

## **PHILIPPINES**

### **COUNTRY PROFILE AND STRATEGIC PLAN FOR AGRICULTURE**

#### **Summary of emissions and characterization of the animal waste management sector**

- a. *Briefly provide information on national and regional methane emissions for animal waste management systems by type of system and animal type.*
- b. *Briefly describe current animal waste management practices (e.g. land application, pasture/range, solid storage, liquid storage, lagoon); livestock types and population numbers (e.g. swine, dairy cattle, beef cattle, poultry, dairy buffalo); and predominant farm sizes.*

A GHG inventory (ADB,1994) accounts for emissions from the five basic sectors of energy, industry, land-use change and forestry, agriculture and waste. Of the 100.8 gigagrams (Gg) CO<sub>2</sub> emissions in the Philippines, 33% is from agriculture. The agricultural sector, with 33.1 Gg CO<sub>2</sub> is the second highest source, next to energy, of GHG emissions in the country. Rice cultivation (40%), domestic livestock (32%), agricultural soils (26%), residue burning (2%) and grassland burning (<1%) are the sources of emissions from this sector.

As of January 2008, swine population stood at 13.7 million pig heads of which 71% is accounted for by backyard farms and the remaining 29% by commercial farms. 62-65% of the medium to large commercial swine farms use lagoon systems while in small commercial farms, 46% use lagoon systems and 40% use settling ponds. Around 7-9% of medium to large commercial farms have biogas systems

#### **Describe the key stakeholders in the animal waste management sector**

*Key stakeholders may include: farmers, farm organizations, utilities, local and/or federal government agencies, non-governmental organizations, equipment providers, consultants, and other private sector representatives.*

Key stakeholders include farmers, industry associations, government agencies, academic institutions, NGOs, and technology suppliers. Details of this are found in the succeeding sections.

#### **Overview of methane recovery potential**

*Provide available statistics on the technical and economic potential for methane recovery and use from animal waste management systems.*

According to a study conducted by the International Institute for Energy Conservation (IIEC), potential methane recovery is approximately 61,509 tons methane per year for swine farming and 426 tons methane per year for slaughterhouses. These are computed using the Intergovernmental Panel on Climate Change (IPCC) Methodology.

#### **Challenges and/or priorities to greater methane recovery and use**

*Discuss the key challenges or barriers to project development, which may include barriers in the following categories discussed in the Agriculture Action Plan:*

- *Awareness*
- *Financial and Economic*
- *National capacity*
- *Policy*
- *Project Identification and Development*
- *Technology*

Although both the public and private sectors have carried out numerous large and small biogas projects over the last two decades, wider acceptance has proved elusive. The barriers are described as follows:

*Awareness.* Despite the many activities that have been carried out in the past, there is still lack of users' and government decision-makers' awareness of biogas, particularly in local government units (LGUs). Unavailable and segregated information on NRE market conditions and status results in the lack of reliable technical information to showcase biogas systems. Dissemination of information on modern systems, including government policies and incentives regarding their transfer is important for promoting technology transfer.

*Financial and Economic.* The financial resources need to be developed. It is important to diversify funding sources and to develop capital markets which could support biogas projects. One barrier is the difficulty in accessing traditional financing windows. This barrier is specifically due to the limitations in project size, markets and balance sheets of project proponents. Project proponents are aware of the available financing schemes and they are also aware that they are not able to avail of most of these unfriendly financing packages. Though many types of renewable energy projects could meet the loan criteria, so far the applications have been few.

*National Capacity.* The country's technology absorption capacity needs to be developed. Existing technology infrastructure should be strengthened by identifying and remedying gaps in its existing capacity. An institutional strengthening program needs to be pursued to build institutional capacity and to improve information dissemination. Capacity building among institutions will help enhance their work structure with clear-cut responsibilities and arrangements. Information dissemination will help strengthen networks among institutions and augment knowledge on technology transfer and related issues.

*Policy.* Specific regulatory and policy barriers to NRE in the country take the form of the absence of appropriate policies, and the existence of conflicting, vague or non-responsive policies. Policy initiatives to attract private investment in clean energy systems are needed, as are regulatory policies that lead to market transformation. Environmental codes, intellectual property rights protection, and foreign direct investment would also encourage technology transfer. The biogas development program in the Philippines has also been hindered by the lack of a policy framework that (1) articulates the contribution that biogas energy can realistically make in the immediate and long terms, (2) provides incentives sufficient to attract private sector participation, and (3) supports effective institutional arrangements for carrying out a coherent national program.

*Project Identification and Development.* This involves the lack of capacity in project packaging and presentation among project proponents. While there is a modest level of knowledge in doing technical and economic studies, there is inadequate capacity in packaging projects and in presenting bankable projects. There is also a lack of private sector involvement in small to medium scale projects and a lack of success stories on sustainable biogas applications in the country. These are basic reasons why market awareness is low and limited is the few success stories known, related to the technical and economic/financial sustainability of biogas projects.

*Technology.* This involves the following Inadequacies in the area of biogas technology development

- Lack of competence - Local technicians and end-users are still largely unfamiliar with the application of biogas technologies.

- Lack of product standards, quality control measures, testing and verification - The quality of materials and other components of biogas technologies are not adequately monitored.

### **List of existing or planned methane capture and/or use projects (if available)**

*Briefly provide information on methane recovery and use practices, including the number of existing digesters and the most common digester types.*

The country has a total of about 300 operational biogas systems with varying capacities ranging from small scale operation for households to large scale process for commercial facilities. These are located in Regions III, IV, V, IX, X, XI, NCR and CARAGA. The most common type in use is the fixed dome design and the covered in-ground anaerobic reactor.

### **Market assessment and reform issues**

*Describe key market issues related to project development. Key issues could include: end uses for methane, potential for on-site uses, prices and tariffs, competition, market access (e.g. access to electric utility grid, gas pipeline), renewable or green energy standards, and regulatory issues.*

Although methane has known benefits, projects on methane and recovery use are not widespread for several reasons. It is usually not a priority of the industrial processes from which it is emitted. In addition, those responsible for the emissions may not be familiar with the technologies available for methane recovery and use.

The national policies on renewable energy (RE), including biogas, are to (a) pursue large-scale use of RE systems; (b) enhance energy self-sufficiency through continuous exploration, development, and exploitation of indigenous energy resources; and c) encourage greater private sector investment and participation in RE activities. Currently, the national priority in RE development is the promotion of off-grid NRE systems to achieve the goal of improving people's livelihood in the rural areas by providing adequate and sustainable energy services

In the near and medium terms, the projected contributions from methane recovery are relatively small but can have significant economic, social, and environmental benefits, especially those that improve energy access for people in the countryside. For cost and technical reasons (e.g., distance from the main network), many rural communities will not be connected to the grid in the foreseeable future, if at all. Small-scale renewable energy systems may be the only practical option for providing basic electricity services to such communities.

### **Financing options (characterize)**

*Provide a brief discussion of available financing options such as internal mechanisms, external support, private sector investment, multilateral agreements, and incentives.*

Government Financing Institutions such as the Development Bank of the Philippines (DBP) and the Land Bank of the Philippines (LBP) have been trained in financing clean energy projects, particularly renewable energy and energy efficiency. The DBP has the primary mandate of providing for the medium and long-term financing needs of enterprises, with emphasis on SMEs, particularly in the countryside. Together with the LBP, DBP is also a main source of finance to local government units. Its lending program caters to environmental protection, climate change, and renewable energy projects. The Land Bank of the Philippines has a mandate to promote countryside development and one of its major roles is to provide credit assistance to small farmers, fishermen, micro-enterprises and SMEs, livelihood loans, agriculture projects, and environment projects. This makes it an ideal financing intermediary for renewable and other clean energy projects.

## **Current cooperation among countries or non-governmental organizations**

*Describe any existing bilateral agreements or cooperation with multilateral development banks.*

None

## **Country strategy**

*Briefly describe the country's strategy and goals (if defined) including the legal framework for reducing greenhouse gas emissions and the role (if any) that agriculture emissions play in this strategy. Also describe any national strategies for the use of biogas.*

*Summarize any international work or goals that the country is supporting or plans to support to promote AD in other countries.*

*List the elements the country is using and plans to use to overcome the barriers and promote methane emission reductions from agricultural waste. These elements may include, but are not limited to, the following:*

- *Data collection and development of information products*
- *Information sharing*
- *Targeted information exchange*
- *Development of financial incentives*
- *Capacity building*
- *Adoption of other new policies, including changes to Regulatory Framework*
- *Specific technical training*
- *Technology demonstrations*
- *Support for research and technology development*

In consonance with this macroeconomic objective, the National Energy Plan sets to address the energy sector's own constraint and objectives, in particular, a) Security of energy supply, b) Affordable and reasonable energy prices, and c) Socially and environmentally compatible energy infrastructures and projects.

The Philippines has an extensive body of legislation and regulation that provide the legal bases for policies and programs related to environmental management. Below are some of these laws:

*The Clean Air Act* sets emission reduction goals using permissible standards and control strategies.

*The Clean Water Act* aims to protect the country's water bodies from pollution from land-based sources (industries and commercial establishments, agriculture and community/household activities). It provides for a comprehensive and integrated strategy to prevent and minimize pollution through a multi-sectoral and participatory approach involving all the stakeholders.

*The Renewable Energy Act of 2008*, signed into law in December 2008, aims to further increase RE utilization in the country, including biogas. The law provides for income tax holidays, duty free importation of equipment, 0%VAT, among other things.

In line with the strategy to protect the environment, with diminishing conventional energy sources and to harness the energy from renewable resources, the country recognizes that biogas technology shows great promise in two respects. First, it promotes the exploitation of methane gas from wastes, hence contributing towards the energy needs and saving on non-renewable resources. Second, the technology promotes better environment through better waste management. To promote the technology, the policy should be placed in context with waste management, environmental protection and renewable energy sources. Its impact on

biogas technology should be discussed. In developing a policy, accurate knowledge of the current situation is required.

Some of government initiatives on biogas include the following:

- Development biogas website. The website consists of information on the technology as well as the extent of its adoption in the country. A training manual on biogas construction was likewise developed.
- Provision of technical assistance in the design and installation of small-scale communal biogas projects in piggery farms.
- Promotion of biogas technology in the country's different regions. This includes the development of information dissemination materials particularly training manual on biogas communal systems, and the conduct of fora on biogas construction.

To overcome the barriers for the adoption of methane recovery and utilization projects from the agro-industrial sector, the following will be undertaken:

*Data collection.* An inventory conducted by the International Institute for Energy Conservation (IIEC) shows the top industries likely to produce significant methane emissions from their wastewater treatment facilities. The study, which will continually be updated, is an important input in efforts to stimulate methane recovery and use projects.

*Capacity building.* This involves activities that will raise awareness in key industries, improve local expertise and knowledge, identify possible collaborative projects, identify cost-effective opportunities to recover methane emissions for energy production as well as potential financing mechanisms to encourage investments. The capacity building can be in the form of workshops, technical assistance, conferences, consultations, meetings and other activities. of the selected biogas systems.

*Information sharing.* Comprehensive information on biogas systems, including the related government policies and incentives, current service providers, potential community and business uses need to be provided to the target stakeholder groups. This is to generate awareness about the technology. Moreover, it would aim to encourage the target stakeholders to seek more specialized information about biogas systems. Information activities, campaigns, publications courses and seminars can be reinforced through preparation of feasibility studies and industry plans, forum and consultations, prototype development, plant assistance, publication, fairs, and information exchange, among others.

*Technology demonstration.* Technology demonstration projects appropriate for the locality will be showcased in selected sites. Private sector participation will be encouraged through consultation with prospective partners and beneficiaries of the project. As a strategy for getting a long term commitment beneficiaries must provide an equity as their counterpart to the project establishment. The operational management of the project must be the responsibility of the beneficiaries under the supervision of a partner agency involved in project implementation. Monitoring and evaluation of the project will be done by the implementing agency in cooperation with the beneficiaries.

*Development of financial mechanisms.* Accessible credit facilities will be provided to potential borrowers by this program. Several schemes are recommended including leasing programs and micro-credit financing.

*Support for research and development.* Although the application of anaerobic digestion is mature and has found full-scale commercial applications, there is still potential to improve these systems through research and development.

*Policy measures* .The government can use several policy measures to provide incentives for renewable energy based power generation in a restructured environment. They can be in the form of production incentives such as per-kilowatt-hr payments or tax credits, guaranteed power purchase agreements at favorable rates, mandated set-asides for biogas energy generation, or renewable energy specific waivers to certain restructuring-related restrictions.

### **Other issues related to animal waste management**

*Summarize other environmental and economic considerations that factor into decisions about animal waste management in your country.*

Already mentioned in previous sections.

### **Government Structures**

*Provide an overview of the governmental or other organization(s) that promote methane emission reductions from agricultural sources (federal and state level, partnerships with private sector, etc).*

The main roles and mandates of these stakeholders are not necessarily directly related to energy, but also refer to energy in some of their broad development objectives. The Department of Energy (DOE) is designated as one of the implementing institutions, specifically, as provider of technical services. The DOST is likewise involved through its various attached agencies and councils like the Philippine Council for Industry and Energy Research and Development (PCIERD) whose role directly relate to research, development, demonstration and pilot scale implementation of biogas projects. Other stakeholders include government agencies, NGOs, beneficiaries and private commercial sector firms. In this case, NGOs and other private sector organizations such as Renewable Energy Association of the Philippines (REAP) are also directly involved through projects and activities relating to biogas. These organizations are involved in biogas through specific projects that these organizations undertake pursuant to their development goals.

<b>AGENCY</b>	<b>FUNCTION</b>
<b>1. Department of Environment and Natural Resources (DENR)</b>	The primary government agency responsible for the conservation, management, development, and proper use of the country's environment and natural resources. DENR is the country's Designated National Authority (DNA) for the Clean Development Mechanism (CDM)
<b>2. Department of Science and Technology (DOST)</b>	The primary science and technology (S & T) body that provides central direction, leadership and coordination of S&T programs. It formulates policies, programs and projects in support of national development priorities in energy and environment.
<b>3. Department of Agriculture – Bureau of Animal Industry</b>	The government agency that formulates and implements long and short-term programs to develop and expand the livestock, poultry and dairy industries.
<b>4. Department of Energy (DOE)</b>	Responsible for implementation of the energy development plan for the country, regulates all petroleum companies and is now promoting the shift to cleaner fuels.
<b>5. Department of Trade and Industry (DTI)</b>	In-charge of promoting industrial development of the country, provides incentive to encourage industries to adopt cleaner technologies and sets standards of products manufactured, imported and sold in the country.
<b>6. Local Government Units (LGUs)</b>	Prepare and implement waste management programs in their respective jurisdiction in coordination with other government agencies. Responsible for solid waste management.
<b>7. Cavite State University</b>	Designated as the National Biogas Center, this state-run University has conducted a number of seminars and hands-on trainings on biogas technology.

## Country contacts

*List the anaerobic digestion contacts in your country, including researcher organizations, technical experts, consulting firms, equipment suppliers, etc.*

### Technology Suppliers

Solutions Using Renewable Energy Inc., (SURE, Inc.)  
602 OMM CTIRA Bldg., San Miguel Avenue, Ortigas Center, 1605 Philippines; Website: [www.sure.com.ph](http://www.sure.com.ph)  
Telefax: 632- 634-794; Email: General: [info@sure.com.ph](mailto:info@sure.com.ph); Biogas: [biogas@sure.com.ph](mailto:biogas@sure.com.ph)

Philippine BioSciences Company Inc.(PHILBIO)  
19<sup>th</sup> Floor, Unit F, Strata 100 Bldg., Emerald Avenue, Ortigas Center, Pasig City  
Tel: 632-6320277; Fax: 632-6312044

Bio-Environmental Services and Technologies, Inc. (BEST, Inc.)  
19<sup>th</sup> Floor, Unit F, Strata 100 Bldg., Emerald Avenue, Ortigas Center, Pasig City  
Tel: 632-6320277

CPI Energy  
39 San Miguel Avenue, 17<sup>th</sup> Floor, One Magnificent Mile, Ortigas Center, Pasig City  
Tel: 632-6352692; Fax: 632-6352693

### Industry Associations

Slaughterhouse Operators Association of the Philippines  
66F Manalo St., San Juan City  
Tel: 7222514

Philippine Swine industry, Research and Development Foundation  
12 Doña Consolacion Bldg.  
Gen. Santos Avenue, Araneta Center  
Cubao, Quezon City  
Tel: 913-5314; 912-9017; Fax: 912-9016

Philippine Association of Hog Raisers, Inc.  
2 Samat St., Sta Mesa Heights, Quezon City  
Tel: 731-7529; Fax: 731-1841/731-6186

United Swine Producers Association  
3F, R. 301, R&G Tirol Building  
831 EDSA Corner Scout Albano St., Quezon City  
Telefax: 924-8884

Philippine Swine Producers Associations  
Sto. Domingo, Capas, Tarlac  
Tel: 045-9250505; Fax: 045-9250506

National Federation of Hog Farmers, Inc.  
2F, Reliance House 205 EDSA Cor. Rochester St.,  
Greenhills, Mandaluyong City  
Telefax: 744-3500/726-3644

Center for Alcohol Research and Development Foundation  
7<sup>th</sup> Flr, Allied Bank Center,  
6754 Ayala Avenue, Makati City  
Tel: 893-3555/ 8120311; Fax: 812-0312

Philippine Sugar Millers Association, Inc.  
Room 1402 Security Bank Centre 6776  
Ayala Avenue, Makati City 1226 Philippines  
Tel: 632-8911138 & 8911202; Fax: 632- 8911144; Website: 632-8911144

Philippine Association of Food Technologists  
c/o Jollibee Food Corporation  
Research and Development

Jollibee Center, San Miguel Avenue  
Ortigas Center, Pasig City  
Tel: 6451693 to 94; Fax: 646-6303

Renewable Energy Association of the Philippines (REAP)  
c/o Maschinen & Technik, Inc. (MATEC) Tech Center  
Buencamino St., Alabang, Muntinlupa City  
Tel: 850 6450 to 52; Fax: 8503631

Annex 1 lists the country's experts on biogas.

## **Conclusions and observations**

Harnessing and utilization of indigenous resources like agro-industrial wastes comprises a critical component of the Philippine government's strategy to provide energy supply for the country. Although biogas systems are considered mature and their use have been amply demonstrated, the technology is not widely adopted in the Philippines. This is due to institutional, technical and economic barriers which the country is trying to address. Current initiatives in the pursuit of this policy are directed towards creating a market-based environment that is conducive to private sector investment and participation and encourages technology transfer and research and development. Thus, current fiscal incentives provide for a preferential bias to renewable, indigenous and clean energy technologies and projects like biogas.

## **References and sources**

PCIERD-Assisted Project Terminal Report, *Technology Validation Of Biogas Technology And Its Utilization In The Philippines*, 2007

International Institute for Energy Conservation (IIEC), *Resource Assessment Report fro Livestock and Agro-Industrial Wastes in the Philippines*, 2009

Philippine Energy plan, Department of Energy, 2006

Asian Regional Research Programme in Energy, *Technologies for mitigation of greenhouse gas emissions: barriers and promotional approaches*, 2005



**EXPERTS ON BIOGAS TECHNOLOGY**

**LUZON AREA**

<b>Region</b>	<b>Name of Person/Company/Organization</b>	<b>Address</b>	<b>Tel/Fax No.</b>	<b>Contact Person</b>	<b>e-mail address</b>
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I	DMMMSU-ANEC	Don Mariano Marcos Memorial State University - Affiliated NonConventional Energy Center Bacnotan, La Union	(072) 242-56-42 TF	Mr. Gil F. dela Vega Dr. Mario B. Mendoza	<a href="mailto:Mbmendoza@excite.com">Mbmendoza@excite.com</a>
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II	Anacleto Gorospe	Alicia, Isabela		Mr. Anacleto Gorospe	Note: contact Ms. Arlene Castillo at 078-622285
II	Quirino State College	Diffun, Quirino			
III	DOST-Aurora	Department Of Science and Technology Region 3, Baler, Aurora	9108916059	Engr. Orlan Anselmo	<a href="mailto:oganselmo@yahoo.com">oganselmo@yahoo.com</a>
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IV-A	B.A. Gonzales Farm Builder	Bago, Ibaan, Batangas	(043) 311-26-71	Mr. Bienvenido A. Gonzales	
IV-A	International Training Center for Pig Husbandry (ITCPH)	Marauoy, Lipa City	(043) 756-1987 (043) 756-1995F	Engr. Medel Dimaculangan	
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XI	USEP-ANEC	University of Southeastern Philippines - Affiliated NonConventional Energy Center Bo. Obrero, Davao City	(082) 221-1636TF	Engr. Fulton U. Yap Engr. Aquileo B. Estrera	<a href="mailto:ab_estrera@yahoo.com">ab_estrera@yahoo.com</a>
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