

T@W Good Practice Form: Thailand

Korat Waste to Energy (KWTE)

Setting:

Title: Korat Waste to Energy (KWTE) Project.
Country: Thailand
Location: Muang District, Nakhon Ratchasima Province,
Start date: 2003
End date: 2027
Technology keyword(s): Industrial Waste
Host sector: The project sectoral scope, as defined by the UNFCCC, is Waste handling and disposal.

General description:

Summary: The Korat Waste to Energy Project is an anaerobic digestion project, treating wastewater from the starch industry, at the Sanguan Wongse Industries (SWI) facility in Nakhon Ratchasima Province, Thailand. The Anaerobic Baffled Reactor (ABR) is used to remove the organic material in the wastewater, thus reducing the Chemical Oxygen Demand (COD) and subsequent fugitive CH₄ emissions from existing open lagoon. Produced biogas is used in the SWI facility to substitute fuel oil. Excess biogas is fed to gas engine-generators, 3 MW capacity to produce electricity, and displace grid fed electricity. GHG emission reduction from the project activities are approximately 314,959 tonnes CO₂ equivalent/year

Aims: To treat wastewater from SWI Starch Factory, this result in mitigation of methane generated in existing open lagoon. Biogas from implemented wastewater treatment system is used for replacing fuel oil and generating electricity to substitute grid electricity.

Summary of Results: Biogas produced from ABR shall be used to replace fuel oil approximately 9,506 tonne (over 8 million litres) per year. Excess biogas shall be converted to electricity using installed 3 MW gas engine-generator, which shall produce electricity, substitute to grid electricity approximately 20,000 MWh per year.

Operation Time: The plant has minimum life time 25 years.

Technical details:

Technical details: The Anaerobic Baffled Reactor will be used to remove the organic material in the wastewater, which will reduce the Chemical Oxygen Demand (COD) and subsequently mitigate CH₄ emissions from existing treatment in open lagoons. The ABR system consists of the following modules:

Pre-treatment module;

Grit trap to remove sand;

Mixing module to maintain the chemical balance of the incoming wastewater;

The ABR reactor;

Biogas treatment system that removes moisture from the gas;

A Power Plant module;

A flare module for burning excess biogas and the delivery system to the new burners in the factory.

Biogas produced will be used in the SWI facility to dry the wet starch cake, replacing approximately 8 million liters of fuel oil a year which is currently employed to dry the starch product. Excess biogas will be utilised in 3 MW gas engine-generators to produce electricity, and displace grid fed electricity.

Energy data:

Energy data: In this project, 9,506 tonne of fuel oil per year is expected to be replaced by biogas generated from wastewater treatment plant. The project installed 3 MW of electrical capacity in the first year of operation, in March 2003, which is 10 months after the initial ABR operation. Expected electricity generation using excess biogas from drying wet starch cake process can replace electricity from grid approximate 20,000 MWh per year.

Energy saved/generated: The project will save fuel oil used in starch factory approx. 382,046 GJ/year (calculated from 9,506 tonne-fuel oil saving x Net Calorific Value of fuel oil of 40.19 GJ/T) and generate renewable energy electricity replacing grid's electricity approx. 72,000 GJ/year (20,000 MWh/year).

Monitoring: The approved baseline and monitoring methodology AM0022 “Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector” is applied to the project activity. The Monitoring Plan (MP) has been provided for the necessary methodological, data collection, and auditing needs and procedures for recording the project variables. The biogas plant supervisor will collect all data relating to biogas-determined emissions, such as wastewater flows, COD concentrations, biogas volumes sent to SWI facility heaters, etc. The power plant supervisor will collect and manage all data relating to electricity generation and operation of the flare. The staff will also monitor any leakage effects as part of the constant plant operational monitoring.

Environmental data:

Environmental data: This project does not require an Environmental Impact Assessment (EIA) under Thai Law. However, this project causes the positive environmental impacts as follows:

- Dramatic reduction in biogas production and fugitive emissions of biogas from current pond system;
- Improved water quality in existing open ponds;
- Reduced demand for fossil fuel intensive grid fed electricity;
- Reduced demand for oil products.

Project GHG-emissions: Total estimated project emissions are the sum of fugitive methane emissions from the existing lagoon based water treatment system, from possible methane emissions from the new anaerobic waste water treatment facility, from incomplete biogas combustion, biogas leaks. Project GHG emission is approximately 39,718 tonnes CO₂ equivalent/year

GHG-emission reductions: GHG emission reduction from the project is approximately 314,959 tonnes CO₂ equivalent/year

“EAU, CER, ERU, AAU”: CER

Methodology: AM0022 “Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector”, Version 03, 28 July 2006 is applied to the project.

Baseline

The baselines of this project are:

1. Wastewater, high in COD, is treated via a lagoon system, producing massive amounts of biogas methane emit to ambient;
2. SWI uses fuel oil to dry wet tapioca starch cake which emit CO₂ from fossil fuel combustion to ambient; and
3. The use of Grid's electricity which is the CO₂ emission of Thailand's Grid Electricity Generation.

Monitoring:

The approved baseline and monitoring methodology AM0022 "Avoided Wastewater and On-site Energy Use Emissions in the Industrial Sector" is applied to the project activity. All required data and parameters shall be collected by plant supervisors as above.

Contribution to Sustainable Development:

The project will contribute to Thailand's sustainable development as follows:

The project will act as a clean technology demonstration project, which could be replicated across Thailand and the region;

It will act as an important capacity building project, nationally and locally, especially demonstrating the use of a new financial mechanism for funding of the renewable energy and waste management sector via the CDM;

It increases diversity and security of energy supplied through energy self-sufficiency, reducing the import of energy from overseas - with a positive effect on Thailand's balance of payment;

The multiplier effect of this investment is likely to bring additional benefits, such as employment opportunities, particularly in the agro-industrial sector;

It provides additional value for cassava production- a valuable export commodity for Thailand;

The project will make use of material currently considered a waste material that gives rise to a considerable hazard in the flammable methane rich biogas emitted;

Technology will be sourced locally where possible, or transferred from overseas where required; and

A fund will be established from the CER proceeds to fund the KWTE foundation (as part of its community development commitment to support greenhouse gas mitigation education).

Economic data:

Economic data: N.A.
Financing: N.A.
Capital cost: 250 million baht

Additional Information:

Printed or electronic reports or other literature available:

Title	Korat Waste to Energy (KWTE) Project in Thailand, Prepared by EcoSecurities Ltd., September 2006 (ver. 02)
Methodology	ACMOO22 ver.2 Address for download of electronic document: http://cdm.unfccc.int/methodologies/DB/BM4NZO7YAH9373G9P0UZHN6G1XM3IW/view.html
Project Document	Address for download of electronic document: http://cdm.unfccc.int/Projects/Validation/DB/1XGJ76MVWAMBLL8592KTYL3LRA3NEJ/8UA2CXS3YPX9IUZDMMURH3VFYZ3AYD

Project Web site: N.A.

Photo Library:

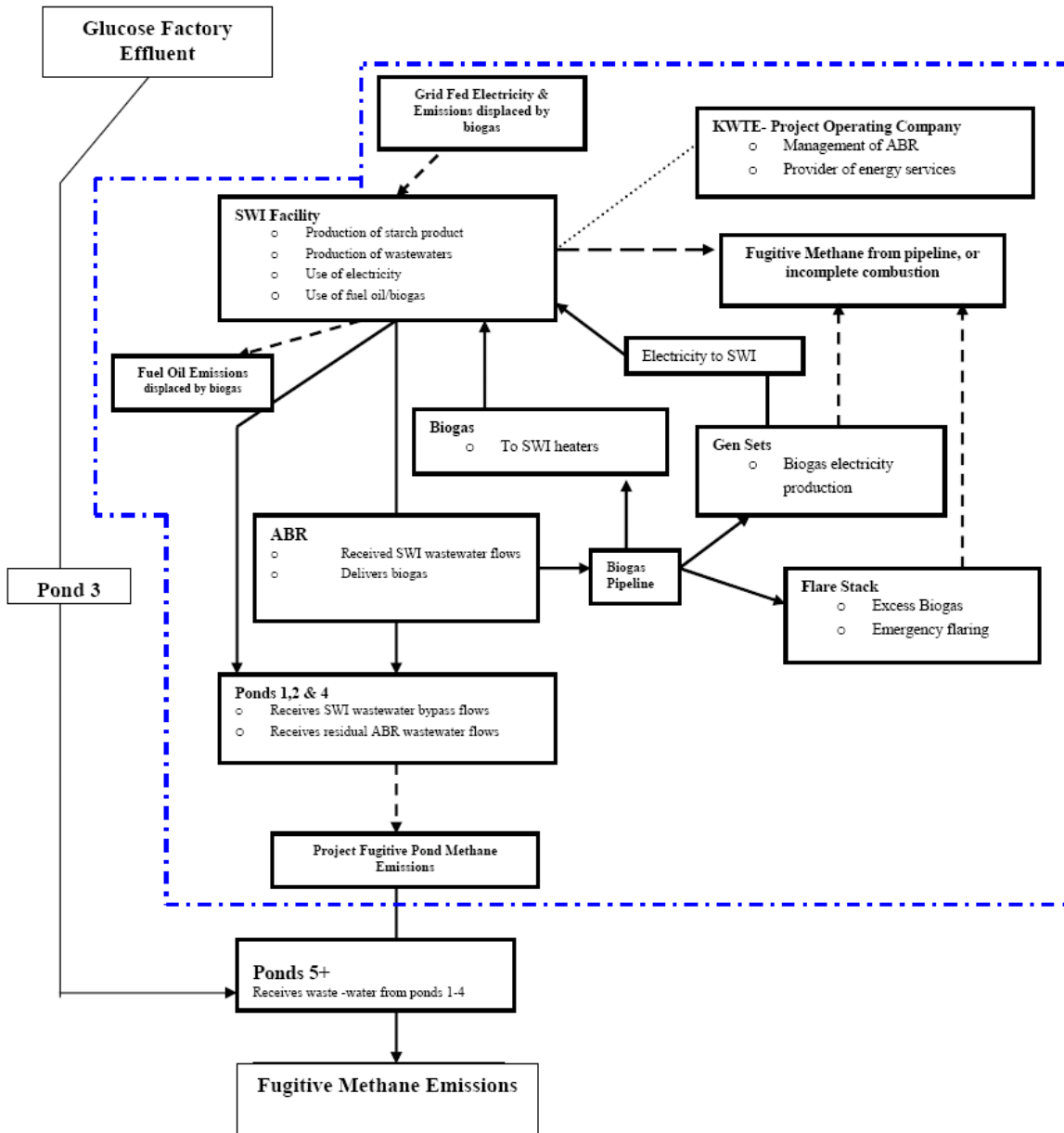


Figure 1 KWTE Project Boundary

(Source: CDM-PDD of Korat Waste to Energy (KWTE) Project)

Contact information:

Type of Organisation: Host Company
Organisation / Agency: Korat Waste To Energy Company Limited
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Description of the Organisation for inclusion in the database of Technology and Service
Providers: The project is owned and operated by Korat Waste To Energy Company Limited

Type of Organisation: Project Participant
Organisation / Agency: EcoSecurities Group Ltd.
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Providers: