



ISO/TC 255  
Biogas

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## **BUSINESS PLAN**

### **ISO/TC 255**

#### **Biogas**

### **EXECUTIVE SUMMARY**

The scope of ISO TC 255 is developing and promoting standardization in Biogas industry.

Biogas is a combustible gas that is generated through fermentation process of organic matter with microorganism in anaerobic conditions. The composition of biogas is mainly methane and carbon dioxide. Biogas is a type of renewable energy that has features of abundant resources, low cost, high thermal efficiency and clean producing. Applying biogas has various benefits, such as reducing greenhouse gas emissions, providing alternative energy to fossil energy of fuel, and improving the ecological environment. Along with the situation of global energy crisis and environment pollution, biogas has played a significant role in the world, and is becoming a sunrise industry with huge potential of broad development.

At present, with the unceasing expansion of global technology and construction scale and the increase of international technology exchanges and cooperation for biogas, the international markets for technology and equipment have been formed. It requires higher level of biogas production quality and international standardization. International standardization is an important measure that spreads advanced production mode by eliminating barriers to international trades, as well as increasing production quality and technology. Biogas technical committee of international standard organization (ISOT/C255) was established in 2011, in order to: i) provide liberalization and facilitation for international trade; ii) develop international cooperation on technical regulation, standard and assessment procedures; iii) curb discriminatory of technical requirements as the main form of trade protectionism; and iv) reduce and eliminate the technical barriers from international trade. TC 255 plans to develop international standards and guidelines in area of biogas produce, operation, product, security and management, and thus to promote international technology exchange, transfer, diffusion, and upgrades for biogas, and to accelerate international application of biogas product and equipment.

This Business Plan (BP) aims to clarify and define the develop environment, objectives and key missions of TC 255, and also describe the strategic measures to reach the relevant targets, thus eventually promote biogas international standardization and meet the need of international trade and cooperation in biogas industry.

## 1 INTRODUCTION

### 1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to make ISO standard to meet the market demand, to align the ISO work program with expressed business environment needs and trends, to allow ISO/TCs to prioritize among different projects, to assess the different standard projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

### 1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 140 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO offers also the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and forum, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

## 2 BUSINESS ENVIRONMENT OF THE ISO/TC

### 2.1 Description of the Business Environment

Biogas is a mixture of gases, which contains 50-70% of methane, a certain amount of carbon dioxide, and small amount of nitrogen, hydrogen and hydrogen sulphide etc.

The calorific value of pure methane per cubic meter is about 34,000 joule, and the calorific value of biogas per cubic meter is about 20800-23600 joule. Thus the heat  $1\text{m}^3$  biogas produces after complete combustion is equivalent to the heat 0.7 kg anthracite coal does. Biogas can be applied not only in area of cooking, drying agricultural and sideline products, heating, lighting and gas welding, but also can be used as the fuel of internal combustion engine and chemical raw materials.

Biogas is mainly applied to produce heat and electricity. In rural area of Asian countries, the biogas generated from household biogas tank is mainly used by farmers to cook, light and heat. The biogas production and application has also been further widened through utilizing large and medium-sized wastewater, aquaculture sewage, biomass waste of towns, wastewater from cities, kitchen waste, and industrial residue organic wastewater etc. In some agricultural countries with rapid development of animal husbandry, biogas technology has been treated as to solve the pollution problem of intensive livestock farming. In some developed countries, power generation by biogas technology has also been widely promoted. Biogas is considered as a widespread and low-cost distributed energy with the advantages of high efficiency, energy conservation, safety and environmental protection. Moreover, biogas fuel battery has been treated as the latest promising biogas technology.

The development of biogas industry varies in different countries, in terms of driving force, focal area and developing speed. In the area of industrialized large biogas plant, Europe, especially Germany leads the world in the forefront, with many specialized corporation investing for construction and managing operation. In the area of small household biogas digesters, Asia, especially China, has taken the leading position. Despite China's early stepping in and large number of biogas projects, the total amount of biogas production and the scale of biogas plants in China, however, are relatively small due to the fact of scattered land ownership in China.

In the market of biogas industry, Europe enjoys the largest mature market of biogas in the world. Germany, Austria and Sweden are the advanced biogas technology countries. Regarding the installed capacity, Germany holds the biggest market in Europe. The shares of the market for other biogas developed countries are also continuous rising. The biogas markets in Belgium, Netherlands and other eastern European countries are still in the early stages of development. In some European countries, biogas has become the fastest growing renewable energy industry and North America and Asia's biogas industry have also shown good momentum of development.

The outstanding feature of the biogas industries is policy dependence and the industry relevance. Every breakthrough for this industry is based on good policy environment and related industry coordinated development. The policy environment can stimulate the development of the industry and attract more private investors to invest in the market. Germany implemented Renewable Energy Sources Act in 2000 and the biogas project amount increased notably. The complete legal framework accelerated the pace of the country's industrialization development. The Swiss government purchased public biogas transport facilities to promote the development of domestic biogas industry. Sweden's heat supply network was decentralized, so the government encouraged enterprise to use biogas for distributed heating system. The rapid biogas development in the Netherlands relied on the raw material system issued by Netherlands government. In recent years, China established a series of positive policy to develop biogas plants construction.

The development of biogas industry has also benefited from public awareness of environmental protection. The availability of fermentable material is the key link between the cost of raw material and the price of biogas production. Economy of scale and technical progress are both key factors for promoting the biogas industry.

With the impact of global economy, biogas business environment also has some uncertainties. Especially in terms of the industry's future growth, financing and

regulation, the uncertainty is more obvious. This kind of environment might produce great negative impact on small companies.

## **2.2 Quantitative Indicators of the Business Environment**

According to *Global Methane Initiative Accomplishments report 2011* from U.S. Government, methane emissions by human factors is about 7,194 MMT CO<sub>2</sub>, and other major sources are oil and natural gas industry, coal industry, waste landfill, waste water and agriculture (including livestock and poultry) fields.

In 2007, there were 111 biogas plants in U.S. Most of the plants are power generation projects through biogas in livestock and poultry field, which produced equivalent total energy of 215 million kWh annually.

Since 2003, China's government has invested CNY 31.5 billion accumulatively for rural biogas construction. The new pattern of integrated development has been formed, including development of household biogas, large and medium-sized farms biogas project, straw gas centralized supply methane project, rural primary and middle schools biogas project. By 2012 the biogas users in china is up to 42 million households; benefitted population is 155 million; biogas plants are 9,2000; annual electricity generating is 237 million kWh; rural biogas production is 15.7 billion m<sup>3</sup> equivalent to 11% of annual consumption of natural gas. According to *China's Renewable Energy Long-term Development Plan*, the amount of biogas production will reach 440×10<sup>8</sup>m<sup>3</sup> in 2020. The specialists estimate that the potential of China's biogas production capacity is 900×10<sup>8</sup>m<sup>3</sup> in 2020, which equals to 45% of annual consumption of natural gas in 2010.

According to the data from German Biogas Association, there are 7,500 biogas plants and 3,200 MW installed electric power; including the equivalent biomethane capacity 3,500 MW in Germany by 2012. There was about 15 billion kWh electricity generated by biogas (Including landfill and sludge) accounting for 3.85% of electric power consumption. In 2012, there was 1 million hectare cultivated land used for biogas energy crops; about 50 biogas plants were connected onto the Germany natural gas pipe network. The potential of German biogas production capacity is 417PJ each year, accounting for 8% of annual consumption of electricity power.

For the development of national standards, the biogas related standards are advanced in developed countries such as UK and Germany. Germany is outstanding in area of biogas project quantity and application technology in Europe, and its development of the industry have also benefited from standards. Germany has established standards in operation, management, engineering equipment and installation of quality (including safety testing, mechanical testing, construction testing and equipment inspection) and project examination. China has promulgated and implemented 33 biogas standards, involving biogas technology, design, construction, the necessary equipment, product and the method to implement, technical specification, testing and so on. India and Nepal also have biogas cookers standards. EU has the regulations and standards for biogas project quality control, and ACT 98/30/EG is also applicable to the biogas access to natural gas pipe network.

## **3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC**

As an emerging industry, Biogas industry is now gradually increasing its globalized trading volume. By establishing an effective and integrated international biogas standard system, TC 255 will provide comprehensive standardized guidance for biogas enterprise production, technology, operation and management, including:

- Promote product competitiveness of enterprises on cost and quality;

- Remove trade barriers to global biogas product and equipment;
- Expand influence of TC 255 through promoting ISO standards for producers, traders and decision-makers;
- Promote innovation and progress for biogas technology in the world;
- Promote information communication, coordination and cooperation for international biogas standardization.

## 4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

### 4.1 Countries/ISO members bodies that are P and O members of the ISO committee

At present, there are 32 member bodies, including 16 Participating Countries and 17 Observing countries.

**Table1 Member bodies of TC255**

Type	Countries
Participating Countries	China (SAC), Canada (SCC), France (AFNOR), India (BIS), Israel (SII), Italy (UNI), Korea, Republic of (KATS), Luxembourg (ILNAS), Netherlands (NEN), Norway (SN), Sweden (SIS), United Kingdom (BSI), Germany (DIN), Kenya (KEBS), Belgium (NBN), Barbados (BNSI)
Observing Countries	Australia (SA), Austria (ASI), Bosnia and Herzegovina (BAS), Czech Republic (UNMZ), Denmark (DS), Finland (SFS), Japan (JISC), Malaysia (DSM), New Zealand (SNZ), Russian Federation (GOST R), Slovakia (SUTN), Spain (AENOR), Thailand (TISI), USA (ANSI), South Africa (SABS), Sri Lanka (SLSI), Uruguay (UNIT)

### 4.2 Analysis of the participation

If classified by region, there are 4 participating countries and 4 observing countries from Asia, 9 participating countries and 8 observing countries from Europe, 2 participating countries and 2 observing countries from America, 1 participating country and 1 observing country from Africa and 2 observing countries from Oceania. The distribution of specific member countries is listed in table 2.

Table2 Distribution of specific member countries of TC255

Region and distribution	Countries	P/O	Region and distribution	Countries	P/O
<b>Asia</b> P: 4 O: 4	China	P	<b>Europe</b> P: 9 O: 8	France	P
	India	P		Italy	P
	Israel	P		Luxembourg	P
	Korea, Republic of	P		Netherlands	P
	Japan	O		Norway	P
	Malaysia	O		Sweden	P
	Thailand	O		United Kingdom	P
	Sri Lanka	O		Germany	P
				Belgium	P
<b>America</b> P: 2 O: 2	Canada	P		Austria	O
	Barbados	P		Bosnia and Herzegovina	O
	USA	O		Czech Republic	O
	Uruguay	O		Denmark	O
<b>Oceania</b> O: 2	Australia	O		Finland	O
	New Zealand	O		Russian Federation	O
<b>Africa</b> P: 1 O:1	Kenya	P		Slovakia	O
	South Africa	O		Spain	O

As listed in the table above, TC255 members distribute in Asia, America, Africa, Oceania and mostly in Europe. The reason is that i) biogas industry is well-developed in European countries, ii) standardization works have taken the leading position in the world, and iii) these countries have sufficient resources to participate in the activities of ISO. However, some of the advanced countries such as Germany, Denmark and USA are still observing countries rather than participating countries.

## 5 OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

### 5.1 Defined objectives of the ISO/TC

The objectives of TC255 are:

1. To design biogas industry international standardization system; and to draft development goals and time-table for TC 255 following the international trade and market demand;
2. To ensure that TC255 standards are in line with international policy, technology and market development trend; and to meet the needs of development in biogas industry;

3. To increase the member countries of TC255; to encourage the participation of countries with large amount of biogas production and use as well as developing countries; to ensure that all countries fully participate in standard drafting, modifying and applying; and to improve the efficiency of standards and guarantee the quality of standards;
4. To strengthen the communications with other ISO TCs; and to ensure the compatibility between TC 255 standards and other standards.

## **5.2 Identified strategies to achieve the ISO/TC's defined objectives**

### **For the objective 1:**

TC 255 will establish international standards of biogas industry; formulate biogas industry development rules; design standard and guide for biogas production, operation, product, safety, management and other aspects, and give priority to the following standards:

- Biogas terms and definitions;
- Biogas characteristics and analyses;
- Biogas resource assessment;
- Biogas facilities design, construction, operation and acceptance;
- Biogas projects equipment design, manufacture, installation and test;
- Biogas product design, manufacture and inspection;
- Biogas purification, heating, power generation and co-generation of heat and power (CHP);
- Health, safety and environmental protection guideline for biogas production, network and utilization.

### **For the objective 2:**

- Survey on the market environment of the biogas industrial development; encourage the development of new standards TC255 project to meet the market demand;
- Fully discuss and evaluate project proposal of potential standard; develop the formulation of standards.

### **For the objective 3:**

- Strengthen the communication with society and promote the influence of international standard;
- Encourage more members to participate; ensure the rights, obligations and responsibility of the member countries; identify revision need for international standard system;
- Encourage translating TC255 standard into unofficial languages;
- Establish relationship with other efficiency/clean energy departments in ISO/IEC ;
- Timely assess the relevant information on applicability and efficiency of standard;
- Review and discuss work plan regularly.

### **For the objective 4:**



- Communicate with other departments of ISO; comprehensively consider the development of the biogas technology and policy issues;
- Encourage member countries to share standard and survey research results; establish the TC members' effective mechanism of regular communication;
- Review and discuss TC 255's work regularly to avoid overlapping.

## **6 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME**

This TC will actively create opportunities and provide necessary conditions to encourage participating and observing countries involved in revision of standard drafting. As the ability of member countries for obtaining technical and financial support is limited, TC 255 will develop reasonable time-table for standard-making to ensure the smooth progress. In addition, considering that the budget of participating and organizing work meetings is limited, TC 255 will encourage online communications and video meetings to save costs.

In the coordination aspect of standard drafting and revising, it is important to ensure the member countries involved reasonably planning the priority sequence of standards project. In order to promote the efficiency and quality for standard system revision, it is essential to set up work schedules and information exchange mechanism for standard project. The compatibility between TC 255 and other TCs will also help the standard acceptance and implementation.

In the aspect of standard implementation, TC 255 encourage each member to carry out effective education and training programs, in order to promote TC255 standard's recognition from governmental departments, enterprises and consumers, and to improve the level of acceptance at social level.

## **7 STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC**

### ***7.1 Structure of the ISO committee***

### ***7.2 Current projects of the ISO technical committee and its subcommittees***

### ***7.3 Publications of the ISO technical committee and its subcommittees***

**Reference information**

*Glossary of terms and abbreviations used in ISO/TC Business Plans*

*General information on the principles of ISO's technical work*