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INDUSTRIAL SYMBIOSIS CASE STUDY

MUTUAL USE OF BOILERS BETWEEN THREE COMPANIES WITH SUPPORT FROM ESCO

CONTEXT

Several companies in Tra Noc 1 IZ operate boilers independently at smaller scales within their own facilities. Smaller and older operations may often result in lower efficiencies and higher associated costs, due to variations across aspects such as the type of technology, scale of operation, skill of operators, lack of maintenance, higher fuel procurement costs, etc. It is expected that shifting from these to an advanced centralised boiler operation that is run by professional operators will result in increased efficiency of the system and reduced overall costs to the companies.

- Increased efficiency of the boiler due to the scaling effect and optimisation of its use over time: one larger capacity boiler is more efficient than several smaller ones.
- Potential air emissions reduction due to optimized resource use and improved stack control.
- Reduction in biomass fuel costs as fuel can be procured in larger quantities (depends upon the signed agreements and specific conditions at the time of implementation).
- Reduced operation and maintenance costs as they are shared by 3 companies.

INDUSTRIAL SYMBIOSIS CASE STUDY

PROBLEM

In 2007, the Dinh Hai Thermal Power Joint Stock Company invested in a rice husk thermoelectric plant and steam supply system to cater to all companies located in the Tra Noc 1 industrial zone. However, due to an increase in the price of rice husk, reducing profits, and due to the instability of the steam supply system due to long transportation distances in some cases, fewer companies were interested in buying steam from the Company. Furthermore, the electricity purchase price by the national grid was too low to cover all the costs from the company. As a result, the project failed and the idea of a centralized steam system at the IZ level was dropped.

The project proposed that setting up of shared boiler systems between companies at smaller cluster-levels was still promising with a high level of feasibility. Therefore, building a demonstration model for a shared boiler was proposed between three companies located in close proximity to each other, namely: Nam Hung Phat Paper and Package Producing Limited Company, Saigon-Western Beer JSC and Can Tho Chemical Fertilizer Joint Stock Company.

SOLUTION

The separate boiler systems at the three selected companies would be replaced by a single 21 tonnes/hour boiler which will be maintained and operated by the ESCO, responsible for providing steam to the companies at a fixed price.

The objectives of mutualising the use of boilers between the three companies at the Tra Noc 1 Industrial Zone, Can Tho, are:

Relevant stakeholders:

- Nam Hung Phat Paper and Package Producing Limited Company.
- Saigon-Western Beer JSC Factory.
- Can Tho Chemical Fertilizer Joint Stock Company.
- Anh Chau Trading and Service One Member Company (ESCO).

CURRENT STATUS

» Can Tho Fertilizer Company leased space within its facility to Anh Chau ESCO to set up their boiler operations. This consisted of two boilers - one boiler with a capacity of 10 tonnes of steam/hour and a second boiler of 8 tonnes per hour capacity. Two boilers were used instead of one primarily because Anh Chau ESCO already owned these units and would be able to put them to use and meet the required demands.

» With this installation, Anh Chau could continue supplying steam and meeting the demand of Can Tho Fertilizer company supported by the 10 tonnes of steam/hour boiler, while also supplying steam to Nam Hung Phat Paper Company and Saigon Western-Beer Company. In addition, having 2 boilers helps as a back-up and builds in redundancy for any downtime required for maintenance on any one boiler.

» The two existing boilers at Can Tho Fertilizer Company with a capacity of 6 tonnes of steam/hour as well as the existing boilers at Nam Hung Phat company and Saigon Western-Beer Company were decommissioned or kept on standby to be used on rare occasions when additional steam was required.

» The third company utilizing the boiler is Saigon-Western Beer company.

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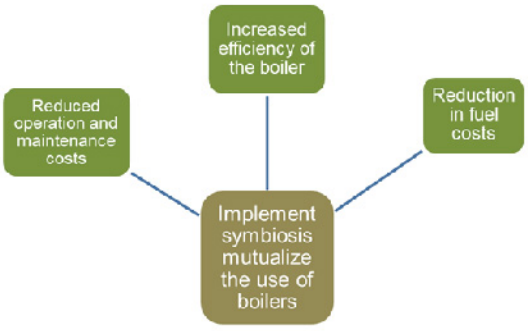
1. Steam pipe network connecting the three companies from the mutual boiler

Locations of the three companies undertaking the IS – new boiler to be situated in Can Tho fertilizer company's premises



Mutualization of boilers - Benefits

KEY BENEFITS REALISED

- **Value addition.**
- **New 'product lines' established.**
- **Alternative source of energy.**
- **Industrial symbiosis: an industrial symbiosis opportunity was realised.**

ECONOMIC INDICATORS

CAPEX	433,380,000 VND (18,481 USD)
OPEX	8.89 billion VND (376,227 USD)
Revenues/ Savings	13.1 billion VND (553,255 USD)
Payback period	2 months

BUSINESS CASE FOR COMPANIES BUYING THE STEAM

CAPEX: N/A

OPEX (Steam procurement costs):

- Can Tho Chemical Fertilizer: 6.11 billion VND
- Wester Beer company: 3.33 billion VND
- Nam Hung Phat Paper: 3.64 billion VND

Total: 13.08 billion VND (553,255 USD)

Revenues/ Savings:

- Can Tho Chemical Fertilizer: 8.17 billion VND
- Western Beer company: 5.55 billion VND
- Nam Hung Phat Paper: 5.69 billion VND

Total savings: 19.41 billion VND (821,276.54 USD)

Simple Payback: <1 year

ENVIRONMENTAL AND SOCIAL ASPECTS

Impact on resource consumption/energy savings: No reduction could be achieved with 50% coal and 50% rice husk usage in the boiler shared between the companies.

However, a reduction in coal consumption could go up to 767t per year if 100% rice husk is being used by Anh Chau as boiler fuel. (This is dependent solely on the price of the fuel as Anh Chau changes the type of fuel procured based on the price at the time).

Impact on air emissions (inc. POP): No reduction in emissions achieved due to 50% coal and 50% rice husk usage as boiler fuel.

However, a reduction in emissions up to ~ 2,026t CO2eq/year and 115 µg/year PCDD/F are possible in case of 100% rice husk usage in the mutually used boiler.

Impact on working environment: Reduction in the risk of environmental incidents.

Job creation: For ESCO: 4 jobs created for boiler operation (FTE 4).

For client companies: No job lost as the operators were moved to other positions.

Organisational and technical capacity building: Training of workers on the management and operations of the new fluidized bed boiler technology.

Impact on neighbouring communities: Reduction in the risk of environmental incidents.