

REGIONAL ENERGY OPTIMISATION WITH REGIOPT CONCEPTUAL PLANNER ON WEB

Stephan MAIER¹, René KOLLMANN¹, Khurram SHAHZAD¹, Michael EDER¹,
Michael NARODOSLAWSKY¹

1. Content

Key challenges in the shift from non-renewable to renewable energy systems are the economical use of renewable resources [4] and the ecological sustainable pathway. RegiOpt Conceptual Planner is now freely accessible on the internet and can thus be used for online decision support concerning optimised technology systems in the regions [3, 5], available at <http://developer.dcs.uni-pannon.hu:8888/index.php/en/404>. After requesting specific regional data about existing energy supply, livestock, area availability, energy demand and basic economics, the results page calculates and assembles information for a sustainable development in regional energy use and resource planning. The aim of the planning tool is to provide insights of economic and ecological pressure exerted by further development of the specific area. The online tool is undergoing permanent testing, correction and updating of structure and pre-defined default values.

2. Method

RegiOpt Conceptual Planner (RegiOpt CP) is based on two methods. For the economic evaluation technology network systems and material- and energy flows are optimised using Process Network Synthesis (PNS) methodology (Friedler et al, 1995). In urban and regional planning, it is usually executed using the software tool PNS Studio (algorithmic solver, Software Version 3.0.4, 2011, www.p-graph.com) [1]. For the web based purpose of RegiOpt CP the PNS solver was adjusted to a web application (PNS solver web app). The ecological evaluation is executed by the Sustainable Process Index (SPI) methodology, which is based on life cycle assessment (LCA) and a member of ecological footprint family [6]. It is a freely accessible tool, available at: <http://spionweb.tugraz.at> [2].

3. Results

Based on the available energy supply and other parameters an optimum structure is created which provides the general overview of the observed region. Beside the suggested technology network, also capacities and flows of raw materials and products are shown along with economic parameters. The total revenue of the solution is calculated out of the cost of materials, investment / operating / transport costs and the revenue of products. These products are evaluated with SPI values to show their respective ecological pressure. The optimum structure can be further discussed with respect to global and local energy use, value added and emissions compared to business as usual. The paper will provide a case study of regional energy optimisation in a first test run of RegiOpt CP.

References

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¹ TU Graz, Institut für Prozess- und Partikeltechnik, Inffeldgasse 13/3, A-8010 Graz, Tel. + 43 316 873 30403, Fax: + 43 316 873 30402, Faxnummer, office.ippt@tugraz.at, <http://www.ippt.tugraz.at>

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