INTRODUCTION OF BIOMASS CO-GENERATION SYSTEM FOR FOOD FACTORY 2.5MW



★ISO 22000/14001/9001, FSSC22000, GMP/HACCP ★HALAL, KOSHER Certified Factory



ISO 14001

Representative participant

FUJI FOODS CORP.

ISO 9001

HACCP

94 MAMEDO-CHO KOHOKU-KU YOKOHAMA, KANAGAWA Prefecture, JAPAN

ISO 22000

Partner participant THAI FOODS INTERNATIONAL CO.LTD

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Agenda

 General information on Thai Foods International Co., Ltd (TFI) History, Location, Project Background, Project support (participants)

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- 2. Project system
 - Improvement concept
 - Main components : Boiler, Water treatment plant, Turbine
- 3. The proposal of the project
 - Reduce fuel (husk) consumption
 - Reduce electricity purchase
 - Reduce electricity peak demand
 - Reduce CO₂ emissions

4. Other merits

1. General Information

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Factory History



THAI FOODS INTERNATIONAL CO., LTD (TFI) 1988 Established factory to produce Seasoning.



In 1999, Japan TOBACCO INC. (JT), 3rd biggest tobacco company, main brand names Mevius, Camel, Winston, Salem etc became our shareholder. Now, our direct mother company is TableMark Holdings Co., Ltd. which is Processed Food business division of JT. TFI produces seasoning products and sells in domestic and export to Japan and the world.



Now, our main business is "Yeast Extract" product, which is one kind of seasoning.



Project Location





Location of Biomass Co-generation (BCG) system in Thai foods international Co.,Ltd., is at Amphur Banglen, Nakhon Pathom Province.

Environment around area of BCG power plant is mostly rice field and the community is not so thick. The nature of the area is lowland and the Tha-Chin River flows through the district.

Project establish background

TFI has operated over 20 years. In current economic situation, energy costs are likely to rise. In addition, the steam supply boiler become older. This may cause problems in the following

■ Higher maintenance costs by machine service time

Higher production costs by the low efficiency old machine.

Higher risk of environment impact to communities.

For better improvement our environmental policy ISO14001, TFI decided to install the Biomass Co-generation system (BCG).

Project support



Joint Credit Mechanism(JCM)

Greenhouse gas reduction program under the Joint Credit Mechanism from Japan together with Thailand Greenhouse Gas Management Organization (TGO)

(THAILAND GREENHOUSE GAS MANAGEMENT ORGANIZATION) <u>http://www.tgo.or.th</u> http://ghgreduction.tgo.or.th/jcm/





Thailand Board of Investment (BOI)

Measure for improvement of product efficiency

- Measure to promote energy conservation alternative energy utilization or reduction environment impact.

- Promotion for machine change and upgrade to save energy and introduce alternative energy.





Fuji Foods Corp. & Thai Foods International and Group company

4S model :We strive to fulfill our responsibilities to our valued consumers, shareholders, employees and the wider society, carefully considering the respective interests of these four key stakeholder groups, and exceeding their expectations wherever we can.

https://www.jt.com/csr/environ/index.html



2. Project System

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Project improvement by main machines

1. Change boiler from steam situated state low pressure to steam super heat and high temperature , high pressure boiler

	Exiting	Improve
Туре	Water tube, traveling grating type	Water tube, step grating type
Fuel	Rice husk	Rice husk , the other bio-mass
Pressure operating (BarG)	8.2	75
Temperature (c)	185/Saturated	500/Super heat





2. Addition water treatment plant by install DI plant (Demineralize Ionization plant) for treat water to pure water without ionize in water and conform with steam turbine quality of live steam specification require.



3. Add Steam turbine and electric alternator to system Back pressure type of Steam turbine rated 30TPH 75Barg 500 $^{\circ}$ With synchronous generator 2.5MW 3.15KV 3phase 50Hz Grid connect



Refer : PEA interconnecting Code 2016

3. Project Proposal (merit)

The proposal of project

1. To introduce new boiler system which can generate electricity and reduce fuel (rice husk) consumption

	Present	Improve
Boiler	8.2BarG 12T/H water tube 3units	75BarG 30T/H water Tube 1 unit
Boiler efficiency %	75%	80%
Average Rice husk consumption per year (T/Y)	45,000	42,000
Rice husk Consumption reduce by boiler Efficiency (T/Y)		-3,000
Electricity Generation	None	Electricity
※ Rice Husk consumption for Electricity produce(T/Y) at 2.5MW		6,500 (not included in 42,000)

2. To decrease purchasing electricity from PEA by generating electricity approximately 13,900 MWh/Year



Present:= Import

Electricity in Factory = Import from PEA Average Consumption :=54,000 MWh/Y



Improve:= Produce

Steam Turbine and Electricity Generator = 2.5 MW Electricity from new system := 13,900 MWh/Y



Result:= Reduce Import Electric Energy Import from PEA := 54,000MWh-13,900MWh := 40,100 MWh/Y 3. To reduce electricity demand from 5.8MW in month to 3.7MW support by steam turbine and generator capacity

Electric Demand := Electric Energy that are supplied to electric machines for start up period.

Unit in "KW"



4. Indirect merit of reducing CO_2 gas emission in case of electricity produced from renewal energy (rice husk).



* Reference emission from steam is zero because it will be supplied by biomass boiler.

Conformity with Thailand government 's policy

In 2012, the Ministry of Energy (Thailand) together with the Electricity Generating Authority of Thailand (EGAT) prepared the **Thailand Power Development Plan 2012-2030** (PDP2010 Revision 3) to formulate power system development framework.

In PDP2010 Rev03 Government strive to substitute fossil energy 25% continuous 10 year by electricity produced by renewal energy from 2012-2021 in AEDP (Alternative energy development plan).

In present now PDP2015 that designed for the security of the country's electrical system. To ensure the stability of the entire power system, power transmission system and power distribution area. The cost of electricity is at a reasonable level, reflecting real costs. People do not carry too much burden. Environmental impacts reduce CO_2 emissions no higher than the 3rd PDP2010, by promoting sustainable alternative energy generation.

Fuels	Status at end of 2014* (MW)	Target at 2036 (MW)	
1. MSW	65.72	500.00	
2. Industrial Waste	-	50.00	
3. Biomass	2,451.82	5,570.00	
4. Biogas (WW/SW)	311.50	600.00	
5. Small Hydro	142.01	376.00	
6. Biogas (Energy Crop)	-	680.00	
7. Wind	224.47	3,002.00	
8. Solar	1,298.51	6,000.00	
9. Large Hydro	-	2,906.40**	
Total install capacity (MW)	4,494.03	19,684.40	
Electrical Energy (Million Units)	17,217	65,588.07	
Total Electrical Energy Demand (Million Units)	174,467	326,119.00	
Share of RE in Electricity Generation (%)	9.87	20.11	

Status and Target of Electricity Generation by type of Fuel

* Including off grid power generation and not including power generated from large hydro

** It is the existing capacity and the generation from large was included in the Target of AEDP2015

http://www.eppo.go.th/index.php/th/plan-policy/tieb/pdp Thailand energy policy and planning office Ministry of Energy



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4. Other merits

Other benefits will be provided from BCG plant.

- Environmental impact will improve by the BCG system.
- The Ash from the power plant can be used in agriculture such as orchid farm, ornamental plant, ceramic factory, steel plant and others.
- Communities near the power plant to receive money from the power plant sent to the Energy Fund. They will use it for community development by request to state that to respond on manage of energy fund.
- Create good relationship between communities, people, factory by every 1 year. Factory will make meeting with communities for talking on environment control and problem.
- Reduce problem of electricity shortage supplied to community. PEA can increase load on electricity 2.5MW

Thank you very much for your attention