

Project no.: 296003

Project full title: Efficient Energy Integrated Solutions for Manufacturing Industries

Project Acronym: EFENIS

Deliverable no.: 1.5

Title of the deliverable: Report on systematic framework for efficient and reliable modelling in site energy management (Public Summary)

Contractual Date of Delivery to the CEC: Month 20

Actual Date of Delivery to the CEC: Month 20

Lead beneficiary: UNIPAN

Author(s):

UNIPAN: Mr Jun Yow Yong, Dr Petar Sabev Varbanov, Mr Gergely Fazekas, Professor Ferenc Friedler, Professor Jiri Klemes, Dr Rozália Lakner, Professor Ferenc Hartung, Mihály Pituk, Professor János Szépvölgyi

UNIMAR: Zdravko Kravanja

UNIMAN: Igor Bulatov

AUTH: Professor Michael Georgiadis

Participant(s): P1, P10, P12, P14

Work package contributing to the deliverable: WP1

Nature: Report

Version: 4.0

Total number of pages: 3

Start date of project: 1st August 2012

Duration: 36 months

This report provides account of the performed actions and obtained results of the task “Task 1.4 Systematic framework for efficient and reliable modelling in site energy management”. This has been performed within the scope of Work Package 1 “Total site integration and optimisation technology”.

The work on the current deliverable has been enriched by the practical activities on data collection, where academic partners (UNIMAN, UNIMAR, AUTH, UNIPAN) have been interacting with the industrial partners – IPLOM and MOL, for instance. The report starts with an outline of the overall strategy followed and links to already submitted deliverables.

There have been several essential elements in modelling Total Sites and exploiting the models for improved economic and energy efficiency of the sites, which have not been previously investigated or need adequate and transparent tools. These are the reconciliation of measured data for further use in the modelling and decision making concerning industrial sites, capital cost estimation for Total Site design, audits and retrofit purposes, and translation of Total Site Integration recommendation into practical solutions.

The first part of the task concerns with the development of systematic frameworks for efficient and reliable site energy management. With the efficiency one understands minimizing the engineering hours (and thus cost) needed to perform different work-flows related to site energy management. This will be achieved by automating time consuming steps involved in site energy management, in particular data collection and reconciliation. This can be achieved by developing a computer-aided framework for energy demand calculation. In this way, considerable time saving is expected in performing site energy management works.

This estimation of capital cost for power cogeneration performed by evaluating the potential steam turbine placement for various steam pressure levels. The methodology uses the basic principles of Total Site Integration and adds estimation of capital cost for steam turbines of different capacity, inlet and outlet steam pressure. It also allows the evaluation of the trade-off between capital cost and energy consumption for the Total Site Integration.

Considering the aspect of practical considerations for implementing Total Site Heat Integration (TSHI), the main aim is to provide an assessment and possible guidance for future development and extension of the methodology from the industrial perspective. Several key issues have been identified as being of vital importance for the industries: design, operation, reliability/availability/maintenance, regulatory/policy and economics. Design issues to consider



include plant layout, pressure drop, etc. For operation, issues such as startup and shutdown need to be considered. Reliability, availability and maintenance (RAM) are important as they directly affect the production. Relevant government policy and incentives are also important when considering the options for TSHI. Finally, a TSHI system needs to be economically viable. This paper highlights the key issues to be considered for a successful implementation of TSHI. The impacts of these issues on TS integration are summarised in a matrix, which forms a basis for an improved and closer-to real-life implementation of the TSHI methodology.