



绿色小水电助力乡村 振兴的新昌实践

Green Small Hydropower Promotes Rural Revitalization in
Xinchang County

浙江省新昌县水利水电局
Xinchang Water Conservancy and Hydropower Bureau, Zhejiang Province

2023年9月

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01

新昌概况

Overview of Xinchang

新昌县始终坚持“绿水青山就是金山银山”的理念，深入贯彻习近平总书记在浙江工作期间到新昌调研提出的“**实现与人协调、与环境和谐发展**”指导方向。

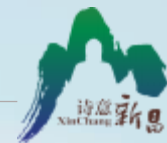
Guided by the concept of "Lucid waters and lush mountains are invaluable assets", Xinchang always carries out the guiding direction of "realising harmonious development in coordination between people and the environment" proposed by President Xi Jinping's research in Xinchang during his work in Zhejiang.

坚持“**节水优先、空间均衡、系统治理、两手发力**”的治水思路，探索出了一条生态优先、绿色发展、人水和谐的特色治水兴水之路。

Adhering to the water control policy of "water saving priority, spacial balance, systematic management, and two-handed efforts". Xinchang has explored a characteristic water management and development road of ecological priority, green development, and human-water harmony.



01 新昌概况 Overview of Xinchang



新昌县位于浙江省东部，钱塘江流域曹娥江上游。县域面积1213平方公里，人口42万，是“唐诗之路、佛教之旅、茶道之源”的精华地所在，李白《梦游天姥吟留别》中的天姥山便坐落于此。是全国百强县、全国生态文明建设示范县、全国“两山”发展百强县、国家级生态县。

Xinchang is located in the east of Zhejiang Province, upstream of Cao'e River in Qiantang River Basin. With an area of 1,213 square kilometres and a population of 420,000, Xinchang is the essence of the Tang Poetry Road, Buddhist Journey and Tea Trail, where Tianmu Mountain, which is featured in Li Bai's Mount Skyland Ascended in a Dream, is situated. Xinchang is one of the top 100 counties in China, a national ecological civilisation construction demonstration county, one of the top 100 counties in the development of Two Mountains Theory, and a national ecological county.



02

实践背景

Practical background



新昌县域境内流域面积1209平方公里，大小支流73条，河网密度0.38公里/平方公里。有大中小型水库124座，总库容5.32亿立方米。山区地貌上下游高差较大，水力资源丰富，多年平均降水量1519.9毫米，多年平均总水资源量9.8亿立方米。水力资源理论蕴藏量达7.28万千瓦，可开发总量6.15万千瓦，居浙江省前列，具有发展小水电的天然优势。

The river basin in Xinchang County covers an area of 1,209 square kilometres with 73 tributaries and the density of river network of 0.38 kilometres per square kilometre. There are 124 large, medium and small reservoirs with a total capacity of 532 million cubic metres. The mountainous terrain has a large difference in height between the upper and lower reaches, and has rich hydropower resources, with average precipitation and total water resources of up to 1,519.9 millimetres and 980 million cubic metres respectively. In addition, the theoretical reserves of hydropower resources can amount to 72,800 kilowatts, and the total amount can be developed up to 61,500 kilowatts, ranking in the forefront of Zhejiang Province, which makes it advantageous in developing small hydropower.

新昌小水电发展史：

History of small hydropower development in Xinchang :

1956年

以水系为脉络，阶梯式建设小水电站。

In 1956, small hydropower stations were built in steps based on the water system.

1983年

被国务院列为第一批一百个农村电气化试点县之一。

In 1983, Xinchang was listed by The State Council as one of the first 100 pilot counties for rural electrification.

1986年

共建成电站227座，装机容量约31000kW，被评为“中国小水电之乡”。

In 1986, a total of 227 power stations were built with installed capacity of about 31,000 kW, and was rated as “the township of small hydropower in China” .

1990年

实现小水电发供电超亿度，成为县内主要供电能源和重要民生水利基础设施。

In 1990, Xinchang has achieved more than 100 million kilowatt hour of power generation and supply by small hydropower, becoming the main power supply energy and important water conservancy infrastructure for people's livelihood.

2023年

共有小水电102座，装机容量60660kW，多年平均发电量为1.5亿度，约占全县用电量的5.5%。

At present, there are 102 small hydropower plants in Xinchang, with an installed capacity of 60,600 kW. The average annual power generation is 150 million kWh accounting for about 5.5% of the county's electricity consumption.

全县54%投产25年以上的老旧电站普遍存在：

设备设施老化、管理落后、利润微薄、缺少技改资金等困境。

54% of the county's old power stations that have been in operation for more than 25 years generally suffer from ageing equipment and facilities, backward management, meagre profits, insufficient funding for technological upgrading.



困境与形势 Dilemma and situation



碳达峰碳中和战略及应对国内绿色转型需求、国际市场“绿色壁垒”的挑战。

The national implementation of the Peak Carbon and Carbon Neutral Strategy, the demand for domestic green transformation and the challenge of “Green Barriers” in the international market.

03

主要做法和成效

Key practices and effectiveness

新昌县以小水电资产整合为基础，大力实施水电站报废重建（生态改造）和技术改造项目，积极试验推广新技术新设备，优化电站管理模式，助力乡村振兴。

Based on the integration of small hydropower assets, Xinchang implements hydropower station scrapping and reconstruction (ecological renovation) and technical renovation projects vigorously, tests new technologies and equipment actively, optimises the management mode of power stations, and promotes Rural Vitalization.

01

以管理为抓手
优化运行体系

Optimising the operating system
by management

02

以改造为手段
实现技术升级

Technological upgrading
through renovation

03

以共富为目标
助推乡村振兴

Aiming for Common
Prosperity to promote Rural
Vitalization

一、突出顶层设计：

Firstly, highlight the top-level design:

- 小水电资产整合作为2022年“促进共同富裕”十大标志性工程之一，投资**1.43亿元**，成立县专项领导小组统筹协调电站资产整合工作，提供政策处理支持；成立新昌县绿色能源发展有限公司，作为项目运营平台，上下联动、点面结合、统筹推进，仅用**8个月**就完成了**31座**电站的资产整合。
- As one of the ten landmark projects of Promoting Common Prosperity in 2022, Xinchang has invested 143 million yuan in the integration of small hydropower assets. At the same time, headed by the county government leaders in charge, a special county leading group and daily offices were set up to coordinate the integration of power station assets and provide policy processing support. In addition, Xinchang Green Energy Development Co., Ltd. was established as the project operation platform. Through the up-and-down linkage and point-to-point work mode, it took only 8 months to complete the integration of 31 power stations.



二、突出规范管理：认真贯彻浙江省水利厅提出的“二不八有”创建目标，制定三年提升计划并开展创建，积极推动1000kW以下水电站开展“两不”“八有”管理提升。

Secondly, highlight normative management. Conscientiously implement the "two noes eight have" creation goal put forward by the Zhejiang Provincial Water Resources Department, formulate a three-year enhancement plan and carry out the creation, and actively promote the "two noes" and "eight have" management improvement of hydropower stations under 1000kW.



“两不”即不存在重大安全隐患、不存在住宿与生产、仓储、经营等混合设置在同一空间内的场所；

"two noes": no major hidden safety risk and no venues where accommodation is mixed with production, storage and business in the same space.



“八有”即有人员、有经费、有制度、有记录、有鉴定检测、有标志标识、有防护措施、有应急管理。

"eight have": personnel, funds, systems, records, identification and testing, signs and markings, protective measures, emergency management

浙江省水利厅文件

浙水水电〔2023〕1号

浙江省水利厅关于开展1000千瓦以下小水电站“两不”“八有”创建工作的通知

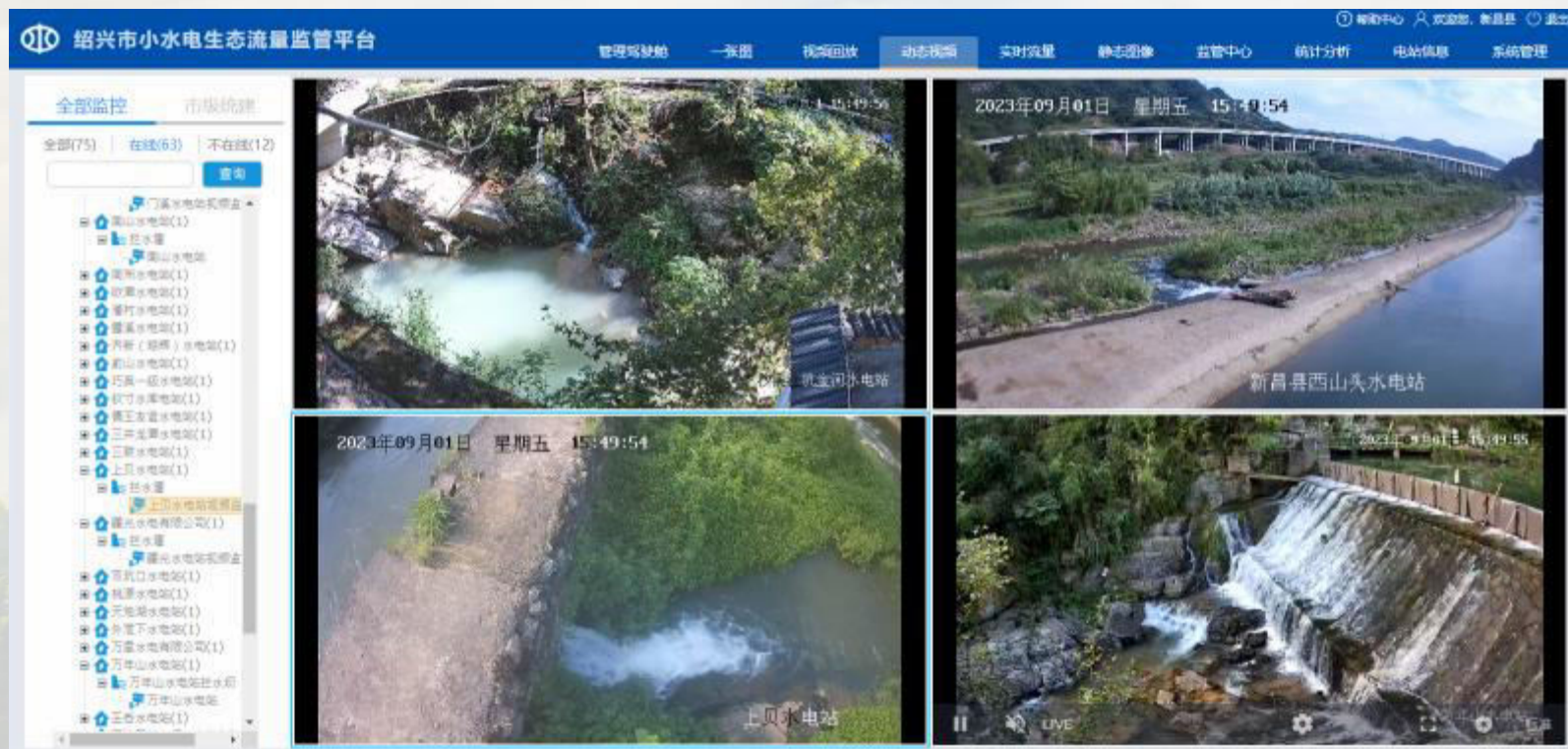
各有关市、县（市、区）水利（水电、水务）局：

为落实党中央、国务院关于长江经济带发展战略，巩固小水电清理整改工作成效，落实水利部《关于推进水利工程标准化管理的指导意见》（水运管〔2022〕130号）和《浙江省水利厅等五家单位关于进一步加强小水电管理工作的通知》（浙水水电〔2020〕25号）文件精神，守住小水电站安全生产底线，决定对全省单机装机1000千瓦以下的农村水电站开展“两不”“八有”创建工作。



二、突出规范管理：实施最严格小水电生态流量泄放监管，建设生态流量泄放监测设施。

Secondly, highlight normative management. Xinchang will implement the strictest regulation of ecological flow discharge, build monitoring facilities.



实现100%实时监测率，治理减脱水河段100%恢复河道生态。
Achieve a 100% real-time monitoring rate, and restore river ecology in 100% of the treated dewatered river sections.



绿色小水电示范电站

中华人民共和国水利部
二〇二〇年一月

农村水电站安全生产标准化

一级单位

中华人民共和国水利部
二〇一六年四月

三、突出安全创建：重视电站安全生产标准化管理

Thirdly, stress demonstration leading. Pay attention to the standardised management of power station safety.

2018年以来已成功创建绿色小水电示范电站**6座**。

Since 2018, 6 green small hydropower demonstration stations have been built successfully.

2014年以来，我县装机容量1000kW以上水电站**100%**完成安全生产标准化创建，500-1000kW水电站**100%**完成标准化三级创建。

Since 2014, all hydropower stations with an installed capacity of more than 1,000kW in Xinchang have completed the creation of production safety standardisation, and all 500KW-1,000kW hydropower stations have completed the creation of standardisation level 3.

03 主要做法和成效-改造 Key practices and effectiveness-transformation



一、整合提升：在电站整合过程中，坚持整合与提升相结合。

Firstly, integration and elevation. In the process of power station integration, we insist on combining integration and upgrading.



实施报废重建和现代化、生态化改造，推进设备更新换代、自动化控制等建设。 Implementing scrapping and reconstruction and modernisation as well as ecological transformation, and promote the construction of equipment upgrading and automation control.



第一批完成整合的21座水电站，改造重建后，装机容量**增加30%**，发电收入**增加近50%**，有效提高水能资源利用率和水电站经济效益。

Through rehabilitation and reconstruction, the first batch of 21 hydropower stations to be integrated increased their installed capacity by 30% and power generation revenues by nearly 50%, which significantly enhances the efficiency of the power stations.

03 主要做法和成效-改造 Key practices and effectiveness-transformation



二、技术升级：引进国内首台直驱型变速改造的水电机组进行项目试点，创新性地将全功率变流器（FSC）发电技术引入到小水电技术改造中。

Secondly, technological upgrading. We introduced the first domestic direct-drive variable-speed transformation of hydropower units for the project pilot, and innovatively introduced FSC technology into the small hydropower technology transformation.



国内首台直驱型变速改造的水电机组
the first domestic direct-drive variable-speed transformation of
hydropower units

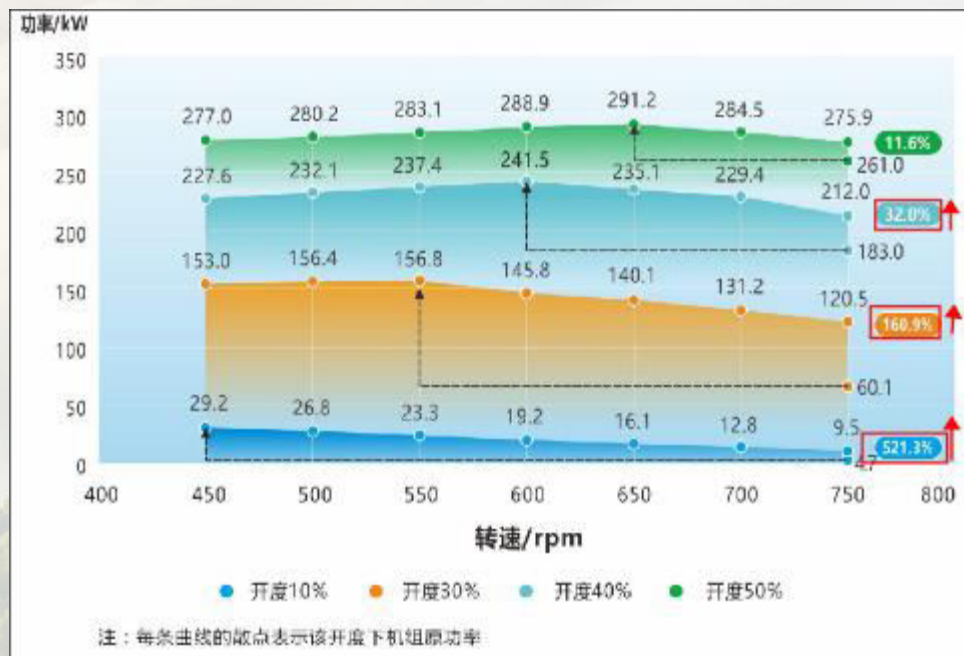


藏潭桥水电站屋顶光伏现场图
Roof photovoltaic scene of Zangtanqiao Hydropower Station



二、技术升级：改造后在低开度和水流变化剧烈的情况下，发电效率提升明显。

Secondly, technological upgrading. After the transformation in the low-opening and water flow changes under the circumstances of severe, significant improvement in the efficiency of power generation.



- 改造后电能质量明显提升，无功问题得到解决，发电效益提升20%左右；
After the transformation, the power quality is significantly improved, which helps solve the reactive power problem, and the power generation efficiency is improved by about 20%.

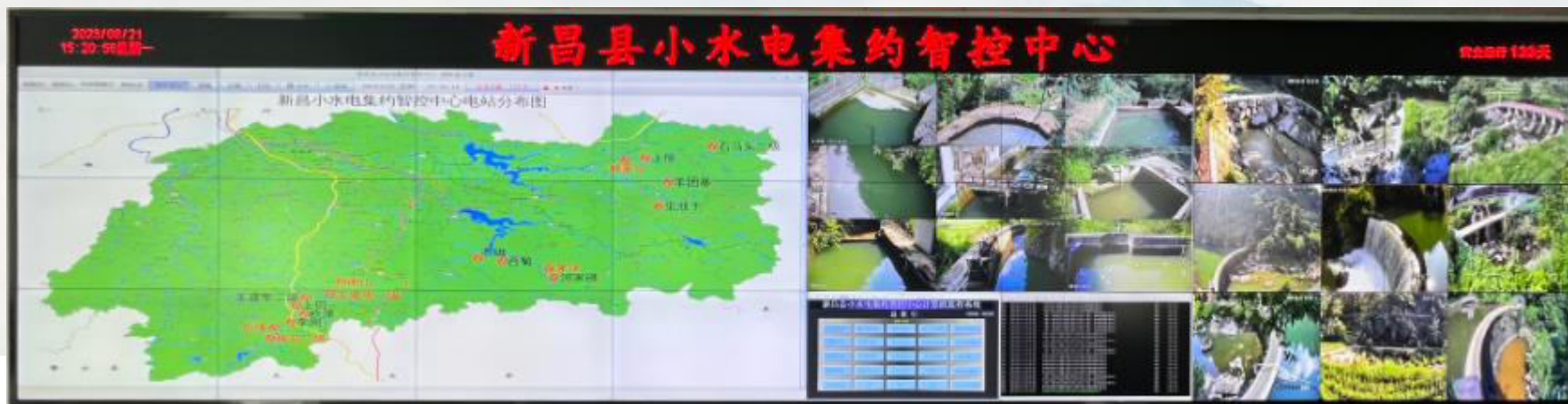
- 项目总结提炼的“小型水电站变速恒频改造规程”目前正在申请浙江省电力行业协会团体标准。

Currently, the "small hydropower station variable speed and constant frequency transformation procedures" summarised and refined in the project is applying for group standards of Zhejiang Electric Power Industry Association.

低水位功率转速实测图 Low water level power rotation speed measured map

三、智慧监管：投资500万元建设高标准现代化小水电集约智控中心

Thirdly, smart regulation. Invested 5 million yuan for the construction of a high-standard modern small hydropower intensive intelligent control centre.



通过对小水电站进行远程智能控制，掌握安全生产、生态流量智慧监管，形成“一屏管理、一键控制、无人值守”的“智慧化、标准化、集约化”管理体系。全县已有**40%**电站完成自动化提升，减少电站劳动用工**80%**，5年内将全县电站纳入集约智控中心管理。

Through the remote intelligent control of small hydropower stations, we can master safety production, ecological flow intelligent supervision, and the intelligent, standardised and intensive management of "one screen management, one key control, unattended watching" can be achieved. Currently, 40% of the power stations have completed automation upgrades, reducing power station labour by 80%. We plan to incorporate all power stations into the management of the Intensive Intelligent Control Centre within five years.

一、促进集体增收：

Firstly, Promoting collective income generation:

增收模式

整合投资模式 Integrated investment model

电站转让后，村集体将整合资金投入到的推荐的投资平台，获取**6%**的年化收益，村集体经济收入可增长利润**115%**； After the transfer of the power station, the village collective can invest the integrated acquisition funds into the investment platform of Xinchang Investment and Development Group, obtaining an annualised return of 6%, and collective economic income of villages can increase profits by 115%.

项目分红模式 Project bonus model

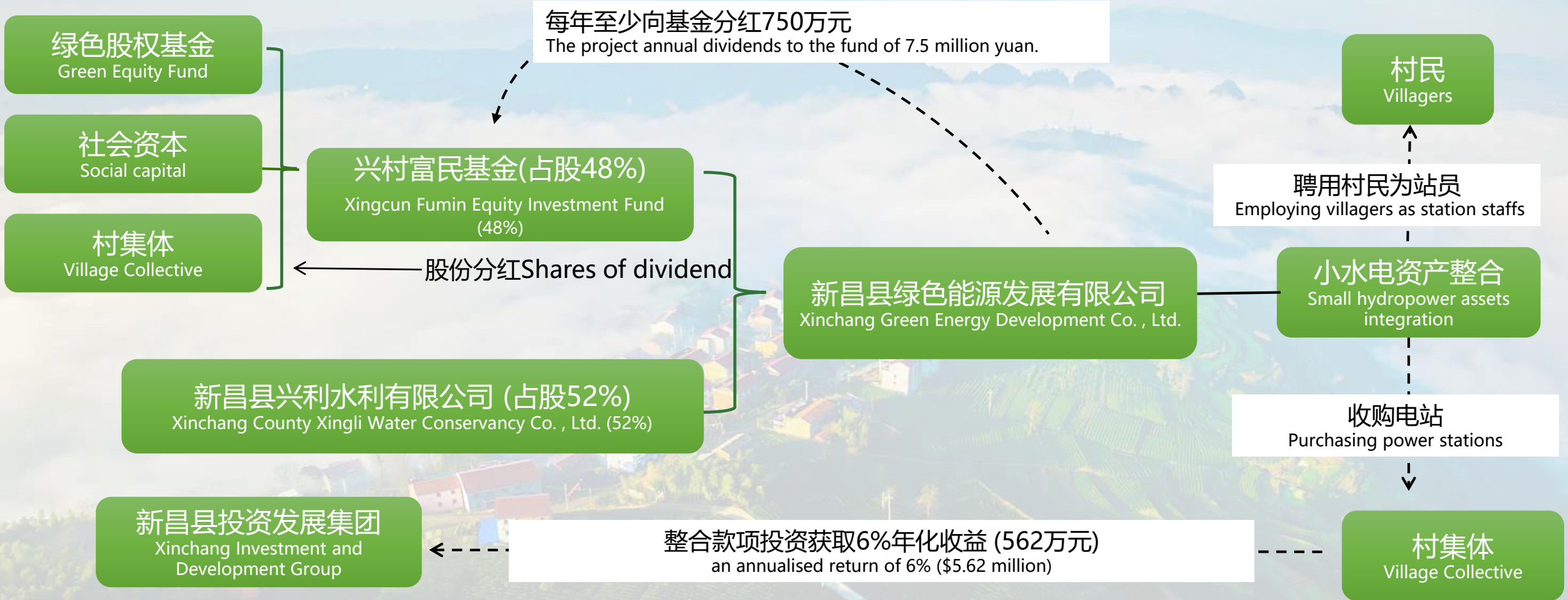
村集体入股兴村富民基金享受分红，项目每年向基金分红**750万元**，最多的村集体年增收**10万元**以上； The village collective enjoy dividends from Xingcun Fumin Equity Investment Fund. The project annual dividends to the fund of 7.5 million yuan, and the largest village collectives can increase their annual income by more than 100,000 yuan.

就地务工模式 Local labour force model

聘用周边村民从事渠道巡查、电站值守等工作，每人每年可增收**3万元以上**。
We integrate the jobs generated and give priority to employing villagers around the power station to engage in channel inspection, power station guarding and other jobs. each person can increase their income by more than 30,000 yuan per year.

03

主要做法和成效-共富 Key practices and effectiveness-common prosperity



村集体增收流程图

Revenue flow chart of village collective

二、拓宽转化渠道：与国际小水电中心合作，探索建立水电生态产品系统价值(GEP)评估体系，开展国际可再生能源证书 (I-REC) 的注册、签发和交易。

Secondly, broadening the Transformation Channel. Cooperating with the International Centre on Small Hydro Power (ICSHP) to explore how to establish a GEP assessment system and carry out the registration, issuance and trading of I-REC.



- **该项目成功入选浙江省水利厅改革试点**

The project was also successfully selected as a pilot reform project of Zhejiang Water Resources Department.

- **生态价值转换——可融资授信规模达20亿元**，用于发展水电、保护生态，构建和谐共生、造福于民的新生态水电格局。

The ecological value assessment can be financed with credit of up to 2 billion yuan for the development of hydropower, ecological protection, and the construction of a new ecological hydropower pattern of harmonious coexistence for the benefit of the people.

二、拓宽转化渠道：为出口企业产品进入国际市场和获得“碳关税”减免奠定了基础，拿到了进入国际能源交易市场的金钥匙。

Secondly, broadening the Transformation Channel. It lays the foundation for export enterprises to enter the international market and obtain carbon tariff relief, which is equivalent to getting the key to enter the international energy trading market.



国际绿证

Renewable Energy Certificate

- **国际绿证交易**——第一批8座电站可申请国际绿证**2.2万张**，若实现全县水电能源统筹，按平均年发电量1.5亿度估算，可申请国际绿证**15万张**，实现了小水电生态产品的价值增益。

The first batch of eight power stations can apply for 22,000 I-RECs, which means that according to the estimation of an average annual power generation of 150 million kWh, if Xinchang's hydropower energy coordination is realised, 150,000 I-RECs can be applied for, achieving value gains from small hydropower eco-products.

三、强化用电保障：通过控制龙头电站，第一时间调控**2万余**千瓦装机容量顶峰发电，缓解电网用电压力，保障平稳有序供电。

Thirdly, strengthen electricity security. By controlling a number of leading power stations, more than 20,000 kilowatts of installed capacity can be regulated at the first time for peak power generation, relieving pressure on the power grid and guaranteeing a smooth and orderly supply of electricity.



门溪电站 Menxi power station



长诏电站 Changzhao power station



钦寸电站 Chinchon power station

04

展望未来

Look forward to the future

随着全球对气候变化和环境污染的关注度不断提高，清洁能源的需求和市场份额不断增长。小水电作为清洁能源的代表之一，将在未来能源发展和乡村振兴中扮演重要角色。

With the increasing global concern about climate change and environmental pollution, the demand and market share of clean energy is growing. As one of the representatives of clean energy, small hydropower will play an important role in future energy development and rural vitalization.



续写绿色生态可持续发展新篇章

continue writing a new chapter of green ecological sustainable development



- 下一步，新昌县将积极实施流域生态水电示范区建设，从整合微型电站、创新智慧管理模式、加强生态调度、探索生态价值等方面，进一步加大改革力度，创建出一批有辨识度的标志成果，形成电站绿色、流域绿色、区域绿色的水电发展新格局。
- In the future, Xinchang will actively implement the watershed ecological hydropower demonstration zone construction. From integrating micro power stations, innovating intelligent management mode, strengthening ecological scheduling, exploring ecological value, etc., Xinchang will further intensify reforms, create a number of recognisable logo outcomes, form a new pattern of hydropower development with green power stations, green river basin and green region.



THANKS
谢谢您的观看

