



STUDY ON MARKET-BASED MECHANISM FOR LARGE AND MEDIUM-SIZED BIOGAS PROJECTS OPERATION

Undertaken by EED Consulting

Background

As a solution of pollution of livestock in rural areas, Livestock farm biogas project (hereinafter referred to as biogas project) can not only protect rural ecological environment, but also improve energy structure of rural areas, promoting the construction of new countryside, meanwhile reducing greenhouse gas emissions of agriculture to contribute towards China addressing climate change. For this reason the development of biogas project have been attached great importance by Chinese government. Since 2003 biogas project have been officially integrated into Treasury bond project, governments at all levels were gradually increasing investment and construction efforts year by year, leading to the boom of biogas project. Up to 2008, China has had 2761 large-scale biogas projects and 12864 medium-sized biogas projects.

In November of 2009, Chinese government announced an ambitious goal that is going to reduce the intensity of CO₂ emissions per unit of GDP in 2020 by 40 to 45% compared with the level of 2005. As one of the key solution for agricultural carbon reduction, biogas is bound to be produced and applied extensively. Plus census data 2009 of agricultural pollution sources displayed the pollution of livestock is one of the three problems of the non-point pollution in rural area which means dual-driven by carbon emission reduction and rural non-point pollution, biogas project will still maintain a relatively high growth rate.

Currently the establishment of biogas project mainly depends on the funds from central and local government, at the same time parts of large-scale livestock enterprises construct biogas projects by self-raising funds. However there are a lot of issues arising in the operation of biogas project completed, of which the uppermost one is low operational efficiency and economic efficiency. To solve these issues, the project team tries to probe into a market-based operation management modes which makes the owner of biogas project commission professional technical service companies to manage the project, ensuring the persistence of follow-up operation through professional, standardized and scale management. The market-based operation management mode is expected to promote the establishment of agricultural circulation system that takes biogas project as a bond, and be beneficial to broaden industrial chain of biogas project, and to maximize economic benefit, environmental benefit and social benefits to guarantee the sustainable development of biogas projects.

Main activities and Executive Summary

To implement the project smoothly, project team carried out the kick-off meeting on 20th June 2010, key officials, related experts and representatives from REEEP IS, REEEP RS, Ministry of



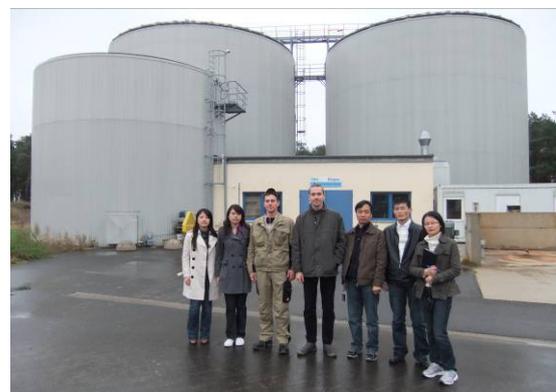


Agriculture, Department of Environmental Protection, Beijing Municipal Development and Reform Commission, Beijing Municipal Bureau of Agriculture etc. have been invited to attend this workshop. Except defining working plan, an in-depth communication and discuss have been made around the aspects of current situation of biogas policies, operation management and external environment etc. under the situation of biogas's rapid growth. The significance of this project is undoubtedly and exploring in market-based operation and management is necessary for healthy development of biogas project. In terms of the development direction in the future, strengthening the management on large and medium-sized biogas project in late stage by government as well as the incentive for the later operation such as price subsidy are needed urgently to inspire professional energy companies to invest and construct biogas projects, to realize commercialization, while improving design criteria and construction standards.

Initially the project obtained strong support from Beijing Municipal Bureau of Agriculture who hopes the project can promote the health development of the biogas project in Beijing through the innovation in management modes. In July of 2009, on-site investigations on around 20 biogas projects in Beijing were conducted to collect first-hand information related to technologies, economy, management of biogas project, meanwhile looking into the usage of household biogas and biogas slurry residue in rural. Based on the finding of investigation and literature review, the project team composed the *Report on Current Situation of Operation and Management of Large and Medium-sized Biogas Projects in Beijing* which comprehensively describe the technical status of Beijing biogas project, analyzing the economic and efficiency of targeted projects, showing the comparison of management modes of different projects, and finally come up with the main problems and provide fundamental data for establishment of market-based modes.



In European countries, especially Germany, market-based management modes grows to a mature period. In order to establish market - based operation modes appropriate for status quo of Chinese biogas project, fieldwork trips in Germany were done with aims of further understanding the operation conditions of different scale biogas projects managed by corporations or farmers, including technical level, economic effectiveness, operation management modes as well as usage of biogas slurry residue



etc. Except members of project team, some officials from Beijing governing departments were invited to participate in this activity to raise the awareness and understanding of the market-based mechanism for biogas project operation. Moreover in order to learn the biogas experiences from developed countries, project team actively participated in various international communication and events, such as the Global Biomass Conference held in



Stockholm which successfully showed the global status and challenges of biomass as well as Sweden achievement and experience on biogas industry that provided important reference for project's output.

To ensure the full communication among relevant stakeholders and high quality of project output, a number of internal and external workshops were carried out during the design process of market-based operation mechanism. To guarantee operability of the innovative mechanism, preliminary outputs about *Current Situation of Operation and Management of Large and Medium-sized Biogas Projects in Beijing* and *Operation Experiences of Livestock Farm Biogas Project in Europe* were presented at an external workshop on 8th January of 2010. Relevant officials from Beijing Municipal Bureau of Agriculture, National Energy Administration, Ministry of Agriculture, Ministry of Environmental Protection actively participated in the meeting, expressing great concerns on the project, in the meanwhile the officials of Energy Office who are in charge of the construction and supervision of regional biogas project were caught up in the research findings, even planned to demonstrate the market-based modes in some areas.

In terms of current situation of biogas project in Beijing, operating personnel's lack of operation experience and with low educational level have been an obstacle to follow-up management of biogas projects, if these biogas projects will adopt the market-based operation modes, improvement the technological level of existing staffs is necessary. So with help of the Beijing Municipal Bureau of Agriculture, in April of 2010 the implementing organization, EED, carried out 4-day training on biogas project that covering theories knowledge and practical operation. There are 90 staffs from Energy Offices and relevant organizations of all areas of Beijing participating in this training program, in which 50 operating personnel were from biogas project and 20 staffs were from builders. In addition, at present number of builders are actively preparing for human resources of biogas project's marketing operation in the future.



Furthermore with the support of key officials at all levels, the project team compiled this collection of technical codes as an input for country's biogas projects' designs and relevant local regulatory documents of Beijing to provide technical standards and design reference for the construction, to promote market-oriented running, and ultimately to realize the long-term, stable and efficient operation.

Main Achievement and Impact

At present this project has been close to the finishing stage, except the planned outputs, producing a wide and good impact in biogas industry of China.

- 2 kinds of market-based operation and management modes proposed by EED: one of them is suitable for recent stage, which means promoting the sustainable development of biogas project by way of commission management with existing investment channels; another one is applicable to the formed mature market of biogas and slurry



residue, that is a kind of fully market-based operation and management mode involved by investment companies as a solution for healthy development of biogas project. Some districts of Beijing have the willingness to demonstrate the commission management mode to accumulate experience on market-based operation and management for larger-scale development in the future.

- The project analyses current problems of biogas project in relation to policies, technologies, economy and market. In the course of project implementation, with frequent exchanges and communication with the relevant governmental departments such as NEA, MOA, DEP, Beijing Municipal Bureau of Agriculture etc., key officials' understanding and awareness on existing issues and current situation of biogas project has been enhanced, which lay the foundation for policies promulgation, benefiting to remove the barriers of biogas industry.
- The training programme co-organized with Beijing Municipal Bureau of Agriculture made more operating personnel have Intermediate Vocational Certificate in Biogas Project, improving technical level of staffs and ensuring stability and security operation of biogas project.
- The demonstration and application of commission management mode will significantly increase use ratio of liquid residue, reduce running cost, enhance economic benefit and environmental benefit, meanwhile reducing the consumption of fossil fuel, lessening peasant's expense and increasing their incomes.

Experiences and Lessons learned

- Strengthening the communication with government authorities is crucial for smooth implementation and impact of this project. During the process of the project, the deeply involvement of competent authorities, especially Beijing Municipal Bureau of Agriculture, not only improved the quality of project outputs but also made a positive impact on feasibility of demonstration projects and participation of the Energy Offices in Beijing.
- Main body of market-based operation mechanism is operating organization of biogas projects. With the increasingly concerned about commercialization of biomass industry, builder of biogas project also is caught up in the market-based operation and management modes, but currently face to face communication with builders is what the project is missing, therefore lately the in the process of understanding needs and requirements of relevant stakeholders, project team should extend the scope of exchanges to learn perspective and conceive of builder and other stakeholders, gathering more comprehensive source material for the research.