy is still expanding, but the growth rate is tapering off. Constrained by grid absorption capacity and land resources, the dividends from large, utility-scale plants are fading. Development is shifting toward distributed PV, wind, and other demand-side solutions. This raises a deeper question: how can we unlock and stimulate rural communities' own energy-transition demand?
- **Lack of scale:** Many rural projects are small and scattered, failing to meet institutional investors' appetite for scale and driving up operating costs and makes it difficult for capital to reach the villages.
- **Unclear benefit-sharing:** In some projects, the distribution of benefits among village collectives, farmers, enterprises, and the grid is poorly defined. Too often, the focus is only on investor returns, while neglecting the rights of village collectives and farmers. This erodes local support and creates resistance during project implementation. In practice, "solar to the countryside" has often been accompanied by problems. Some farmers unknowingly or without proper assessment took on loans, while financial institutions and small distributors promised that "electricity savings would cover the loans and even generate surplus" without sound calculation. In reality, due to inaccurate generation estimates and uneven equipment quality, many households could not cover their repayments, and some had to borrow again just to service debt. These negative experiences eroded farmers' trust in clean energy and made banks even more cautious about rooftop solar. Only when major firms like LONGi, Jinko, and Trina Solar entered the market did order gradually return, and started to help rebuild confidence among both farmers and financiers.

In light of these challenges, we see the main breakthroughs in the following areas:

- **Attracting more private sector participation**, both from new-energy and non-new-energy companies.
- **Leveraging technology to reduce costs and broaden financing coverage.**
- **Exploring institutionalized co-construction and benefit-sharing mechanisms**, where fiscal, corporate, and collective capitals are tied together through innovative equity structures and governance models.
- **Supporting and empowering new rural actors — returning youth, women, and grassroots NGOs — so they can play a key role in governance and operations.**

Guided by these reflections, we have selected four themes and eight cases, covering both energy production and consumption. Together, they demonstrate how money is used, how projects land, how limited seed funds can be leveraged to mobilize much larger flows of investment, and ultimately deliver big change.

I. When Companies Get Involved in Rural Renewables — How Can Solar Philanthropy Truly Deliver?

Breakthrough: Private-sector involvement

Background

Alongside deep corporate and financial-sector involvement in the "Solar-to-villages" drive, philanthropic projects have also played a role. But not all have lived up to their promise. Some solar projects were launched with great fanfare, only to be abandoned after installation. Others lacked mechanisms for long-term O & M, or had vague rules for benefit distribution. The result: wasted resources and a credibility crisis for philanthropy itself. What began as a well-intentioned gift risks became a short-sighted “vanity project”.

When solar philanthropy becomes little more than an awkward show, we must revisit the initial purpose of giving. **Who is truly accountable for the donation? How can solar philanthropy deliver real, lasting impact?**

It is against this backdrop that TCL Charity Foundation, and Tencent’s Sustainable Social Value (SSV) division have each explored different approaches to building more sustainable and effective models.

Case: TCL Charity Foundation × Solar-Powered Low-Carbon Campuses

TCL Charity Foundation adopted a new model of corporate-led philanthropy. In China, most solar donations stop at giving panels, with no long-term O & M or benefit-sharing. Equipment goes unused, resources are wasted, and skepticism about "philanthropy as PR" grows. But some companies are now trying to break this cycle, embedding sustainability into their models.

TCL's strength lies in building a highly integrated and institutionalized path for solar philanthropy: linking fundraising, equipment purchase, project construction, and long-term operation into a closed loop. It combines corporate leadership, philanthropic purpose, and policy alignment.

On the financing side, the program applies a pure donation model for small-capacity rooftop solar on primary and secondary schools. Once the equipment is installed, schools don't have to contribute any funds but can enjoy gains from lower electricity bills or direct generation revenue. With equipment lifespans projected at 25 years, each school can expect annual returns ranging from a thousand to tens of thousands of RMB, all managed and used by the schools themselves — whether for student support, new equipment, or other educational needs.

In August 2022, the first batch of TCL solar-powered low-carbon campuses were established in Xixiang County, Hanzhong, Shaanxi

Environmental and economic impact

By December 2024, TCL had built 27 solar-powered low-carbon campuses nationwide, with a combined installed capacity of 1,614.65 kW. Over their lifecycle, these projects will generate about 50.77 million kWh of clean electricity, equivalent to saving 16,413 tons of standard coal and reducing CO_2 emissions by about 40,783 tons, or planting 2.24 million trees. By the end of 2025, the program is projected to deliver around RMB **17.43 million** in financial benefits to schools.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
TCL Foundation × Solar-powered Low-carbon Campus	Corporate philanthropic foundation budget + equipment donation	By leveraging group resources and new-energy expertise, enterprises can set up philanthropic foundations to build initiatives that accelerate rural solar adoption and close the project loop from fundraising to equipment purchase, construction, and maintenance, ensuring sustainability of philanthropic projects.

Case: Tencent SSV × Solar Rural Revitalization Pilot

Unlike TCL Foundation's one-stop solar solution for remote schools, Tencent SSV set its sights on the financing and O&M headaches that stall large-scale rooftop solar across rural China. Many families have idle rooftops but lack the funds to install solar panels, and fear poor project management. Traditional one-off donations can't solve this. Tencent sought a model that could both scale and attract wider social capital.

Since 2021 Tencent SSV has invested significantly in model designing. In 2022, Tencent finally launched a dual-trust structure:

- **Charitable trust (top tier)**: seeded with 8 million RMB from Tencent to lock in the philanthropic mandate of the funds, with earnings reinvested in rural development.
- **Capital trust (bottom tier)**: manages and grows funds, channeling investment to project companies.

Project companies, as market operators, build and manage the solar plants, pay farmers roof rent, and use the remaining revenue to support the charitable trust, either sustaining the project or funding broader rural initiatives in education and healthcare. A digital management system is also in place to keep money transparent and projects sustainable.

Seed funding comes from Tencent's broader "Common Prosperity Fund" of 50 billion RMB, but instead of a simple grant, Tencent used the trust design to lock in the philanthropic mandate while also attracting external financing from China Construction Bank (CCB) and other partners, achieving initial leverage and risk isolation for the charity money.

Tencent SSV designs the model. China Construction Trust manages both trusts. CCB Shaanxi branch supplies the loan. A competitive tender picks the professional solar EPC. Each party plays to its strengths, ensuring regulatory compliance, capital safety and operational expertise.

The first pilot was launched in Shaanxi in 2022. Tencent's initial 8 million RMB levered several times more in social capital, solving the financing challenge for rural distributed solar. The model has since been replicated in other villages.

Social and environmental impact

Although the structure required significant upfront legal and compliance effort, once stabilized, the"finance + philanthropy" model achieved strong leverage effects, allowing rapid replication. With the introduction of professional lenders for market-oriented operations, the project as a whole boasts sound long-term economic sustainability.

Socially, the model pays households a stable, long-term rent, directly boosting family resilience against economic shocks.

Meanwhile, remaining revenue is continuously injected back into the charitable trust to fund rural health, education and other public causes, creating a virtuous "philanthropy-finance-industry" loop and offering a replicable, systemic solution for finance-enabled rural revitalization.

Environmentally, each distributed solar plant displaces part of the fossil fuel use. Tencent's model is estimated to cut thousands of tons of CO_2 emissions annually. More importantly, it points to a future-oriented path: scaling clean energy while achieving public-good goals through financial innovation.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
Tencent SSV × Solar Innovation Pilot for Rural Revitalization	Charitable trust (seeded by enterprise) + capital trust (recycling project surplus) + leverage of financial & social capital	Using a charitable trust to lock in the philanthropic mandate, a structured design then brings in bank loans and industry players, enabling a "philanthropy + finance + industry" model.

Summary

In exploring how solar philanthropy can truly deliver, the experience of TCL Charity Foundation and Tencent SSV reveal multi-layered, systematic pathways where private enterprise meets philanthropy.

They highlight that avoiding resource waste requires moving beyond equipment donations to mechanisms that respond to real needs, embed professional expertise, and ensure sustainability.

Private-sector involvement brings supply-chain synergy and financial innovation to solar philanthropy, sharply boosting scale and sustainability. TCL leveraged its group resources to deliver an integrated, closed-loop package —from module supply and construction to O&M, ensuring long-term stability; Tencent's "finance + philanthropy" model amplifies philanthropic capital and crowds in market investment, offering a replicable route for financing rural distributed solar. Both demonstrate how companies, with their capital, technology, and organizational strength, can move solar philanthropy from short-term charity to institutionalized, sustainable practice.

Yet scaling up these models across more enterprises is far from straightforward. The main challenges include:

- **Limited strategic will**: Not every company is willing to treat CSR as a long-term responsibility. Many have small philanthropic budgets and care more about short-term publicity than 20-year O&M.
- **Lack of tools**: Tencent's dual-trust structure required complex compliance and financial expertise, which most companies simply do not have.
- **Weak incentive**: For companies, philanthropic spending is booked as "cost," not "investment". Unless directly linked to the core business, few are willing to keep funding them over time.
- **Regulatory constraints**: In China, philanthropic funds cannot directly engage in market-based equity or debt financing, which narrows the room for innovation.

Replicating the pathways of TCL or Tencent requires three conditions: a strong long-term vision from the company, access to proper institutional tools, and the ability to integrate operational and financial resources. All three are indispensable.

This suggests that when discussing corporate philanthropy, we must recognise the special conditions behind successful cases. The real value of such cases lies less in offering a "ready-made template" for replication, and more in providing a framework for thinking: to engage more companies in rural energy, we need not only corporate strategic shifts, but also policy support, financial innovation, and cross-sector collaboration.

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II. How Technology Is Reshaping Rural Finance and Energy Networks

Breakthrough: Using technology to cut costs and unlock efficiency

Background

Since the National Energy Administration issued the *Interim Measures for the Administration of Distributed PV Power Generation Projects* in 2013, national policy has continuously promoted standardized and high-quality development of distributed PV. In January 2024, the new *Administrative Measures for the Development and Construction of Distributed PV Power Generation* further underscored the strategic role of distributed PV in achieving China's dual-carbon goals. Yet, even as policy improves, one core bottleneck persists for rural rooftop solar: **financing**.

The "last mile" of distributed PV is further complicated by the transaction chain: equipment manufacturers, system integrators, micro-distributors, installers, and end-users all operate on different cash cycles. For example, installers must pre-pay for equipment, while farmer payments and electricity revenue collection come later, creating mismatches that heighten the financing needs of small downstream players.
As distributed PV rapidly penetrates villages, finance becomes the critical link that turns technology deployment into farmer participation.

Against this backdrop, the collaboration between Trina Solar and MYbank represents tech-enabled supply chain green finance for micro and small enterprises.

Case: Supply chain finance model – Trina Solar x MYBank

In the fast-growing distributed PV sector, traditional finance has long struggled to serve the highly fragmented, small-but-frequent funding needs of downstream players. To address this, Trina Solar partnered with MYBank in 2022 to build the industry's first green supply chain finance solution—tackling financing bottlenecks in household and small commercial PV, while exploring how green finance and digital technology could work together on the ground.

As a leading brand in distributed PV modules, Trina's downstream network of dealers and installers is made up of over 70% micro and small enterprises, spread across counties and even townships. Large-scale projects like a 10,000 m² rooftop plant might require 3 million RMB, but for individual households, a 10–20 m² rooftop typically costs only 10,000–30,000 RMB. These needs are small, scattered, inconsistent in timing, and dependent on roof conditions, subsidy policies, or whether neighbors have already adopted solar. Traditional banks struggle to identify users (high credit-assessment cost) and to tailor products (small size, high frequency, high management costs). Faced with this "gap," Trina turned to MYbank, a digital bank specialized in serving small businesses.

Under the partnership, Trina provides a list of prospective dealers/installers; MYBank uses its "Goose System" and AI-based risk models for dynamic credit screening; and loans of up to 3 million RMB can be approved automatically through the Alipay platform nationwide.

The "Goose System" combines AI models with industry chain big data to build precise profiles of small enterprises. It auto-analyzes core operations, positions them within the sector, and dynamically adjusts risk strategies based on sector trends—effectively fitting the bank with an "smart microscope" that makes formerly opaque micro-credit transparent.. This "AI + industry chain" innovation boosts micro-loan efficiency, and enables light-asset technology companies to quickly access growth capital. It is a vivid example of finance supporting new productive forces.

By September 2023, the model had reached 30 provinces, cutting average loan interest rates for distributors by **21%**. Importantly, 70% of beneficiaries were in counties or lower-level regions, effectively extending green finance into rural markets.

The cooperation also goes beyond lending. Joint operations, joint risk control, and joint interest subsidies, Trina and MYBank deliver targeted support and dynamic management.. For instance, when Trina plans seasonal marketing campaigns, MYBank can simultaneously raise credit limits or offer interest subsidies—even zero-interest options. Data sharing between the two further enhances risk management. According to Trina's project lead, as of September 2023, no bad loans had been recorded among its downstream partners, significantly improving financial institutions' perception of and confidence in green micro-enterprise.

Project value

- **Economic impact:** This model eases cash flow pressure on micro-distributors and installers, allowing them to respond more flexibly to market demand and expand coverage. By accelerating credit approval and lowering interest rates, their financing costs are significantly reduced. Rural financial accessibility also improves, drawing more market-driven capital into villages.
- **Social impact**: With 70% of beneficiaries located in counties or lower-level regions, the model clears the "last mile" obstacle for green-energy products to reach households, improving renewable-energy access in remote areas and creating new jobs.
- **Environmental impact**: The accelerated deployment of household and small-scale PV plants provides stable clean energy alternatives for rural families and enterprises. The more micro-actors are activated and connected to the green transition, the stronger the grassroots momentum for carbon reduction.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
Trina Solar × MYbank	Financial product innovation (Funds are provided by MYbank, while Trina Solar supplies supply chain data to help MYbank more accurately identify and screen eligible micro and small enterprises.)	Leveraging corporate credit and fintech risk models: combining supplier credit guarantees with MYbank's AI-driven risk control to provide small, flexible loans for downstream distributors and installers; this secures the cash flow along the capital chain from equipment purchase to installation to revenue realization.

Summary

The Trina Solar-Mybank partnership demonstrates that technology can fundamentally transform financial access in rural renewable energy. By combining corporate supply chain data with AI-driven risk control, the model enabled small and scattered PV installers and dealers to access credit efficiently and at lower cost—bringing green finance closer to counties and townships. This approach not only addresses a long-standing financing bottleneck in distributed PV but also highlights the broader potential of digital finance.

Yet scaling up remains challenging: most solar companies lack data pools and systematic customer management, and traditional banks have no ready digital tools to manage small, scattered and high-frequency loans effectively. Moreover, data-sharing, interest subsidies, and risk-sharing mechanisms between enterprises and banks require strong trust and institutional safeguards.

Yet this is precisely where the opportunity lies: scaling such models will depend on accelerating banks' digital transformation and encouraging enterprises to leverage supply chain data more systematically. In this sense, the Trina–MYbank case points to a future where technology-driven innovation can make rural green finance both scalable and inclusive.

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III. From “Me” to “We” — Sharing Benefits and Reimagining Governance

Breakthrough: Exploring institutional pathways for co-creation and shared ownership

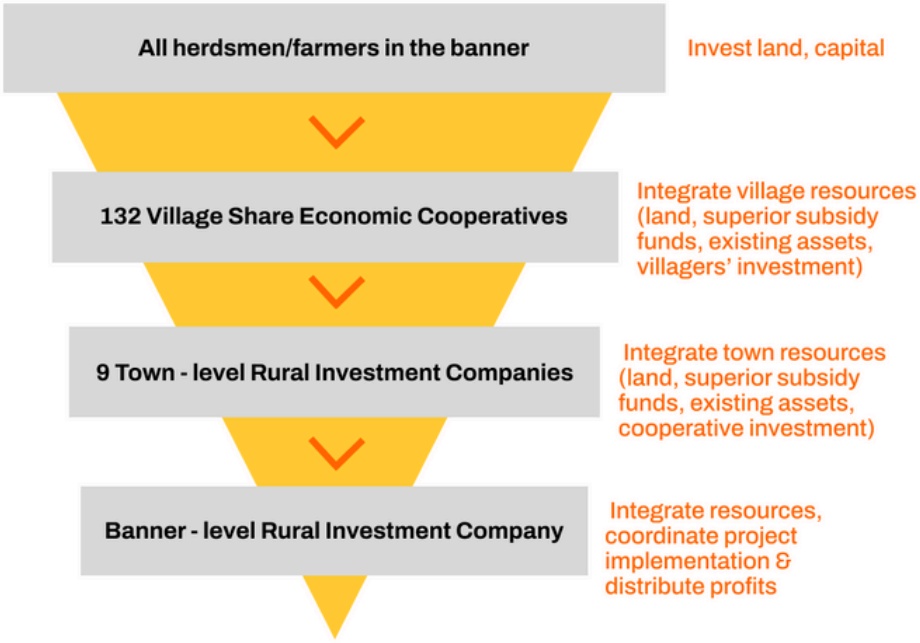
Background

Among renewable energy projects, wind power stands out for larger equipment, longer construction cycle, and more complex O&M. Compared with solar PV, the unit investment is much higher. Based on current market estimates, building a single 1MW onshore wind turbine costs between 4 million and 6 million RMB, covering turbines, foundations and towers, transportation and installation, grid connection, and land compensation. Such projects are typically led by energy companies or local platform companies that mobilize commercial capital through financial instruments, while village-level organizations remain at the margins, with little chance to participate or benefit.

The question is how to institutionalize mechanisms for joint construction and shared benefits to redefine the “rights-responsibilities-benefits” relationship of rural new-energy projects, turning village collectives from passive takers into genuine investors and governance party. In Dalad Banner, Ordos City, Inner Mongolia, a wind project on the grassland has broken the traditional pattern. Here, wind is not only a gift of nature but also a lever to strengthen the collective rural economy. The significance of this project goes beyond power generation—it signals a shift in rural energy development from “enterprises lead, villagers wait and see” to “collective equity participation, joint construction and shared benefits”. By restructuring financing mechanisms, governance structures, and benefit sharing systems, the project provides a practical pathway toward “extensive participation, shared dividends, and sustainable future” in rural energy co-governance.

Case: Dalad Banner's "1+9+132" Model for Village Collective Equity Participation in Wind Power

Rural energy projects in China often face the dilemma of "having resources but no capital". The Dalad Banner project tackled this by creating a "1+9+132" equity structure: one banner-level SOE, nine town-level companies, and 132 village collectives co-invested to form the Dalad Banner Rural Collective Economic Development Co., Ltd.. This structure addressed the weakness of individual villages, which usually lack both financing capacity and bargaining power.



The total investment was 75.6 million RMB, of which 66.75 million came from multi-level government rural revitalization funds (central, autonomous region, municipal, and banner-level), allocated to 132 villages, plus 4.75 million RMB of self-raised funds from 56 villages.

This "special-purpose fund + shareholder contributions + bank loans" mix is a financing innovation. It effectively binds fiscal money and village capital through equity, turning "resources into capital, capital into equity, and equity into dividends".

In many past projects, rural "participation" existed only on paper or in mobilization meetings. This time, Dalad Banner's gacha villages sat at the core of project governance. Every village was not just an investor but also a builder and supervisor. This cross-level governance mechanism enhanced both bargaining power and mutual trust throughout project implementation.

Beyond financing innovation, the project injected vitality into rural collective economies. As Zhang Xiping, Chairman of Inner Mongolia Yellow River Jiziwan Agricultural and Animal Husbandry Development Co., Ltd. (Formerly Inner Mongolia Jiziwan Commerce and Trade Co., Ltd.) put it: "This project allows ordinary people to truly benefit, while offering valuable experience for rural energy transition and revitalization. Next we will advance a 5.26MW solar PV for Rural Revitalization project and a 50MW pilot under the 'Wind Program for Thousands of Townships and Villages', aiming to ensure that every village has wind power, collective revenues grow, and people gain tangible benefits.

Unlike “build-and-leave” projects, the Dalad wind farm was designed for long-term participation and benefit-sharing. The project used a multi-tier profit-distribution mechanism: banner-level SOEs received returns based on management and equity share, town-level enterprises divided profits pro-rata, while 132 gacha village collectives enjoyed both share-based dividends and a guaranteed annual minimum of RMB 50,000 per village.

Zhang Xiping, Chairman of Inner Mongolia Yellow River Jiziwan Agriculture and Animal Husbandry Development Co., Ltd., accepts media interview

Project Value

- **Economic impact**: Returns far exceed a single-project IRR. The expected annual generation is 43.18 million kWh (equivalent to 2,879 hours of full-capacity operation), bringing in about 10.81 million RMB in revenue at RMB 0.2504/kWh. From grid connection on August 28, 2024, to December 31, the project already distributed 2.07 million RMB in dividends to all 132 villages. Over the next 20 years, each village is expected to gain at least 50,000 RMB annually—creating a “self-sustaining” collective economy.
- **Social impact**: By bringing 132 villages into co-governance, the project rebuilt collective capacity and confidence in development. It demonstrated a viable pathway toward common prosperity.
- **Environmental impact**: Annually, the project is expected to reduce 17 tons of smoke dust, 99 tons of SO_2, 35,496 tons of CO_2, and 5,158 tons of coal ash—real emission cut in the grassland. This not only reduces air pollution but also provides quantified evidence for building a northern rural model of “ecology-prioritized and green development”.

Project electrical control room

By focusing on financing innovation, the Dalad Banner “1+9+132” distributed wind project successfully integrated dispersed resources, solved capital bottlenecks, and built a replicable model for rural green energy that boosts collective economies sustainably.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
Dalad Banner Wind Power Project (Inner Mongolia)	Government special-purpose funds + village collective capital + bank loans	How policy-driven capital spurs village participation (equity design): by binding fiscal funds and village capital through equity, this case turns “resources into capital, capital into equity, and equity into dividends”, ensuring real participation of village collectives in governance and benefit sharing.

Summary

If past rural energy projects were mostly “blood transfusion”, Dalad’s approach is more like “self-generation”. Anchored in financing innovation, tied together by benefit-sharing, and safeguarded by governance reform, it provides not just a wind power model but a replicable pathway for rural economic, green, and institutional transition. Its success rests not only on innovative equity structures but also on multiple enabling conditions:

- **Abundant wind resources:** Located in Inner Mongolia’s wind-rich western region with high annual average wind speeds, Dalad has natural advantages for small-scale distributed wind.
- **Mature grid access:** Chinese villages usually sit at the end of the grid, with weak connections and low loads. Dalad, however, is a designated integrated “wind-solar-coal-storage” base with strong grid infrastructure and experience. Local distribution and transmission are relatively advanced, especially after agro-pastoral upgrades.
- **Existing wind industry:** The region already hosts major wind developers, O&M providers, and equipment suppliers, ensuring technical and logistical feasibility for distributed deployment. This makes household wind replicable in technology, installation and maintenance.
- **Good absorption & storage:** Dalad is a core new energy hub with ample demand and advanced storage, such as the 2025 3GW/12.8GWh Gushanliang storage project invested by Inner Mongolia Zhongdian Storage Tech and Envision, which smooths supply and boosts local consumption.
- **Policy support:** As one of Inner Mongolia’s first “rural wind power pilot” banners, Dalad benefited from government planning and coordination, earmarked rural revitalization funds, energy bureau financial support, and SOE participation.

Following Dalad's 15MW "1+9+132" project, the National Development and Reform Commission, National Energy Administration, and Ministry of Agriculture and Rural Affairs jointly launched the "Wind Program for Thousands of Townships and Villages" in April 2024. During the 14th Five-Year Plan, eligible counties will pilot village-level wind projects (each capped at 20MW), exploring mechanisms for joint construction and shared benefits under village-enterprise cooperation.

The Wind Program Notice emphasizes tailoring projects to local wind resources, available land, ecological protection, grid capacity, and safety needs. Projects should be implemented "where conditions allow, one by one, without rushing or blindly scaling up". Grid access and grid capacity are identified as key prerequisites for project returns.

This underscores that replicating Dalad's model requires four critical elements: wind resources, government leadership, village participation, and grid access. It cannot be reduced to simply "installing turbines and paying rent". Instead, it is a public-interest innovation mechanism that calls for systematic coordination, strong organization, and equitable benefit-sharing.

At the same time, it is important to recognize that village collectives are not merely passive recipients of revenue, but also key governance actors with serious responsibilities. Once a wind project is in place, village collectives must deal with land coordination, benefit distribution, project supervision, and communication with enterprises and government. This means they must not only "take dividends" but also develop governance capacity and a sense of responsibility, preventing weak management or unfair distribution from undermining the project's long-term sustainability. In other words, the challenge of replicating the Dalad model lies not only in securing similar resource and policy conditions, but also in cultivating and empowering village collectives so that they can genuinely shoulder the role of long-term governance and collaboration.

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IV. New Rural Forces: Women, Returning Youth, and Grassroots Organizations in Green Co-creation

Breakthrough: Supporting and empowering emerging actors in rural transformation

In the process of rural green and low-carbon transition, beyond governments, enterprises, and financial institutions, emerging actors such as women, returning youth, and grassroots non-profits are emerging as vital forces. Deeply rooted in their communities, they are able to reach villagers with unique identities and perspectives, mobilize collective action, and take on key roles in governance, operations, and innovation. The following cases illustrate how these three groups contribute to rural energy projects, together forming essential pillars of green development.

Case: Rural Women Embracing Green Agriculture

Background

Tianmen, a county-level city in central China's Hubei Province, is known for its vast rice fields and the birthplace of Lu Yu, the “Sage of Tea”. While traditional farming practices (heavily reliant on manual labor and conventional techniques) urgently need a green upgrade of crop protection, the region faces a dual challenge: a shortage of professional services and a skewed labor pool.

As one of China’s historically famous “lands of fish and rice”, Tianmen should, in theory, have a natural advantage in developing modern agriculture. Yet reality is more complicated.Many young laborers have migrated out for work. The resident population is mostly elderly, women and children. This demographic pattern makes it difficult to build a professional crop protection team, which requires precision spraying and drone operation—skills that do not easily align with the stay-behind villagers' technical capacity. Farmers often had no choice but to hire out-of-town service teams at a 20–30% higher cost per mu, driving up production costs.

In Tianmen, drones fly over rice paddies—not under the control of agri-corporate engineers, but piloted by a group of rural women. In this county-level city where traditional farming still dominates, a project jointly supported by non-profit organizations and banks has enabled “female drone pilots” to become a new driving force behind green agriculture.

Case description

The turning point came in 2019. With support from the "Tianmen Rural Entrepreneurial Leader Capacity Building Program", jointly run by HSBC and the Sichuan Haihui Poverty Alleviation Service Center (Haihui thereafter), entrepreneur **Jiang Minglan**—who had been working in agricultural crop protection for years—organized an all-women drone spraying squad. Why women? Jiang explained that rural women often have flexible schedules, and drone operation has become increasingly accessible. With some training, they could perform crop protection tasks while still caring for their families and earning income locally.

Jiang Minglan operating in the field (Photo: Jimu News)

With a modest seed funding of 30,000 RMB from the project, Jiang was able to launch the initiative. Within a month and a half, her team completed systematic training for 130 women. In the following years, local labor and agriculture authorities began subsidizing these training programs. Each trainee, after completing the 15-days training, could receive a qualification certificate and get a job placement.


A female pilot remotely operating a drone (Photo: Xinhua)


Jiang Minglan promoting plant protection drones to clients

To date, the "Hornet Plant Protection Service Cooperative" founded by Jiang has trained more than 2,000 drone operators, with women accounting for around one-third. The team now sprays over one million mu of farmland annually, covering 60–70% of Tianmen's arable land, and has expanded into provinces such as Henan and Xinjiang—developing preliminary cross-regional operations capacity.

Project value

This is not just about introducing new technology. The project initiated by HSBC and Haihui provided seed money and structured training in fertilization, pest control, precision mapping, and targeted spraying. It also connected the team to supply chains—input purchase, order matching, and maintenance services. As service capacity improved, the team gradually expanded its market reach and secured long-term contracts with local farmers.

Jiang noted that in the past, drone spraying services mostly relied on mobile teams from outside the region, as there were no local operators. Now, with trained local women, there is no need to bring in outsiders, and customers practically come knocking on their own—farmers simply walk up when they see drones in the field.

Environmental Benefits

This “women-driven and technology-focused” service model has reshaped not only the labor force but also agricultural practices. Before drones, spraying one rice field required three to four people and an entire day. Now, a single female pilot can complete precision spraying within an hour, using a drone controlled via smartphone. The margin of error is reduced to centimeters, preventing duplicate fertilizer or pesticide passes. Traditional machinery often crushes seedlings; drones’ aerial operations avoid that entirely.

Efficiency gains are substantial: less fertilizer and pesticide are used, cutting farmers’ costs and mitigating non-point source pollution. Overuse of fertilizers and pesticides typically flows into rivers, lakes, and groundwater, harming ecosystems and undermining soil health. Drone-based precision spraying helps curb these risks.

Social benefits

The social structure of the village has also been transformed. These women are not just drone pilots; they bring skills, orders, and specialized knowledge into local governance and agricultural organizations. Many are now invited to collective industrial planning meeting, and some have become core members of local cooperatives.

Economic benefits

Some women now run their own operations. For low-income participants, this work has been a path out of poverty. One of the eldest trainees became a drone pilot after certification and earned 70,000 RMB in just six months.

In a rapeseed field in Huangtan Town, Tianmen City, female pilot Chen Birong remotely operates a crop-spraying drone as it carries out automatic spraying.

The phone and joystick in Chen’s hands are her new farm tools.

Another female pilot Wu Ling and her husband fine-tune a crop-spraying drone on the ridge, ready for take-off.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
Tianmen, Hubei – Women Drone Operator Project	Philanthropic incubation + policy subsidies + market-based transition	Turning grants into sustainable business models: small seed funding combined with structured training enables rural women to master modern agricultural skills and form local, sustainable service teams. This model opens up access to upstream inputs and downstream tech support, cutting outside dependency and keeping value in the village.

Summary

This rural initiative, combining both talent development and technology adoption, remains in a transitional zone—driven largely by philanthropy but edging toward market-based sustainability. Its hardware, training, and some operational resources continue to depend on philanthropic capital, and a fully commercial model is still under exploration. Without steady external capital, funding equipment upgrade and securing a predictable source of orders are two core challenges for scaling.

Moreover, while boosting female employment, the project faces financial-sustainability risk.

Two major challenges remain:

- **Dependence on subsidies and philanthropy:** Current training costs (2,000–3,000 RMB per person) are covered by charitable funds and government programs. Without continued support, the model's sustainability and scalability would be at risk.
- **Equipment renewal pressures:** Agricultural drones require regular maintenance and upgrades (batteries, sensors, etc.) that village women cannot easily afford.
- **Lack of financial products:** Local financial institutions have yet to develop tailored credit solutions—for example, low-interest micro-loans to help women cover training or equipment. Order acquisition is still largely ad hoc and based on individual networks, without stable customer pools or standardized pricing. Policy support, financial tools, and data capabilities will be essential for the cooperative's next stage of development.

Still, the "female pilot squad" led by Jiang Minglan has already become one of the most vivid attempts in rural revitalization today. During our call, Jiang was busy using a low-altitude drone to capture high-definition farmland boundaries, then feeding the images to crop protection drones for precise spraying — more accurate than satellite imagery and a fix for labor-intensive field mapping in hot weather.

Entrepreneurs like her show that drones are not some distant, high-tech fantasy in modern agriculture, but a practical tool that weaves climate-smart farming, gender inclusion, and ecological transition into a new rural business logic. Its significance lies in demonstrating the potential of rural women in green energy transitions. At the same time, its financial and operational risks highlight the need for multi-stakeholder collaboration. Only when philanthropy, market, and policy support can such innovations truly sustain themselves.

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Case: New Villagers vs. Outsiders – A New Force in Rural Development

Background

In Tieniu Village, Xilai Town, Pujiang County, Chengdu, the story of rural revitalization did not begin with “bringing in factories” or “attracting agri-business”. Instead, it quietly unfolded with the arrival of a group of “new villagers”—mostly returning youth and urban young people who chose to move toward the countryside. Settling down in the village and picking up farm tools, they stepped in as architects, brand managers, tour guides, and agricultural advisors, redefining what “rural development” could look like, and in the process attracted tens of millions of yuan in investment to this village of just 5.4 square kilometers.

Case Description

Over the past few years, these young people—driven by a longing for the countryside’s natural ecology and authentic culture—gradually became part of Tieniu’s daily life, production, and governance. Working side by side with old villagers, they explored a new path for revitalization grounded in green energy, eco-agriculture, and community co-construction.

New villagers rebuild their new homeland

They chose to begin with the basics of farming. In orchards, they experimented with replacing chemical fertilizers with organic ones, and substituted pesticides with yellow sticky boards and solar-powered insect-trapping lamps. Through scientific monitoring and field practice, they improved fruit tree varieties and cultivation methods, helping to put green production standards into practice.

New villagers in the citrus fields

At the same time, they extended the value chain. By developing processed products such as fruit wine, dried fruit, and chocolate, and by organizing educational farm tours, rural camps, and craft workshops, the new villagers broke the cycle of “depending on the weather” that traditional agriculture had long relied on. They shifted the industry cycle from weather-dependent to year-round operations and creating more local jobs and start-ups. Some even addressed community needs that emerged along the way, such as hiring early-childhood teachers for new villagers’ children.They also established companies such as “Choumei Life”, “Maikunta Rural Construction” and “In the Fields”, and formed a joint village-enterprise entity with the village collective to pool resources and grow the collective economy. In this joint entity, Tieniu Village Collective Economic Cooperative holds 40% of the shares, while the new villagers’ company Choumei Life holds 60%.

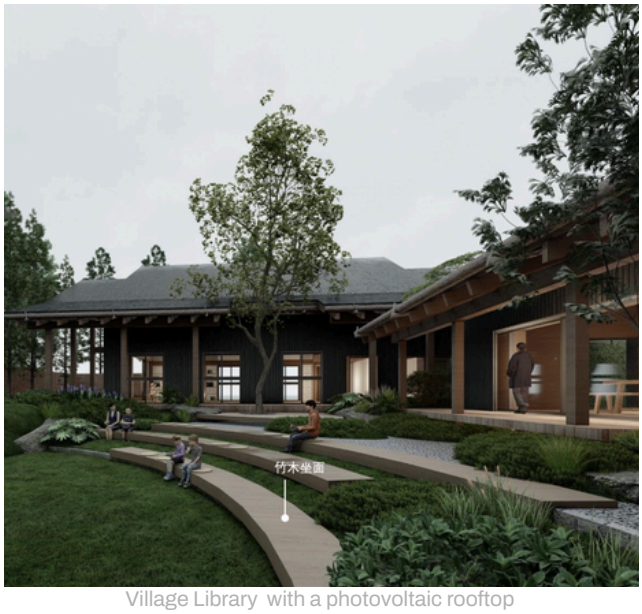
Choumei has developed nearly 20 products

But their vision went beyond agriculture itself—they aimed to shift the village's energy use. The new villagers actively introduced and promoted distributed PV and other clean energy solutions, providing sustainable power for agro-processing, tourism operations, and daily village life.

New villagers organized the "National-Day Low-Carbon Living Festival"

Old and new villagers build Tieniu Village together (beyond 80+ resident new villagers, there are also 500+ "migrant" villagers)

Their efforts encouraged the government to proactively pools resources now, using the new-villager-led greenc-ommunity building as a template to advance an ecology-oriented rural-governance path. Pujiang Rural Construction Development Group Co., Ltd. (a local platform company) decided to support Tieniu through direct project investment. The company helped finance a Talent Park and a Village Library with a PV rooftop system (scheduled to be grid-connected by September 2025), pioneering a new model of "public buildings + renewable energy + community benefits". In addition, in 2025 another local platform company invested in a fruit-drying workshop, which started operations in late August. Here, citrus from Choumei and kiwifruit from surrounding farms are deep-processed into higher-value dried products.



Village Library with a photovoltaic rooftop


"Talent Park" for talents' rural entrepreneurship

What is Platform Company?

A Platform Company in China is a government-backed entity, often established by local or provincial governments, to implement public infrastructure, development, or policy-driven projects.
One common type of platform company is the **Local Government Financing Vehicle (LGFV)**, which raises funds on behalf of local governments, often through bonds or bank loans.
However, not all platform companies are LGFVs; some focus on project execution or industrial development rather than direct financing.

Alongside community construction, Tieniu Village also launched a range of village-level zero-carbon initiatives, such as waste recycling, green mobility (villagers' own three-wheel e-bikes), and household-energy substitutio. Gradually, these efforts have taken shape as a practical *Village Zero-Carbon Action Map*.

Tieniu Village Near-Zero Carbon Action Map

Project Value

This transformation is already showing clear impact on three levels:

Economic impact:

- Leveraging e-commerce platforms, citrus grown in Choumei's ecological orchards fetch prices 4–5 times higher per kilo than conventionally farmed fruit, with over 200 pesticide residue tests showing "zero detections". By 2023, the village collective's operating income had grown nearly tenfold compared to pre-transition levels, while eco-growers saw a 30% rise in annual income.
- Village public spaces gradually become revenue-generating assets.

Social impact:

- New industries have created diverse jobs, increased opportunities for old villagers to participate in cultural life, and enabled a community-based model of joint construction and benefit sharing.

Environmental impact:

- Adoption of organic farming has reduced chemical fertilizer use by over 80% in participating orchards. The low-carbon architecture and PV rooftop library further reduce carbon emissions—bringing ecological restoration and renewable energy together as foundations for future rural living.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
Tieniu Village, Chengdu – New Villagers as New Forces for Rural Revitalization	Social enterprises + community co-construction + local platform company investment	New villagers as catalysts: integrating eco-agriculture, green energy consumption scenarios, cultural tourism, and community governance; experimenting with "village collectives + new villagers + platform companies" to achieve shared growth while balancing industry development and local governance.

Summary

The experience of Tieniu Village disrupts the traditional logic of “technology input + industry landing”. Instead, it shows how committed individuals can spark endogenous transformation.

From early experiments in production and marketing, to collaborations with agricultural universities on scientific planting and soil restoration, and finally to county-level and platform company-backed public projects, the transformation of Tieniu shows not only in bricks and mortar but in the re-engineering of village governance logic and development mechanisms. Governance is no longer top-down push but is instead co-created through new villagers’ commitment and multi-stakeholder participation, weaving together a sustainable, low-carbon village ecosystem.

In Tieniu, one often hears new villagers asking themselves:

Whose countryside is the countryside?

Who should be responsible for building it?

And for whom?

Their answer is clear: the countryside belongs to everyone, and building it must rely on the participation of both old and new villagers. Green energy, together with human-centered applications, is seen as the foundation for sustainable development. From distributed PV to agro-processing, from tourism operations to community energy use—these everyday needs have become fertile ground for clean energy application.

Of course, challenges remain. Extreme weather continues to affect farming, soil restoration requires long-term investment, and the O&M and benefit distribution mechanisms for green energy infrastructure still require further exploration.

Yet Tieniu Village points to an important direction: future transformation of the rural energy mix may well be driven by user-side demand, led by returning youth and new villagers. They need clean electricity, and they are willing to put it into practice—processing local products, running tourism, building community life—every step can become an entry point for distributed renewable energy.

Across China, diverse grassroots experiments in rural revitalization continue to emerge. Ziyang, Sichuan, is building a “digital nomad community”, leveraging cooperation between SOEs, universities, and private companies to turn Renli Village into a shared office and cultural hub. In Wenjiang, Chengdu, Tianxing Village combines smart agriculture and cultural creativity to foster digital nomad settlement. In Chongming, Shanghai, the focus in on green agricultural technologies, with “chemical-free” farming systems and youth entrepreneurship platforms. Anji, Zhejiang, applies the philosophy that “lucid waters and lush mountains are invaluable assets”, integrating eco-tourism, leisure farming, and youth empowerment into new models of rural economy.

Young people return to the countryside, and green development return to the countryside—this is a vision of rural revitalization worth anticipating.

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Case: Fengma Philanthropy × Warm Classrooms on the Plateau

The story of Fengma Philanthropy began in Jiqu Township, a boarding primary school more than 3,000 meters above sea level on the Qinghai–Tibet Plateau. For years, the school's 270 students depended entirely on coal for winter heating, purchased at high cost from outside the region. "In winter, children's noses would turn red from the cold, so had no choice but to buy coal at great expense," recalled Principal Dunzhu.

As coal prices climbed year after year, the situation became unsustainable. Each winter, Fengma's team had to raise an extra 10–20 tons of coal just to keep the school warm. This constant struggle pushed them to search for a more sustainable alternative.

In 2019, Fengma began its exploration, and by 2020 they landed on a "solar-thermal collection + water-heat-storage circulation" system. Vacuum-tube collectors heat water directly, which is circulated to dormitories for heating and hot water. At night, an automatic night-time return-water loop prevents freezing. A mobile app allows remote monitoring and temperature control.

The construction of the first phase of the project was completed in October 2023, with an investment of 1.6 million RMB. It now provides stable heating for 16 hours a day and 10 tons of hot water daily, solving the school's long-standing heating problem. The second phase, budgeted at 800,000–900,000 RMB, began in November 2024. Funding combines corporate donations with public crowdfunding through charity platforms.

Social and environmental impact:
Although the upfront costs were high, once built, the system requires minimal ongoing expenses. School staff can operate the system after basic training, making the project economically sustainable.

Socially, the system extended the school's teaching calendar. In the past, classes had to stop by November because of the cold. Now, winter courses continue until late December, giving each of the 270 students an extra 30 days of learning per year. This ended the problem of "endless winter breaks" in high-altitude schools and created a model that other remote schools can follow.

Environmentally, the system covers heating and hot-water needs for roughly 300 teachers and students, replacing the former 63–73 tons of coal burned each winter. Each year it avoids an estimated 167.6–194.2 tons of CO_2 emissions. This was not just a technical fix but a forward-looking ecological practice.

Summary of financing models and replicable lessons of the selected cases

Case	Financing Models	Replicable Lessons
Fengma Philanthropy × Warm Classrooms on the Plateau	Corporate donation + public crowdfunding	Grounded in local needs: selecting renewable energy solutions that are highly adaptable, operationally simple, and stable over the long run; training school staff to operate and maintain systems themselves, lowering long-term costs; offering a replicable clean energy model for high-altitude and cold regions.

Summary

Grassroots NGOs play a unique role: Fengma's project shows how being embedded locally allows them to identify genuine needs—like heating rather than electricity in high-altitude schools—and adapt technology accordingly. The strength of this approach lies not only in directly improving the living conditions of students and teachers, but also in building a system that can be operated and maintained locally after one-time training, lowering long-term costs and offering a replicable model for other cold, remote areas seeking clean energy solutions.

Yet, replication is not without challenges. The upfront investment is relatively high, and the model relies heavily on corporate donations and public crowdfunding. Without stable and predictable sources of funding, it is difficult to scale up. At the same time, while solar thermal systems are well-suited for certain geographies, their performance is still bound by local climate conditions and cannot be applied universally. Finally, although school staff can manage day-to-day operations after training, complex repairs and component replacement still require external expertise, which is often scarce in remote areas.

This case therefore both shows the unique value of grassroots NGOs in rural energy transitions and reminds us that replication requires more robust financing mechanisms, more accessible technical support systems, and broader alignment with policy and market actors.

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SUMMARY AND OUTLOOK – LEVERAGING INNOVATIVE FINANCING MECHANISMS TO UNLOCK A GREEN RURAL FUTURE

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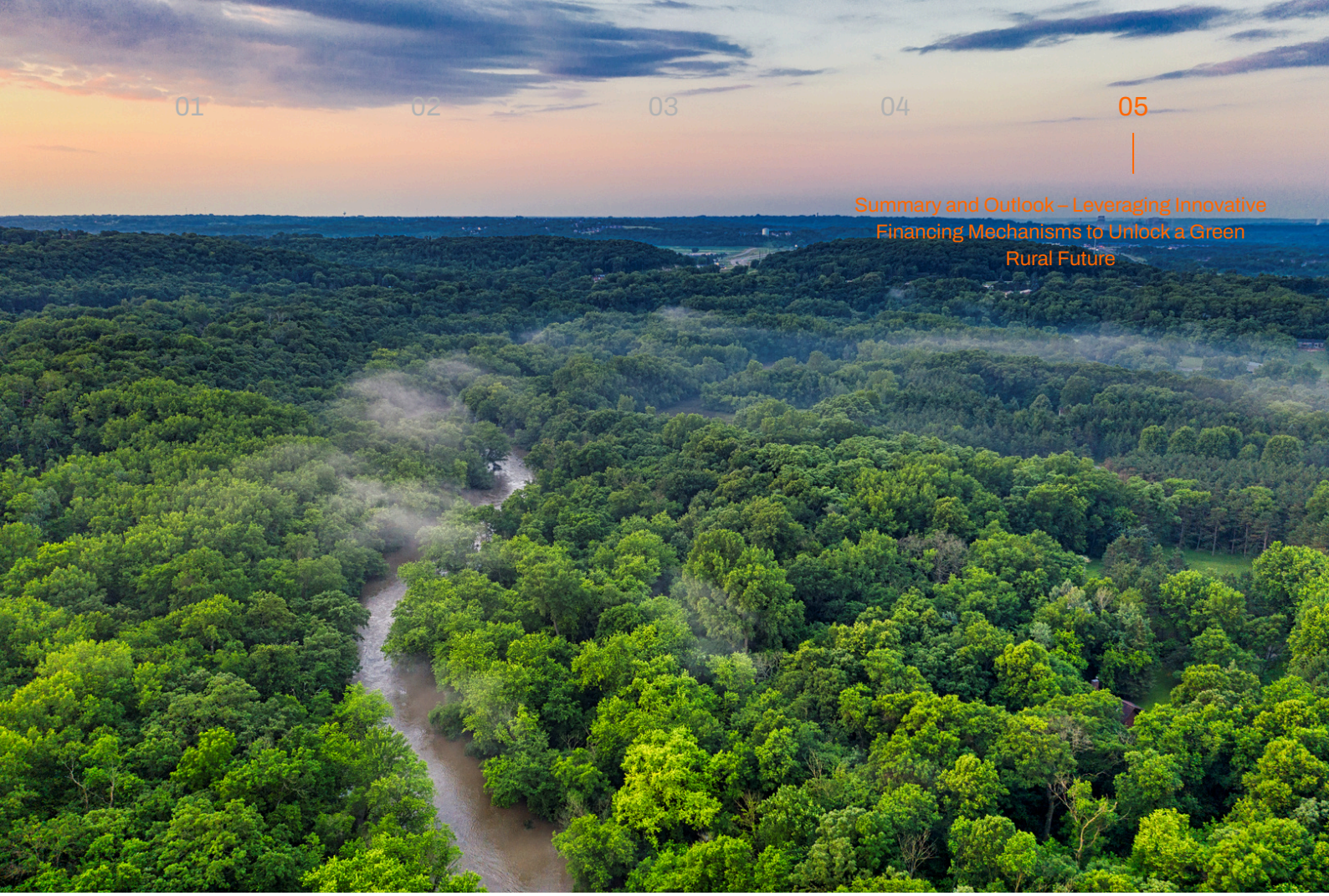

Summary and Outlook – Leveraging Innovative Financing Mechanisms to Unlock a Green Rural Future

Through close engagement with rural China, we have witnessed a quiet but profound transformation: endogenous drivers from villagers, returning youth, women, and grassroots organizations is fueling green practices, with renewable energy at the core. Yet the scale and pace of this transformation are constrained by a persistent tension: the vast green potential of rural areas versus the difficulty of mainstream finance to reach the grassroots effectively.

Our casebook clearly shows that solving this tension does not rely on a single “magic bullet” financial instrument, but on building an **innovative financing mechanism**. At its essence, this means the financing model must be flexible, the sources of capital can be diverse, small-scale projects should not be excluded. Instead, through well-designed risk-sharing and benefit-sharing mechanisms, more capital with “catalytic” and “risk buffer” functions can participate. By doing so, the entry barriers for commercial capital are lowered, and rural renewable energy projects can achieve sustainable development. Among these innovative approaches, **blended financing** stands out as a particularly effective tool.

Guiding Principle: Using Innovative Financing to Overcome the Early-Stage Barriers

Rural renewable energy projects, such as distributed solar PV or small wind farms, often face an early-stage dilemma: high risk, low returns, and long payback periods, which tend to deter commercial investors seeking short-term gains. The essence of an innovative financing mechanism is to leverage diversified funding sources and well-designed risk sharing structures. Policy funds, philanthropic capital, and private sector investment can all play catalytic and risk buffer roles early in the project, significantly lowering the barriers for commercial capital and maximizing capital efficiency. Blended financing is one of the most important forms of such innovation.

Practical Pathway: Building a Collaborative and Win-Win Ecosystem for Multiple Stakeholders

The success of blended financing depends on an "collaboration ecosystem" where diverse actors play complementary roles:

Public sector – Guidance and Risk-Taking

Local governments should serve as rule-makers and initial risk-takers in rural renewable energy development. Going forward, their role can deepen in three ways.

- **Providing continued market certainty.** Through policy design, fiscal subsidies, and concessional loans, governments can mitigate risks and secure returns, they can give commercial investors more confidence to participate and stay engaged.
- **Enhancing market-oriented tools.** By embracing market-driven capital with an open mindset, governments can help create ecosystem where enterprises, investors, and communities make joint contributions and share benefits, achieving win-win cooperation rather than one-way intervention.
- **Strategically aligning rural revitalization with carbon and energy goals:** Integrating renewable energy into broader rural development plans ensures that clean energy contributes meaningfully to the economic, social, and environmental troika.

This refined role emphasizes not just policy guidance, but also the public sector's core value in integrating market-oriented, ecological and strategic objectives, providing stable institutional supports for sustainable rural energy projects.

Philanthropic & Social sector – Empowerment and Linkages

Grassroots organizations deeply embedded in communities act as crucial "trust agents". Their immediate tasks are capacity building (bridging the information gap between renewable energy technology and finance) and demand-matching (identifying community needs and connecting them with external resources). Philanthropic & social capital should prioritize enabling them to launch pilot renewable energy projects. By providing funding, capacity support, and strategic guidance, foundations help local NGOs improve project design, management, and operations. This division of labor ensures that projects remain grounded locally while the support from foundations expands their reach and replicability.

Private sector – Efficiency and Deep Engagement

Renewable energy companies bring technology, equipment, and scaling expertise, while non-energy companies can participate through supply chain finance or CSR investment. Cases like Trina Solar × MYbank show how fintech solutions can reduce financing costs and widen reach, allowing more micro and small businesses to obtain inclusive green credit. The role of private actors is not just profit-seeking—they are co-builders of a rural green future.

Community – Leadership and Beneficiaries

Village collectives, returning youth, and rural women should be the leaders and ultimate beneficiaries of projects. Getting involved through equity participation, employment opportunities, and skills training (including financial health programs), they can enter projects step by step: from low-risk initiation to realizing tangible benefits, and eventually to market-oriented operation. This cycle ensures that green income truly reaches households.

Looking Ahead: From "Project Financing" to "Ecosystem Financing"

China's rural green transition carries significance far beyond emission reduction. It is a co-evolution of the society and economy. The future direction is to move from financing individual projects to financing a thriving ***rural green ecosystem***. We believe the most promising pathway is as follows:

Who: Identify and cultivate more **new rural forces**—returning youth, rural women, village collectives, and local NGOs. They are not merely recipients of funding; they are the driving force behind rural transformation.

What: These rural builders use the resources and support they receive to:

- Launch green enterprises and local renewable energy projects—such as household solar PV, biomass energy, and smart agriculture—integrating renewable energy into diverse application scenarios, including agriculture, industrial processing, tourism, and community life.
- Strengthen community governance, improve rural institutions and public services, and ensure that renewable energy translates into tangible economic, social, and environmental benefits.
- Build innovation and practical capacity, enhance skills in finance, technology and project management, and enable autonomous operation and scaling of local solutions.

How: By designing **innovative risk-sharing tools**: In practice, rural renewable energy risk-sharing does not necessarily rely on complex financial derivatives. More often, it comes from how financing models and organizational mechanisms are designed. Experiences from the above cases show that innovative risk-sharing tools are less about single financial products, and more about co-designed mechanisms: joint community contribution, philanthropy as early movers, and financial institutions offering loans. Together they form a layered risk-sharing system. In addition, **technology can lower barriers and expand reach**, reduce information asymmetry, and allow more rural micro and small enterprises and individuals to access green finance. These "soft" tools are embedded in rural social structures, making them replicable and sustainable.

We have noted the "Three Zeros and One More (Sustainable Villages—Three-Zero Communities with Financial Wellbeing)" project jointly launched by the China Academy of Finance Inclusion and the World Resources Institute in Chengdu, Sichuan. They emphasize that financial health will be a key driver of rural revitalization in China, and grassroots projects like the social innovation initiative in Tianxing Village are included as a pilot. In the future, similar projects should be extended to other rural areas, and we look forward to seeing more mature and supportive pathways emerge to foster rural innovation and entrepreneurship.

Conclusion

China's experience shows that the key to rural renewable energy is not to find a single, massive, perfect source of funding, but to design **an innovative financing mechanism that is both ingenious and inclusive**. With public and philanthropic capital absorbing risks, it is possible to unlock the efficiency of private capital and ultimately empower the endogenous drivers of community actors, mobilizing large-scale social investment at relatively low cost. The result is not only environmental gains, but also economic benefits and greater social equity.

This is a pathway of resilience and vitality that other countries—particularly in the Global South—may find both relevant and inspiring.

APPENDIX

Appendix - Acknowledgements

We would like to express our sincere gratitude to the many industry experts, researchers, and practitioners who generously shared their time, insights, and experience during the preparation of this casebook. Their contributions were invaluable in helping us compile, refine, and enrich the cases.
The following is a list of contributors (in no particular order):

Beibei Gu	GF60
Haoran Zhang	GF60
Xiaoning Shen	Jichuan Communications
Fei Li	Jichuan Communications
Jijiang He	Energy Transition Research Center, School of Social Sciences, Tsinghua University
Peter Knaack	Council on Economic Policies (CEP)
Jennifer Wang	New Energy Nexus
David Fishman	The Lantau Group
Fei Han	Chinese Academy of Financial Inclusion (CAFI)
Xu Hu	Chinese Academy of Financial Inclusion (CAFI)
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Yifu Feng	Energy Foundation China
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Xiaozhen Li	World Resources Institute (WRI) China
Zhenyu Ma	World Resources Institute (WRI) China
Yushi Chen	SJTU-BOC Institute of Technology and Finance, Antai College of Economics and Management, Shanghai Jiao Tong University
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Lu Jiang	Graduate School of Translation and Interpreting, Beijing Foreign Studies University

Main Actors	Type of Capital	Role and Contribution	Notes and Additional Context
Central and Local Governments	Policy-guided capital	- Provide policy support (tariffs, grid priority, subsidies, and facilitation measures such as the "Wind Harnessing Action") - Coordinate land, forest, rooftop and other resources - Offer seed funding or partial subsidies for demonstration projects (e.g., village-grid integration, county-wide programs)	The roles differ across levels of government: the central level is responsible for top-level design, while provinces, cities, and counties focus on implementation and investment promotion. In some areas, governments also promote "village-grid co-construction" or mechanisms linking governments, banks, and enterprises.
State-owned Enterprises (Central SOEs)	Policy-guided capital	- Main investors (especially in utility-scale wind, solar, and agrivoltaic projects) - Lead project development, construction, and operation - Sometimes participate via PPP model	They enjoy stable financing channels and strong capacity for resource integration. Often sign strategic cooperation agreements with local governments and village collectives, and frequently take the lead in county-wide renewable rollout.
State-owned Enterprises (Local SOEs)	Policy-guided capital	- Municipal-level energy groups or local investment companies, tasked with local project construction and operation	Strengthen local fiscal revenues and support energy structure adjustment.
Policy Banks	Policy-guided capital	- Provide long-term, low-interest loans to support demonstration and foundational projects	Policy banks such as the China Development Bank and Agricultural Development Bank mainly provide long-term concessional loans. Their lending is usually tied to government planning, playing the role of a financial "ballast stone."
International Development Institutions (mainly multilateral banks)	Policy-guided capital	- Provide concessional loans, grants, and risk-sharing instruments (e.g., guarantees, blended finance) to support rural energy transition projects aligned with global climate agendas - Channel international carbon markets and climate funds into local projects - Support early-stage studies and capacity building (feasibility reports, planning consultancy, technical training) - Promote joint investment or PPPs with local financial institutions and enterprises	Multilateral development banks are currently the main way international institutions engage with rural renewable energy in China. They rarely cover full project financing, but play a leveraging role by lowering risk and cost in collaboration with the Ministry of Finance, NDRC, local governments, policy banks, and commercial banks. They also introduce advanced governance standards such as ESG safeguards and carbon accounting, helping local projects align with international norms.
State-owned Commercial Banks	Policy-guided + market-driven capital	- Provide large loans for utility-scale renewable projects - Under policy pressure, extend inclusive finance to rural projects	Examples include ICBC and the Agricultural Bank of China. They balance policy guidance with commercial interests, and often cooperate with local governments and SOEs.

National and Local Commercial Banks	Market-driven capital	- Focus on cash flow and risk assessment, support distributed power stations and village-level projects	National banks focus heavily on project cash flow and risk assessment, often using guarantee companies to share risk. Local rural commercial banks and village banks are closer to grassroots needs and maintain strong trust relationships with villagers.
Non-bank Financial Institutions (securities firms, insurers, leasing companies, asset managers)	Market-driven capital	- Participate through bonds, green insurance, leasing, and other instruments	They can design structured finance and risk-hedging solutions. But their entry into rural projects often requires policy incentives and strong project pipelines.
Internet Banks and Fintech Platforms	Market-driven capital	- Use big data and digital risk controls to provide microloans and supply-chain finance	Examples include WeBank and AntChain, which have started exploring loans for household solar systems and equipment financing.
Local Financial Organizations	Market-driven capital	- Guarantee companies and rural microcredit providers help village collectives and farmers obtain financing	Their strength lies in being “grounded” and trusted locally. But their funding scale is limited, and interest rates are usually higher than bank loans.
Private Enterprises	Market-driven capital	- Equipment suppliers, developers, or EPC contractors invest directly or co-invest with village collectives	Particularly active in distributed, household, and rooftop commercial solar. Flexible but weaker than SOEs in financing capacity. Foreign companies generally participate through joint ventures with local partners or governments, often creating a project SPV to operate and finance projects.
Village Collectives	Market-driven capital (self-raised, with public attributes)	- Contribute land or rooftops through leasing or equity - Join joint ventures with enterprises (“village-enterprise co-investment”) - Earn rental income, dividends, or operating revenue	Village collective funds are not purely market-driven; they clearly aim to solve community needs. Collectives are highly motivated, with diverse participation models—cooperatives, collective companies, or joint platforms with third parties—making them essential to project sustainability at the village level.
Domestic and International Foundations and Nonprofits	Philanthropic and social capital	- Provide seed funding and capacity building - Promote community participation and socially oriented projects	Usually enter through grants or nonprofit projects, emphasizing co-benefits such as emissions reduction, poverty alleviation, or education. While limited in scale, they often play a “filling” or “empowering” role in rural projects. They may also collaborate with international institutions or corporate CSR funds to pool resources.

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Contact Us

www.newenergynexus.cn

hellochina@newenergynexus.com

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