Barriers towards Sustainable Energy Cooperation in Industrial Parks

Themenbereich: (7) Industrie

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1. INTRODUCTION

In S-PARCS (Envisioning and Testing New Models of Sustainable Energy Cooperation and Services in Industrial Parks), industrial park managers, large, medium and small-scale companies, engineering consultants, innovation exploitation specialists and research organizations work together to significantly improve the energy efficiency and competitiveness of industrial parks by breaking the barriers toward energy cooperation and mutualized energy services. **S-PARCS revises the paradigm of single-process or single-plant optimization in industrial parks and puts cooperation mechanisms at the center of its optimization approaches**.

This outline gives an overview of the findings of the working paper “Barriers towards Energy Cooperation”, which intends to comprehensively identify, summarize and cluster the manifold barriers associated with various solutions of energy cooperation and mutualized energy services.

2. METHOD

Literature research and workshops on barriers within industrial energy projects, and, more specifically, industrial energy cooperation projects, showed that categorising the barriers as well as distinguishing them is a complex task. Various research teams have found varying possibilities to cluster the barriers. Another aspect is which level of detail is presented or discussed. Most literature either presents general barriers [1–3] or individual case studies and best practises [4–6]. S-PARCS deals with several Lighthouse parks, which differ in their frameworks, current cooperation and commitments to future cooperation. In order to establish a joint basis for the development of intensified cooperation, and to provide boundaries for the development and utilisation of the S-PARCS Initial Assessment Tool (IAT), a detailed analysis of the individual barriers is undertaken in the deliverable, based on literature, experts’ involvement and own research

One purpose of the working paper is to cluster individual barriers and, by doing so, structure and understand them more clearly. Different approaches of categorization were elaborated, for example by type of origin, time of occurrence, research discipline or energy carrier.

3. RELATED LITERATURE

Experiences in the field, described and analysed by various authors in recent years, highlight the relevance of economic, technical and regulatory barriers. After the artificial implementation of “brownfield” Eco-Industrial Parks (retrofit cooperation) and “green field” Eco-Industrial Parks (cooperation planned from scratch) with some of them failing to reach their goals [1], various research institutions began analysing the reasons behind these failures. The parks were planned and built target-oriented and reasonable, moreover being supported by public

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support schemes. Therefore, economic and regulatory barriers, as well as technical ones to some extent, were mitigated for the greater part. The reasons must therefore lie at least partially somewhere else.

Several authors [7–9] found that planned parks tend to be less successful than parks that emerged over time by adding industrial symbioses step-by-step based on self-organization, like the industrial district at Kalundborg, Denmark. [10]

There are also large differences in barriers in already existing parks, which are to be refurbished, and parks, which are newly planned and built. For planned and self-organized Eco-Industrial Parks, some barriers are the same, namely in legislative and normative regulations, availability of technical solutions and economic considerations. Other barriers they share, but tackle differently, are social and managerial issues. In literature the importance of social networking, communities and overhead institutions is discussed.

4. RESULTS

4.1. Results on the clustering of barriers

It was found that due to the barriers' comprehensive and cross-thematic characteristics, there is no clear distinction, no matter which categorization is chosen. It was decided that the categorization in disciplines fits best as it is the most meaningful classification, i.e. barriers were categorized for economic, social/managerial, framework, technical/engineering and information provision barriers.

Another approach is sorting barriers according to their internal or external origin, the size of the company/park, their technology dependency, the industrial sector or the stage of the decision chain at which they come into effect. Additionally, since this working paper deals with energy cooperation, barriers do either exist for industrial energy efficiency in general or only because two or more companies are involved. Furthermore, many barriers cannot be allocated exclusively to one category or they overlap or have causal relationships.

4.2. Results on identified barriers

The working paper of the deliverable comprehensively presents **100 barriers regarding energy cooperation**. Each barrier identified is allocated to only one of the clusters and is discussed throughout the working paper.

It should be noted that the barriers will have a different relevance in the specific cases of application and in different framework conditions. Therefore, certain barriers may or may not apply to concrete situations or individual companies, parks or countries.

5. CONCLUSIONS

The working paper shows that the implementation of energy cooperation or mutualized energy services is a multi-stage process involving many disciplines. Therefore, barriers are allocated alongside these stages and are relevant to all academic disciplines, as opposed to being linked to a dominant discipline, for example the technical one. Although social and informational barriers also occur inside single companies, they play a more crucial role for energy cooperation and mutualized energy services. As compared to internal measures, which converge at a central decision-making point (e.g. board), cooperation implies additional efforts to exchange information, advance in negotiations and set up bilateral contractual agreements.

6. ACKNOWLEDGEMENTS

This outline is based on a working paper, which is part of the deliverables from the project "S-PARCS" which has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 785134. More information on the project can be found at http://www.sparcs-h2020.eu/

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