

Capital Cost Assessment for Total Site Power Cogeneration

Stanislav Boldyryev (a), Petar Sabev Varbanov (*b), Andreja Nemet (b), Jiří Jaromír Klemeš (b), Petro Kapustenko (c)

a National Technical University “Kharkiv Polytechnic Institute”, Frunze str. 21, 61002 Kharkiv, Ukraine

b Centre for Process Integration and Intensification – CPI2, Research Institute of Chemical and Process Engineering- MÜKKI, Faculty of Information Technology, University of Pannonia, Egyetem u. 10, H-8200 Veszprém, Hungary

c AO "SODRUGESTVO-T", Krasnoznamenyy per. 2, off. 19, 61002 Kharkiv, Ukraine
varbanov@cpi.uni-pannon.hu

Summary

Industrial regions consume large amounts of energy. A lot of research effort is targeted at improving energy efficiency. Heat recovery on Total Site level can provide a considerably high potential for energy saving for industrial areas. It offers opportunities for heat recovery and cogeneration in addition to individual processes. This work deals with estimation of capital cost for power cogeneration, 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 with different capacity, inlet and outlet of steam pressure. It also allows evaluating the trade-off between capital cost and energy consumption for the Total Site Integration.

Main Findings

Developed approach lay out the ground for a procedure evaluating the capital cost targets for power cogeneration on a Total Site level. Using these results, the basic capital energy trade-off can be evaluated and an optimisation of power cogeneration for Total Sites can be estimated. It lets to determine compromise between capital cost and energy consumption for the Total Site Integration. Results of this paper may be used for the advanced capital cost targeting of Total Site. Other important points which has significant contribution to Total Site capital cost should be determined and estimated. It allows reducing the overall cost and identified the optimal distance between hot and cold side of Total Site profile. This will increase heat recovery and improve utility usage as well as decrease the pollution that will have environmental and social impact. The results can ground for further development in Total Site approach to estimate overall capital cost on site level.