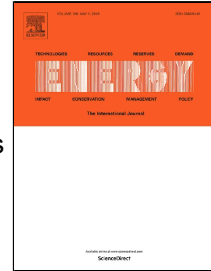


# Accepted Manuscript

Multi-Period Energy Targeting for Total Site and Locally Integrated Energy Sectors with Cascade Pinch Analysis

Peng Yen Liew, Sharifah Rafidah Wan Alwi, Wai Shin Ho, Zainuddin Abdul Manan, Petar Sabev Varbanov, Jiří Jaromír Klemeš



PII: S0360-5442(18)30809-0  
DOI: 10.1016/j.energy.2018.04.184  
Reference: EGY 12823  
To appear in: *Energy*  
Received Date: 27 January 2018  
Revised Date: 26 April 2018  
Accepted Date: 30 April 2018

Please cite this article as: Peng Yen Liew, Sharifah Rafidah Wan Alwi, Wai Shin Ho, Zainuddin Abdul Manan, Petar Sabev Varbanov, Jiří Jaromír Klemeš, Multi-Period Energy Targeting for Total Site and Locally Integrated Energy Sectors with Cascade Pinch Analysis, *Energy* (2018), doi: 10.1016/j.energy.2018.04.184

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# 1           **Multi-Period Energy Targeting for Total Site and Locally Integrated** 2                           **Energy Sectors with Cascade Pinch Analysis**

3                           Peng Yen Liew<sup>a,b\*</sup>, Sharifah Rafidah Wan Alwi<sup>b,c</sup>, Wai Shin Ho<sup>b,c</sup>,

4                           Zainuddin Abdul Manan<sup>b,c</sup>, Petar Sabev Varbanov<sup>d</sup>, Jiří Jaromír Klemeš<sup>d</sup>

5           <sup>a</sup>Department of Environmental Engineering and Green Technology, Malaysia – Japan International Institute of  
6           Technology (MJIT), Universiti Teknologi Malaysia, Jalan Sultan Yahya Petra, 54100 Kuala Lumpur, Malaysia

7           <sup>b</sup>Process Systems Engineering Center (PROSPECT), Research Institute of Sustainable Environment (RISE),  
8           Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor, Malaysia

9           <sup>c</sup>Faculty of Chemical and Energy Engineering, Universiti Teknologi Malaysia, 81310 UTM Johor Bahru, Johor,  
10           Malaysia

11           <sup>d</sup>Sustainable Process Integration Laboratory – SPIL, NETME Centre, Faculty of Mechanical Engineering, Brno  
12           University of Technology - VUT Brno, Technická 2896/2, 616 69 Brno, Czech Republic

13           \*pyliew@utm.my

## 15   **ABSTRACT**

16   Total Site (TS) analysis for incorporating short-term or daily energy variation has been  
17   introduced in the previous studies as an extension of the Time Slice Model for the Heat  
18   Integration of batch processes. However, the energy supply and demand fluctuation could also  
19   be affected by changing customer demands due to seasonal climate variations, economic  
20   downturn, maintenance, plant turn-around, plant operability issues and raw material  
21   availability. This paper extended the cascade energy targeting methodology for TSHI  
22   incorporating long- and short-term heat energy supply and demand variation problem. The  
23   methodology aims to estimate the energy requirements of the TS system considering seasonal  
24   energy storage system as a feasibility study for energy efficiency project. A newly extended  
25   algebraic tool, known as Seasonal Total Site Heat Storage Cascade (Seasonal TS-HSC), is  
26   introduced in the methodology for modelling the energy flow between process units and storage  
27   facilities. The general tool could be used for different storage systems. This proposed tool  
28   includes the estimation of energy losses through self-discharge, charge and discharge process  
29   based on the energy storage system performance. The methodology is illustrated by a case  
30   study, which integrates batch processes, community buildings and space heating system.  
31   Implementation of the developed methodology on the case study resulted in 93.4 % (low-  
32   pressure steam - LPS) and 38.2 % (hot water - HW) heating requirement reduction via seasonal  
33   energy storage system application at two utility levels. The result shows the energy requirement  
34   reduction, which contributes to profitability margin improvement, greenhouse gas emission

Download English Version:

<https://daneshyari.com/en/article/8071436>

Download Persian Version:

<https://daneshyari.com/article/8071436>

[Daneshyari.com](https://daneshyari.com)