



ADB

People's Republic of China: Air Quality Improvement in the Greater  
Beijing-Tianjin-Hebei Region—Henan Cleaner Fuel Switch Investment Program

中华人民共和国：京津冀及周边地区空气质量改善 - 河南省清洁燃料转换投资项目

以煤改气为基础，构建绿能、生物质多元能源发展体系带动乡  
村能源革命，支撑乡村振兴

Building a Diversified Energy Development System with  
Green Power、Biomass Based on the Coal-to-gas Program  
Promoting Rural Energy Revolution and Supporting Rural  
Revitalization

14 June 2023  
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01

# 项目背景

## Program Background



# 贷款项目实施背景

## Background of the Loan Program

01

为打造全省范围天然气管道，河南省政府启动了清洁燃料转换投资计划，该计划旨在建立以县域为基础的分布式供气网络，在80个经济不发达、地理上比较分散的县域达到450万用户，在工业、商业和家庭能源使用方面，加快工业、商业及家庭能源燃料从煤炭到天然气和沼气的转换进程、形成多样化清洁能源供应格局。

In order to build a province-wide natural gas pipeline, the provincial government launched the Cleaner Fuel Switch Investment Program, which aims to establish a county-based distributed gas supply network serving 4.5 million customers in 80 economically underdeveloped and geographically scattered counties, accelerating the switch from coal to natural gas and biogas in industrial, commercial and household energy consumption and developing a diversified clean energy supply.

02

尽管主要城市中心天然气消费量迅速增长，但由于负担能力有限，且很难改变使用传统燃料的习惯，天然气的使用仍未覆盖到河南城乡接合部的大部分家庭。其原因主要是由于负担能力有限，以及私营部门和公共部门投资意愿较低，且向居住分散的乡镇人口提供天然气服务的投资成本也比较高。

Despite the rapid growth of natural gas consumption in major urban centers, most households at the rural-urban fringe of Henan Province are still not covered by natural gas due to limited affordability and difficulties in changing their habits of using traditional fuels. The main reason lies in limited affordability, which is a result of low willingness of the private and public sectors to invest and high investment costs in providing natural gas services to scattered township populations.

03

为确保在河南省内，地理上比较分散的乡镇和农村地区450万用户清洁燃料转换计划，长期投资需求提供可持续资金，本项目采用亚洲开发银行的结果导向型贷款（RBL）模式。ADB的RBL项目将为2019-2030年总体投资项目2019-2023时段项目提供资金支持。RBL项目根据河南省过去天然气输配管网投资经验而设计，全面解决扩大清洁燃料供应的重大挑战。

To ensure sustainable funding for the long-term investment needs of the Cleaner Fuel Switch Program for 4.5 million customers in geographically dispersed townships and rural areas within Henan Province, Greater BTH Region, ADB's Results-based Lending (RBL) was adopted for the Program. ADB's RBL program will provide financial support for the Program from 2019 to 2023 among the 2019-2030 overall investment program. The RBL program is designed based on the province's past experience in investing in natural gas distribution networks and comprehensively addresses major challenges to expanding cleaner fuel supply.



02

## 项目实施情况

### Basic Information of Program Implementation





People's Republic of China: Air Quality Improvement in the Greater Beijing–Tianjin–Hebei Region—Henan Cleaner Fuel Switch Investment Program  
 中华人民共和国：京津冀及周边地区空气质量改善 - 河南省清洁燃料转换投资项目

**谈判**  
**Negotiation**



在河南省财政厅的大力支持下，豫资控股集团积极与亚行对接，2019年3月至9月，亚行团队先后5次到郑州对项目进行实地考察，同年12月，该项目获批亚行2.69亿欧元贷款，用于支持河南省乡村清洁能源发展和大气环境改善。

With the strong support of the Henan Finance Department, ZYIG actively cooperated with ADB. From March to September 2019, the ADB team visited Zhengzhou five times to conduct field investigations of the Program. In December of the same year, the Program was granted a loan of EUR 269 million from ADB to support the development of rural cleaner energy and the improvement of the atmospheric environment in Henan Province.

**签约**  
**Signing**

2020年5月26日，中华人民共和国与ADB签订《贷款协定》，及与河南省政府签订《项目协议》。本项目从上报到批准，仅用了9个月时间，创造亚行同类能源项目最快审批记录，2020年11月，该项目完成首期成果验证工作。

On May 26, 2020, the Government of the People's Republic of China signed the *Loan Agreement* with ADB and the *Program Agreement* with HPG. This project only took 9 months from reporting to approval, creating the fastest approval record for adb energy projects. In November of the same year, the first phase of outcome verification of the Program was completed.



**验证及支付**

**Verification and Payment**



2021年3月，河南省财政厅与豫资控股签订《再转贷协议》，2020年至2022年，两级项目办在河南省财政厅及发改委的支持下，克服重重困难，顺利完成三次验证及提款报账工作，提款金额累计10337万欧元。

In March 2021, the Henan Finance Department and ZYIG signed the *Re-onlending Agreement*. From 2020 to 2022, the two-level Program Offices, with the support of the Henan Finance Department and HPDRC, overcame many difficulties and successfully completed three verifications and withdrawals for reimbursement, with a total withdrawal amount of EUR 103.37 million.

# 项目实施机构介绍

## Introduction to Program Implementing Agency

**中原豫资投资控股集团有限公司**  
Zhongyuan Yuzi Investment Holding Group Co., Ltd.



中原豫资投资控股集团有限公司成立于2011年，是河南省政府为支持全省新型城镇化建设，促进城乡一体化发展，批准由河南省财政厅独资成立的省级投融资公司。2017年3月，省政府明确集团公司为省属功能类企业。2014年12月以来，豫资控股积极拓宽融资渠道，创新融资模式。经省政府批准，开展航空基地、新能源的开发和应用、工业互联网的应用和智慧医疗与高端器械战略引进，文化旅游、教育康养、重大工业和科技园区、特色小镇直接投资，努力打造成为中原地区有实力的产业投资平台，有特色的国有资本投资运营公司。截至2022年底，集团合并总资产4000亿元，国内评级AAA、国际评级A2（穆迪）、A（惠誉），也是省内唯一拥有3个AAA主体的集团公司。

Founded in 2011, Zhongyuan Yuzi Investment Holding Group Co., Ltd. (ZYIG) is a provincial investment and financing company approved by Henan Provincial Government (HPG) and solely funded by Henan Finance Department to support the construction of new-type urbanization and promote the urban-rural integration in Henan Province. The HPG identified the Group as a provincial special-function enterprise in March 2017. Since December 2014, ZYIG has actively expanded financing channels and innovated financing modes. With the approval from the HPG, it has carried out the development and application of aviation base and new energy, application of industrial Internet, the introduction of intelligent healthcare and high-end medical instruments, and direct investment in cultural tourism, education and wellness, major industrial and SciTech parks and characteristic towns. It strives to be a competent industrial investment platform in the Central Plain area and a characteristic state-owned capital investment and operation company. By the end of 2022, the Group, with consolidated assets of CNY 400 billion, owns a domestic rating of AAA, international rating of A2 (Moody), and international rating of A (Fitch), and is also the only group with 3 AAA subjects in Henan Province.



**河南豫天新能源有限公司**  
Henan Yu-Tian New Energy Co., Ltd.



豫天新能源  
YUTIAN NEW ENERGY

为深刻践行河南省委省政府《河南省乡村振兴战略规划》的相关要求，推进农村基础设施提档升级，优化省内乡镇能源供给结构，构建全省清洁低碳、安全高效的现代农村能源体系，2018年6月，省属功能性企业中原豫资投资控股集团有限公司与天伦燃气控股有限公司联合共同发起设立总规模100亿元的“河南豫资天伦新能源投资基金”并成立投资运营实体河南豫天新能源有限公司(简称“豫天新能源”)，作为实施绿色能源双碳战略的载体。目前拥有气化乡村、生物质气、分布式光伏三大业务板块。在河南省拥有覆盖200万户天然气用户，铺设天然气管网3万余公里。

To deeply implement the relevant requirements of *Henan Provincial Strategic Planning for Rural Revitalization* issued by the CPC Henan Provincial Committee and the HPG, promote the upgrading of rural infrastructure, optimize the rural energy supply structure in the province, and build a clean, low-carbon, safe and efficient modern rural energy system in the province, in June 2018, Tian Lun Gas Holding Limited and Zhongyuan Yuzi Investment Holding Group Co., Ltd., a provincial functional enterprise, jointly initiated the establishment of "Henan Yuzi Tianlun New Energy Investment Fund" with a total scale of CNY 10 billion and established the investment and operation entity Henan Yu-Tian New Energy Co., Ltd. (hereinafter referred to as "YTNE") as a carrier to implement the "carbon peaking and carbon neutrality" strategy of green energy. At present, it has three business sectors: gas penetration in rural areas, biogas, and distributed photovoltaic. It has covered 2 million natural gas customers and laid more than 30,000 kilometers of natural gas pipelines in Henan Province.

**河南省天伦投资控股集团有限公司**  
Henan Tian Lun Investment Holding Group Co., Ltd.



天伦燃气集团创立于2002年，旗下天伦燃气控股有限公司（股票代码：01600.HK）于2010年在香港联交所主板上市，目前已发展成为中国领先的城市燃气运营商。在乡村振兴和“双碳”目标两大国策引领下，天伦燃气集团携手中原豫资投资控股集团，布局气化乡村，引入战略股东珠海港控股集团，发展绿色能源，目标成为中国一流的绿色低碳能源供应及服务商。

Tian Lun Gas Group was founded in 2002, and its subsidiary Tian Lun Gas Holding Limited (stock code: 01600.HK) was listed on the main board of the Hong Kong Stock Exchange in 2010, and has now developed into a leading city gas operator in China. Guided by two national policies, i.e. rural revitalization and "carbon peaking and carbon neutrality" goals, Tian Lun Gas Group, together with Zhongyuan Yuzi Investment Holding Group, has promoted gas penetration in rural areas and invited a strategic shareholder, Zhuhai Port Holdings Group, to develop green energy, aiming to become a first-class green and low-carbon energy supplier and service provider in China.

天伦燃气集团践行“扎根河南，走向全国”的发展战略，业务涵盖城市燃气、气化乡村、绿色能源、健康生活四大板块。目前，已在中国16个省区战略布局。截至2022年12月，在全国拥有69个城市燃气项目，为490万户城乡居民、3.57万家工商企业用户提供燃气服务，覆盖人口约1,500万人，累计敷设运营中高压输气管道8,606公里，拥有51座已投运的加气站、1个LNG工厂、6条已投入运营及在建长输管线，2021年公司运营及代输业务共分销天然气27.55亿立方米。

Tian Lun Gas Group adheres to the development strategy of "taking root in Henan and going national" and operates businesses covering four major sectors: urban gas, gas penetration in rural areas, green energy, and healthy life. At present, it has realized the strategic layout in 16 provinces including Henan, Hebei, Jilin, Shandong, Shaanxi, Gansu, Hunan, Fujian, Guangdong, Guangxi, Sichuan, Yunnan and Qinghai. As of December 2022, it owns 69 urban gas projects nationwide, and provides gas services for 4.9 million urban and rural residents and 35,700 industrial and commercial enterprise customers, covering a population of about 15 million. A total of 8,606 kilometers of medium and high-pressure gas pipelines were laid and operated. The Company owns 51 gas stations in operation, 1 LNG plant, and 6 long-distance pipelines in operation and under construction. In 2021, the Company has a natural gas distribution of 2.755 billion m<sup>3</sup> in its operation and agency business.

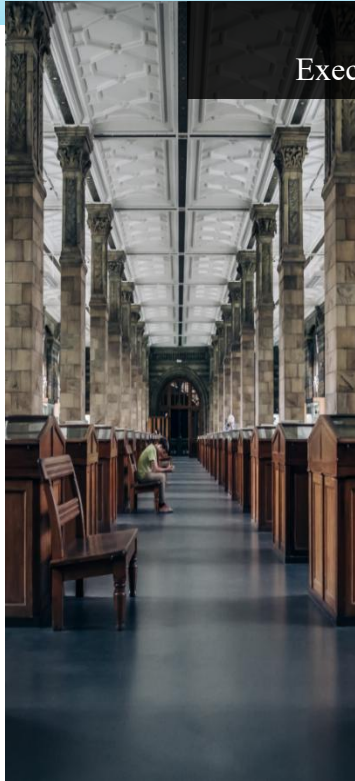




# 项目执行机构及实施机构



执行机构  
Executive agency



中华人民共和国河南省财政厅  
Henan Finance Department, the People's Republic of China

根据亚行对项目的要求，加强项目的执行和管理，本项目设置两级项目办公室管理项目实施与建设  
According to the requirements of ADB for the project, it is necessary to strengthen the program implementation and management. A two-level program office will be set up for the Program to manage the program implementation and construction

### 中原豫资投资控股集团有限公司亚行项目管理办公室

豫资控股集团于2019年成立了亚行贷款项目领导小组（以下简称“领导小组”）。领导小组由豫资控股集团主要领导及政府相关部门领导组成。领导小组负责对项目重大事项进行决策，解决与项目相关的重大政策性问题，协调各有关部门共同做好项目准备、执行和管理工作。  
ZYIG established the ADB Loan Program Leadership Team (hereinafter referred to as "Leadership Team") in 2019. The Leadership Team consists of the main leaders of ZYIG and the leaders of relevant government departments. The Leadership Team is responsible for making decisions on major project issues, addressing major policy issues related to the program, and coordinating relevant departments to ensure adequate program preparation, execution and management.

实施机构  
Implementing agency



### 河南豫天新能源有限公司亚行项目管理办公室 Henan Yu-Tian New Energy Co., Ltd. ("YTNE").

- 根据亚行对项目条件的要求，豫天新能源作为亚洲开发银行河南省“煤改气”项目实施机构，为切实加强贷款项目工作的组织实施管理，成立了河南豫天新能源有限公司亚洲开发银行贷款项目管理办公室。
- According to the requirements of ADB for program conditions, YTNE, as the implementing agency of the "coal to gas" program of the Asian Development Bank in Henan Province, established the Asian Development Bank Loan Program Management Office of Henan Yu-Tian New Energy Co., Ltd. ("YTNE ADB Program Office") in order to effectively strengthen the organization and implementation management of the loan program.

- 在豫资控股项目办的监督管理下，豫天亚行项目办全面负责豫天新能源公司亚洲开发银行项目的实施工作，协调各有关部门共同做好亚行项目的日常工作，负责与豫资亚行项目办资料上报、沟通协调工作。
- Under the supervision and management of ZYIG Program Office, YTNE ADB Program Office is fully responsible for implementing the Asian Development Bank Program of Henan Yu-Tian New Energy Co., Ltd., coordinating all relevant departments to ensure adequate daily work of ADB Program, and reporting, communicating and coordinating the data with ZYIG ADB Program Office.



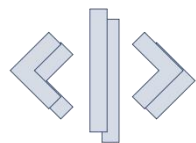
# 结果导向型贷款介绍

## Introduction to Results-based Loan

结果导向型 (RBL) 创新贷款模式，是一种基于结果的融资形式，其支付与结果的实现机密相关。RBL核心是根据成果和制度发展匹配相关的放款进度，通过实现结果为考核手段，促进贷款企业通过提升自身能力达到企业目标。RBL是一个重要的范式转换，将运营重点转为用融资支出和控制交易的手段来直接支持结果。

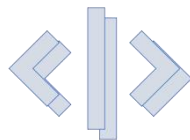
Result-based lending (RBL), as an innovative loan model, is a result-based financing form, and its payment is closely related to the realization of results. The core of RBL is to match the relevant lending progress according to the outcome and system development, and to promote the lending enterprises to achieve their corporate goals by improving their own capabilities and realizing the results as an assessment means. RBL is an important paradigm shift, which shifts the focus of operations to directly support results by means of financing expenditure and transaction control.

### 优势 Advantages



1. RBL贷款模式符合政策及行业发展规划。  
1. The RBL loan model conforms to the policy and industry development plan.
2. BL贷款模式将前期准备工作简化，有利于贷款快速落地，有效支撑项目推进。  
2. The RBL loan model simplifies the preliminary preparation, which is conducive to the rapid receipt of loans and effectively supports program implementation.
3. RBL贷款模式注重对项目进程的有效管理，保证项目资金的实效性。  
3. The RBL loan model focuses on effectively managing the program process and ensuring the effectiveness of program funds.
4. RBL贷款模式重视项目实施主体的能力培养。  
4. The RBL loan model takes into account the ability development of the program implementers.
5. RBL贷款模式增加了政府对该项目的所有权，促进政府各部门相互协同，共同完成项目目标。  
5. The RBL loan model increases the government's ownership of the program and promotes coordination among government departments to achieve the program objectives.

### 劣势 Disadvantages



RBL为贷款前预设成果，在项目实际执行中，如果实际成果与预设目标产生偏差，直接影响成果验证及提款。  
RBL is the preset result before the loan. In the actual implementation of the program, if the actual result deviates from the preset target, it will directly affect the verification of the result and withdrawal.

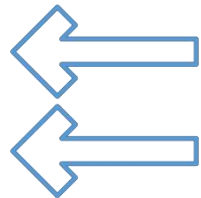
### 针对劣势我们的经验和建议： Our experience and suggestions for disadvantages:

1. 在设定目标阶段将目标设置成多个维度，包括可用数据描述的目标、可用文字描述的目标等；  
1. In the target setting stage, the targets are set in multiple dimensions, including those described by available data and text.
2. 在设定目标阶段，与亚行商定部分目标可在项目实施周期追溯提款。  
2. In the target setting stage, agree with ADB that some targets can be withdrawn retroactively during the program implementation cycle.
3. 在项目实际执行后，出现实际成果与预设目标产生偏差的情况，及时与上级项目办及亚行沟通进度，协商调整目标进行提款。  
3. After the actual implementation of the program, if the actual result deviates from the preset target, it shall communicate with the superior Program Office and ADB in time to negotiate and adjust the targets for withdrawal.

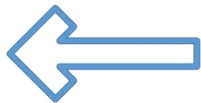




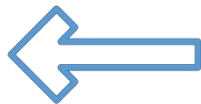
输出1: 燃气管网系统扩建  
Output 1: Expansion of gas network systems



输出2: 开发清洁替代燃料  
Output 2: Development of cleaner alternative fuels



输出3: 提高使用清洁燃料意识  
Output 3: Stronger awareness of using cleaner fuel



输出4: 增强体制和组织能力  
Output 4: Enhancement of institutional and organizational capacity



序号 S/N	关联指标项目 DLI item	DLI	结果指标描述 Description of result indicator	累计提款 (万欧元) Cumulative withdrawal (EUR 10,000)
1	燃气用户数量 Number of customers connected to the gas	DLI 1.	到2022年, 使用燃气的用户数量120万用户 Number of customers connected to gas increased to 1.2 million customers by 2022	4,483.00
2	总耗气量 Total gas consumption	DLI 2.	到2023年, 累计消耗天然气增加至3.1663亿标方 Volume of gas consumption increased to 316.63 million Nm <sup>3</sup> by 2023	1,480.00
3	后续融资 Subsequent financing	DLI 3.	取得9.15亿人民币融资, 用于2022年起项目实施 CNY 915 million of commercial financing mobilized for cleaner fuel switch to continuously implement the overall program from 2022 and beyond	-
4	燃气输配管网 Gas distribution network	DLI 4.	截止2021年, 安装的天然气输配管总长度达到26880KM Total length of installed gas distribution network pipeline of 26,880 km by 2021	4,035.00
5	气源场站 Gas station	DLI 5.	截止2021年, 安装12座气源场站 12 gas stations installed by 2021	-
6	生物质气 Biogas	DLI 6.	截止2023年, 沼气年产量达到1700万立方米/年 Total annual biogas fuel production of 17 million Nm <sup>3</sup> by 2023	-
7	性别意识宣传 Publicity of gender awareness	DLI 7.	累计开展500次性别敏感型清洁燃料使用意识宣传项目, 至少50%的参与者为女性 At least 50% of participants in 500 gender sensitive cleaner fuel use awareness outreach programs are women	16.00
8	机构能力建设 Institutional capacity development	DLI 8.	增强管理信息系统, 财务风险管理、社会合欢街方面的体制和组织能力, 人员配备齐全 (至少30%为女性) Institutional and organizational capacity in management information system, financial and risk management, social and environment safeguard enhanced with full staffing (at least 30% women)	323.00
			总计 Total	10,337.00

# 项目实施经验

## Experience From Implementing the Program



01

政府部门大力支持，各级项目办沟通顺畅，默契配合，创造亚行同类项目最快审批记录。  
With strong support from government authorities, POs at all levels communicated and cooperated smoothly, resulting in the fastest approval time among similar ADB-financed programs.

02

选择结果导向贷款，促进项目落地实施，提高贷款资金使用效率与效果。  
RBL was selected to promote the implementation of the Program and improve the efficiency and effect of the loan proceeds.

03

项目实施机构亚行办设置专职人员转办贷款项目，提升管理水平与项目实施效率。  
The ADB Program Office of the Implementing Agency set up full-time management to improve the management level and implementation efficiency in respect of the Program.





03

# 亚行贷款积极影响

## Positive Impact of ADB Loan



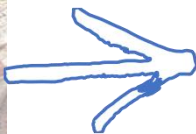


(一) 加速煤改气进度，环境效益日趋凸显

(I) Accelerate the progress of changing from coal to gas, Increasingly prominent environmental benefits

随着乡镇煤改气项目工程的稳步推进，乡村能源的供给结构得到有效优化，由原来污染重、经济性差的散煤、液化石油气逐步替代为清洁安全经济效益好的天然气，有效地改善了当地空气质量和生态环境，环境效益显著。

With the steady progress of the coal-to-gas program in villages and towns, the supply structure of rural energy has been effectively optimized, and the original bulk coal and liquefied petroleum gas with heavy pollution and poor economic efficiency have been gradually replaced with clean, safe and economical natural gas, which has effectively improved the local air quality and ecological environment, with remarkable environmental benefits.



温室气体减排量（代煤）  
Greenhouse gas  
emission reduction  
(replacing coal)  
**200万吨**  
**2,000,000 t**

氮氧化物减排（代煤）  
NOx emission  
reduction (replacing  
coal)  
**0.3万吨**  
**3,000 t**

二氧化硫减排量（代煤）  
Sulfur dioxide emission  
reduction (replacing coal)  
**1.5万吨**  
**15,000 t**

PM2.5减排量（代煤）  
PM2.5 emission reduction  
(replacing coal)  
**0.87万吨**  
**8,700 t**

## (二) 乡镇居民幸福获得感增强，生活水平提升 (II) Township residents have a greater sense of happiness, and their living standards have improved



乡镇煤改气工作的实施，有效改善了农村人居环境质量与农民生活品质。兰考县是河南省煤改气项目的首批试点，截至目前，豫天新能源已在兰考县全域完成20余万户煤改气工程建设。时任兰考县委常委副县长王彦涛说，“该县将致力于构建清洁、高效、经济的农村能源供应体系，大力支持煤改气项目。”

The implementation of the coal-to-gas program in villages and towns has effectively improved the quality of rural living environment and farmers' life. Lankao County is the first batch of pilot regions for the coal-to-gas program in Henan Province. Up to now, YTNE has completed the construction of coal-to-gas works for more than 200,000 households in Lankao County. "The county will be committed to building a clean, efficient and economical rural energy supply system and strongly support the coal-to-gas program," said Wang Yantao, then executive deputy head of Lankao County.

仪封乡代庄村是兰考县“煤改气”推进速度最快的自然村。该村党支部书记代玉建算过一笔账，“生活质量提高了，但生活成本却在降低，以前一家人吃饭炒菜每月一般要耗1罐气，需要花百元左右，改烧天然气只需四五十元。”自2018年煤改气以来，总体为河南乡镇用户节约能源消耗2.25亿元。煤改气改变了奔小康农民的生活方式，改变了谋发展农业的生产模式，更改变了农村生态环境，助力绿水青山化作金山银山，实现了转变经济发展方式的质变。如今走进兰考县仪封乡，空气清新宜人，街道干净整洁，错落有致的燃气管道在房前屋后整齐排列，居民屋顶再无昔日“袅袅炊烟”，过去靠燃煤取暖、烧炭做饭的传统习惯已然成为历史。而这都得益于“煤改气”工程的推广和实施。

Daizhuang Village in Yifeng Township is the fastest natural village in Lankao County to promote the "coal-to-gas" program. Dai Yujian, Secretary of the Party Branch of the village, believed that, "The quality of life has been improved, but the cost of living is decreasing. In the past, a family usually consumed one tank of gas per month to cook, which cost about 100 yuan, but it would only cost 40 or 50 yuan using natural gas." Since the coal-to-gas program was launched in 2018, the total energy consumption savings for rural customers in Henan have been CNY 225 million. The coal-to-gas program has changed the lifestyle of farmers who are striving for a moderately prosperous life, changed the production mode of seeking to develop agriculture, changed the rural ecological environment, and helped lucid waters and lush mountains to become invaluable assets, achieving a qualitative change in the transformation of economic development mode. Nowadays, in Yifeng Township, Lankao County, the air is fresh and pleasant, the streets are clean and tidy, and the gas pipelines are well-arranged in front and back of the houses. There is no longer "curling smoke" on the residential roofs, and the traditional habit of heating and cooking with coal has become history. This benefits from the promotion and implementation of the coal-to-gas works.



提升基础设施建设，乡镇生活接近城市



### (三) 促进乡村性别平等意识，妇女生活条件改善，使用清洁能源意识提升

#### (III) We will promote awareness of gender equality in rural areas, improve women's living conditions, and raise awareness of using clean energy



在河南省，农村地区生活能源仍以混合燃料为主，包括煤炭、液化石油气、电和木柴。农村清洁燃料转换项目要求人们对天然气有较多了解。项目所在区域内的农民、教师和学生等将受邀参加有关清洁燃料意识运动，通过各种方式来了解天然气相关知识以及如何安全使用天然气。In Henan Province, domestic energy in rural areas is still dominated by mixed fuels, including coal, liquefied petroleum gas, electricity, and firewood. Conversion programs for rural cleaner fuel require people to have a better understanding of natural gas. Farmers, teachers, and students in the program area will be invited to participate in a cleaner fuel awareness campaign, in which way to learn about, through various means, natural gas and how to use natural gas safely.



清洁燃料意识运动旨在提高农村居民对清洁燃料的认识，特别是落实一些紧急处理措施以及禁止破坏天然气管道的行为。The cleaner fuel awareness campaign aims to raise awareness among rural residents about cleaner fuel, in particular the implementation of some emergency treatment measures and the prohibition of vandalism of gas pipelines.

在迅速铺开煤改气工程建设的过程中，豫天新能源积极进行大规模环保与安全教育宣传与培训。截至2023年4月底，共开展符合亚行标准的意识宣传累计近1000余次。In the process of rapidly launching the construction of the coal-to-gas works, YTNE actively carried out large-scale environmental protection and safety education publicity and training. By the end of April 2023, more than 1,000 awareness publicity activities in line with ADB standards have been carried out.



针对乡村实际情况，豫天新能源着重邀请农村家庭女性成员参加培训，通过发放宣传册、现场讲解、动画演示、关注微信公众号等多种灵活生动的方式，培养乡村居民大气污染防治和用气安全意识，让乡村居民切实体会到使用天然气带来的环保性、经济性和便利性。In view of the actual situation in rural areas, YTNE focused on inviting female members of rural families to participate in the training, and cultivated rural residents' awareness of air pollution prevention and gas use safety through various flexible and vivid methods such as distributing brochures, on-site explanations, animation demonstrations and following WeChat official accounts, so that rural residents can truly experience the environmental protection, economy and convenience brought by using natural gas.

## (四)改革创新能源供应体系，户用光伏、生物质等新能源有了发展平台

(IV) Reform and innovate the energy supply system, providing a development platform for household photovoltaic, biomass and other new energy sources

豫资公司作为省属功能类企业，始终将符合绿色能源发展的产业作为重点支持方向。在乡镇煤改气实施基础上，结合我省实际情况，豫资公司联合天伦燃气实施生物天然气项目，在解决农村玉米秸秆等问题的同时生产清洁能源和有机肥料，是豫资公司实现能源多元化、清洁化发展，构建多轮驱动的能源供应体系，增强能源自主保障能力的重要举措，具有较高的创新示范价值。首个项目落地周口市商水县，项目总投资近6亿元，采用国际先进的干式厌氧发酵工艺，年生产1800万多方生物天然气，7.5万吨有机肥，年消耗玉米秸秆20多万吨，项目潜在最大二氧化碳减排量估值为40万吨/年。该项目拟于2023年6月建成投产，目前各项建设安装工作正在按计划稳步推进。

As a provincial functional enterprise, ZYIG has always taken the industry in line with green energy development as the key direction of support. On the basis of the implementation of the coal-to-gas program in villages and towns and in combination with the actual situation in Henan Province, ZYIG, together with Tianlun Gas, implemented the biogas program to produce cleaner energy and organic fertilizer while solving the problems of corn straw in rural areas, which is an important measure for ZYIG to realize diversified and clean energy development, build a multi-wheel-driven energy supply system and enhance the ability to independently guarantee energy, with high innovation demonstration value. The first program is implemented in Shangshui County, Zhoukou City, with a total investment of nearly CNY 600 million. With the internationally advanced dry anaerobic fermentation process, the program can produce more than 18 million cubic meters of biogas and 75,000 tons of organic fertilizer annually, and consume more than 200,000 tons of corn straw annually. The estimated potential maximum carbon dioxide emission reduction of the program is 400,000 tons/year. The program is planned to be completed and put into operation by the June of 2023. At present, various construction and installation work is steadily progressing as scheduled.







## 实施煤改气项目的积极影响

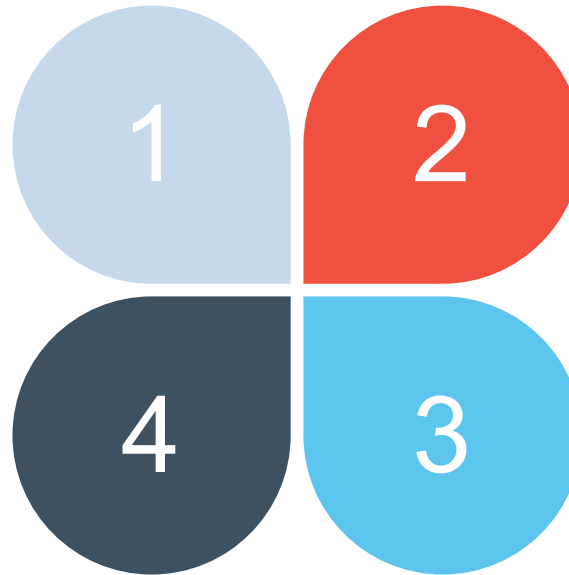
### Positive Impact of Implementing the Coal-to-gas Program

实施煤改气项目，减少污染物及二氧化碳排放，洁能源，经济发展和环境保护协同发展。

The implementation of the coal-to-gas program effectively reduced pollutants and CO<sub>2</sub> emissions, and improved the quality of energy, achieving a coordinated balance between economic development and environmental protection.

一站式管理，规范的项目开发、工程施工、运行维护管理标准，确保项目质量，满足国家规范标准。

The implementation of the Program followed a one-stop and standardized approach for development, engineering, construction, operation, and maintenance management, which **ensured the quality of the program and met national specifications and standards.**



煤改气公司均为属地化公司，税收留在当地，吸纳当地劳动力，解决当地农民工就业问题，**促进农民增收。**

As all companies participating in the coal-to-gas program are local, they contribute taxes at the local level. The terminal operators were able to solve the issue of unemployment among local migrant workers, and also **increase the income of farmers** by creating job opportunities for the local labor force.

通过煤改气项目结合亚行要求的实施，形成公司ESG体系，提高机构管理能力，保障后续平稳运行。

Through the implementation of the coal-to-gas program in accordance with ADB requirements, the company formed its ESG system and improved its institutional management capabilities, ensuring its subsequent operation.



04

项目创新及延伸  
Program Innovation and Extension



# 气电协同发展模式 Development Mode of Gas-electricity Coordination

## 先立后破

### Making before breaking

推动农村能源转型，在清洁能源过去30年市场发展基础上，充分发挥好光伏、风电等新能源“生力军”的作用。未来农村地区主要用能形式包括燃气和电力。将能源有效供应、提高人居环境、改善农民生活水平、解决用能成本、乡村垃圾及畜禽粪污处理等重大问题综合考虑。

Promote rural energy transition, and give full play to the role of the "new force" of new energy such as photovoltaic and wind power on the basis of the market development of clean energy in the past 30 years. In the future, the main forms of energy consumption in rural areas will be gas and electricity. Comprehensive consideration will be given to the effective supply of energy, the improvement of the living environment, the rise in the living standard of farmers, the solutions to energy consumption costs, the treatment of rural garbage and livestock and poultry manure and other major issues.

## 整合优势

### Integrating the advantages

根据农村资源禀赋，形成以绿色电力、清洁燃气及再生能源资源利用为主要组成部分的低碳能源供应，互补互惠，就地生产、就地消费、分布发展、客户共享、服务共建。充分发挥可再生能源经济性好、效率高、可持续的特点，整合丰富的风光绿色资源，阶段调峰、高效储能、平衡供给，有助于实现新型电力系统的安全可靠、经济可行、绿色低碳的“能效三角”。

Based on the endowment of rural resources, a low-carbon energy supply system will be formed, with green power, cleaner gas and renewable energy resources as its main components. These components will be complementary and mutually beneficial. They will be locally produced and locally consumed, and will be developed in a distributed way. The services will be co-constructed and shared by all customers. By giving full play to the characteristics of renewable energy such as good economy, high efficiency and sustainability, integrating abundant green power such as wind and solar power, carrying out power peak regulation, adopting efficient energy storage and balancing the power supply, it will be possible to realize a safe and reliable, economical and feasible, green and low-carbon "energy efficiency triangle" in the new power system.

## 解决问题

### Solving the problems

解决目前农村“生物质还田危害”、“散烧煤污染”、“垃圾污染”、“取暖高费用”等落后点，可明显改善农村人居环境、显著增加农民收入、实质性提升乡镇居民生活水平。

By tackling the drawbacks such as "harm of returning biomass to farmland", "pollution of burning bulk coal", "garbage pollution" and "high heating cost" in rural areas, the rural living environment, the income of farmers and the living standards of township residents can be significantly improved.

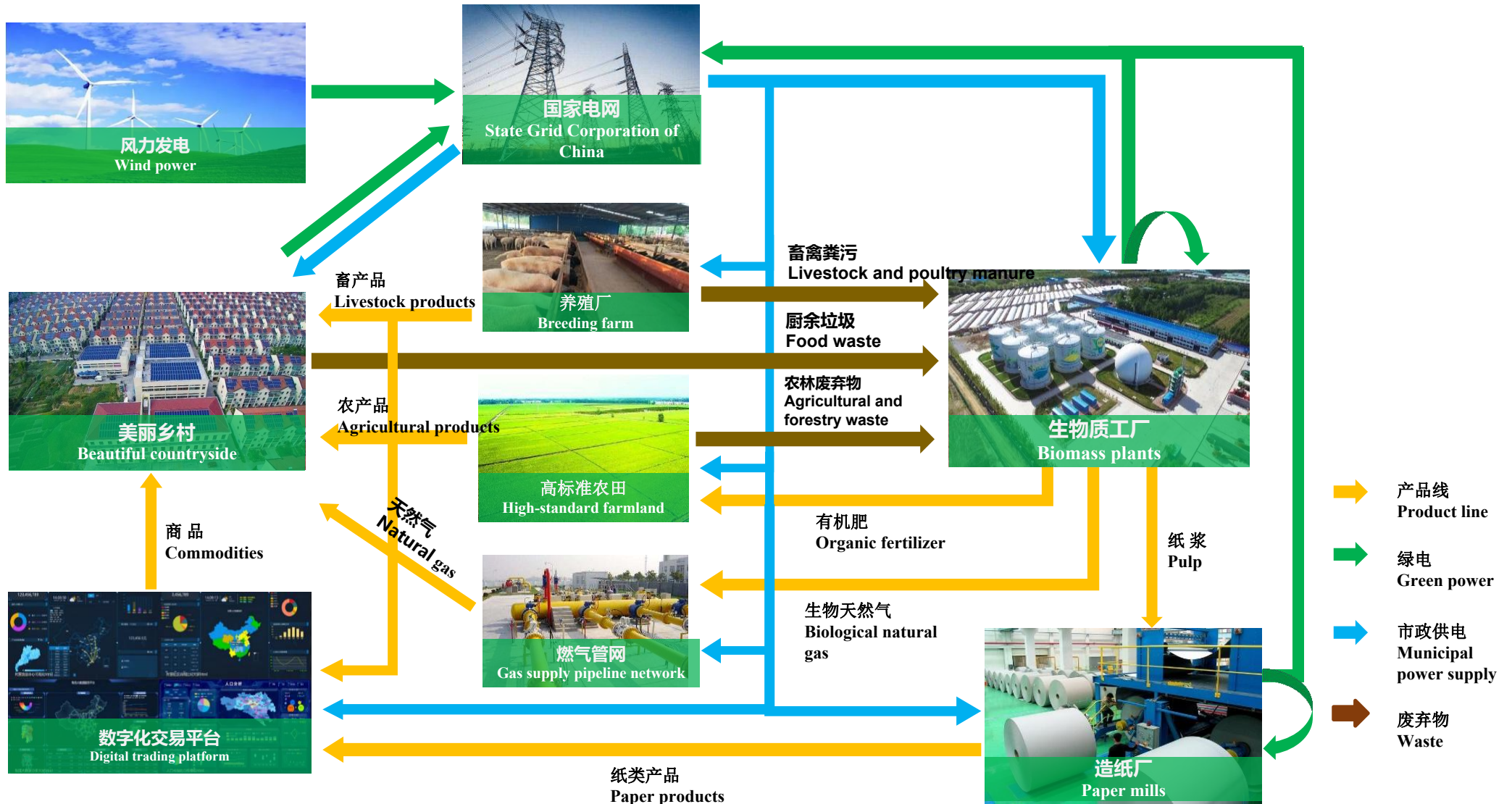


## 创新整合，共建生态

Innovative integration and ecological co-construction

# 生物质天然气行程农业产业生态链，构建了生态体系，未来市场空间巨大

## Biomass natural gas forms an ecological chain of the agricultural industry and builds an ecosystem, with huge market space in the future



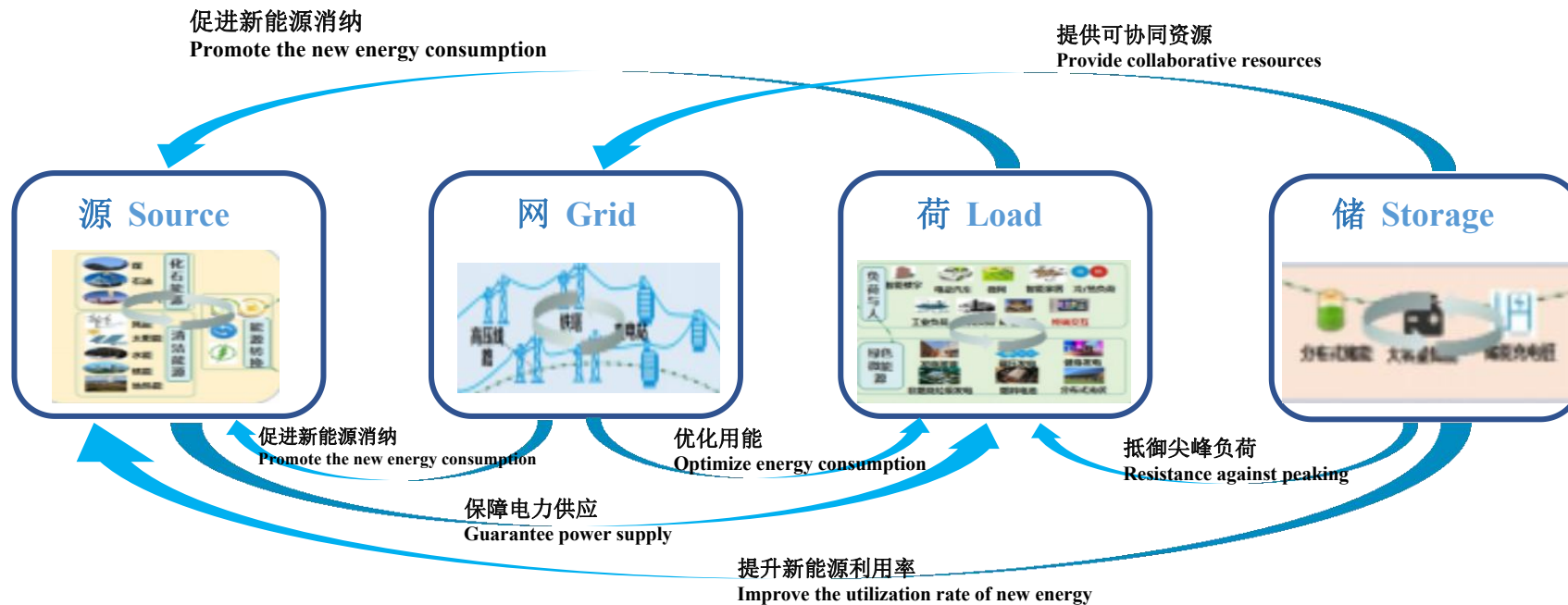




# 数字化用户增值服务，三网融合，提升服务，提升农村生活质量

## Value-added services for digital users, ETI integration to improve services and rural life quality

- ◆ 用户提供屋顶及废弃秸秆等资源换取收入，提升生活质量；
- ◆ Customers may provide the space on their roof and waste straw in exchange for income, thereby improving the quality of their lives;
- ◆ 通过数字化本地运维服务，保证长期稳定收益，消除后顾之忧；
- ◆ Digitalization of local operation and maintenance services ensures long-term stable income and eliminates any worries;
- ◆ 构建能源智慧化服务，挖掘河南400万用户需求价值，提升增值效益；
- ◆ Value-added benefits can be obtained by offering intelligent energy services to 4 million potential customers in Henan;
- ◆ 三网融合，为政府和居民提供多元化增值服务；
- ◆ Three-network integration provides diversified value-added services for the government and residents;





THANKS

