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A modelling tool selection process for planning of community scale energy systems including storage and demand side management

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Highlights

- Identification of 13 community scale applicable modelling tools from 51 potential tools
- Categorisation and documentation of tool capabilities to inform modelling
- Storage and DSM modelling and functionality of tools detailed
- Tool selection process for identifying appropriate tools for specific analysis
- Future applicability of selection process, gaps of modelling tools, and future modelling trends

Abstract

Storage and Demand Side Management (DSM) are key in integrating renewable energy into community energy systems. There are many modelling tools which support design of such systems. In order to select an appropriate tool it is essential to understand tool capabilities and assess how these match requirements for a specific situation. The aim of this paper is to provide a process to be used to make such a selection consisting of: (i) a tool capability categorisation, (ii) a stepwise tool selection process.

Capabilities of 13 tools (screened from 51) for community scale were categorised covering: input data characteristics; supply technologies; design optimisation; available outputs; controls and DSM; storage; and practical considerations.

A stepwise selection process is defined, adapted from software engineering, in which tools are scored based on 'essential', 'desirable', or 'not applicable' technical capabilities for the specific situation. Tools without essential capabilities are eliminated. Technical scores and practical considerations are then used to select the tool. The process is demonstrated for a simple case study.

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