



Do eco-districts support the regional growth of cleantech firms? Notes from Stockholm



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ABSTRACT

In cities around the world, achieving greater environmental sustainability is increasingly accompanied by economic motivations. This is illustrated in Stockholm, Sweden, Europe's first Green Capital (2010), where an important aspect of the city's contemporary environmental success has been the development and promotion of flagship eco-district projects. Packaging the environmental sustainability and marketability of these development projects has been part of a concerted strategy in Stockholm, one shared by numerous cities around the world. But to what extent can eco-districts contribute to economic growth? Despite implicit policy motivation, a concise approach to connecting and measuring these issues has yet to be established. Based on an examination of two eco-district developments, this paper combines a qualitative commentary consisting of company-specific interviews with and analysis of productivity of regional cleantech firms in an effort to verify the connection between Stockholm's eco-districts and the growth of its cleantech sector. Through this mixed methods approach, promising opportunities to assess the economic impact that eco-districts can have on local eco-innovation sectors have emerged. This type of information can be used to support wider public initiatives in eco-district projects.

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1. Introduction

Eco-districts have emerged as an important component of urban sustainability efforts in many cities across the globe. They provide much needed building stock in growing cities, and they can do so in ways that help reduce the environmental impact of urban activities (OECD, 2013). These environmental interventions are brought about in a variety of direct and indirect ways, including reduced energy demands of buildings, support for urban renewable energy production and implementation of proactive land use, transport and mobility policies. The OECD recognises the many roles and characteristics of eco-districts, including their potential for seeking out, testing and potentially rolling-out new innovative technologies, business models and planning practices. As a result, the OECD (2013) refers to eco-districts as a building block for the green city, providing a format for testing the technical, financial and social viability of new urban technologies. These opportunities suggest that eco-districts could play a valuable role in urban and regional economic growth, while also offering motivation for decision-makers and private actors to pursue greater environmental sustainability.

Existing research has focused on eco-districts from a range of fields and perspectives, including affordability (Dale & Newman, 2009), resource management (O'Riordan, Lucey, Barraclough, & Corps, 2008) transportation management (Broaddus, 2010) and not least, urban planning and development processes (Bylund, 2006; Caprotti, 2014; Johansson & Svane, 2002; Roseland, 1997; Schroepfer & Hee, 2008; Svane, 2008). A similar amount of research has focused on policy initiatives and regional innovation systems for supporting the cleantech sector in regional development (Chapple, Kroll, Lester, & Montero, 2011; Cooke, 2008a, 2008b; Horwitch & Mulloth, 2010; Pernick & Wilder, 2007; Rosiello, 2008). However, while there are approaches for evaluating environmental performance in eco-districts (see for instance: Azhar, Carlton, Olsen, & Ahmad, 2011; Bauer, Möhle, & Schwarz, 2009; Forsberg & Von Malmberg, 2004), we have found no attempts to measure the direct economic impacts that eco-districts have on the development of the cleantech sector within their respective cities or regions. Furthermore, there also appears to be only limited critical discussion on the challenges of making such an assessment and how these challenges could be pragmatically resolved.

Given the recognition that an eco-district can serve as a showcase and demonstration site (OECD, 2013) for new technologies, it is relevant to test its contribution to regional cleantech development. From a policy perspective, this relevance is reflected by the

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OECD: “Further investigation and economic analysis appears to be needed to guarantee their eventual influence on innovation dynamics and enterprise creativity.” (OECD, 2013, p. 84) While investigating the impacts that eco-districts can have for supporting cleantech firms is important for providing evidence-based information to policy-makers, private actors and the third sector, the range of actors involved and the extended timeframe of such projects makes this difficult.

Through the study of two flagship eco-districts that are currently under construction in Stockholm, Sweden, this study tests the potentials of assessing the extent that eco-districts contribute to cleantech growth in city-regions, with a specific focus on local firms. In carrying out the test, interviews were used gain firms’ perceptions regarding the eco-districts’ contributions to the local cleantech sector. These qualitative findings were then coupled with a quantitative analysis that assessed the productivity of cleantech firms located in the region. In carrying out this analysis we identify key challenges to such strategic assessments, particularly in terms of defining which firms fall under the “cleantech” umbrella when tracing firm performance resulting from eco-district development. In response to these challenges, we assess to what extent a mixed-methods approach, using BAD (Best Available Data), presents a viable option to such analysis. In doing so, we test a pragmatic and transferable two-step assessment approach, through which we may indicate the impacts that eco-districts have had on Stockholm’s cleantech sector. We also discuss revisions that can be made to our approach in further testing the capacity to monitor the performance of eco-district policy initiatives.

The introduction is followed by insight into the definition and characteristics of eco-districts and cleantech firms, and a literature review that outlines methods that currently exist for measuring the cleantech sector and green growth. The analytical framework of this study is then described before delving into the case of eco-districts and their role in cleantech development in Stockholm. In this section, a qualitative analysis using selected interviews is presented first and then augmented with a quantitative analysis. In the discussion section, we critically assess the methodological challenges of measuring the cleantech economic impact of eco-districts, how these challenges might be solved, and what benefits this type of assessment may provide for decision-makers. Finally, a brief conclusion presents considerations for the continued testing of measures for the important economic elements of eco-districts.

2. Defining eco-districts and cleantech firms

The relationship between two important aspects of urban development are analysed in this paper: ‘eco-districts’ as strategic urban planning projects and ‘cleantech firms’ as companies producing value-added product and service innovations that directly or indirectly improve environmental performance (Davies, 2013).

“Eco-district” is a widely used urban development term, but we have found that it lacks a broadly accepted definition within an academic or scientific context (Liu, Zhou, Wennersten, & Frostell, 2014). Likewise, they can also be referred to as eco-neighbourhoods, and, in the case of Stockholm, eco-profile areas (Liu et al., 2014; City of Stockholm, 2010). “Eco” (ecological) often references the ambitious environmental goals of a planning project (particularly in terms of energy, water, waste and materials), and “district” references a development scale going beyond the building or block, allowing for the integration of planning measures among multiple aspects of the built environment, including buildings, mobility systems and waste and water management. At the same time, the notion of “district” reflects that they also

tend to be fixed in their spatial extent, clearly distinguishing them from urban plans and planning processes taking place in neighbouring or other parts of the city-region (GlashusEtt, 2007).

Eco-districts often achieve greater environmental potentials by applying innovative ecological principles to support the integrated planning, design, implementation and functioning of different components of the urban system. This is well-aligned with the OECD: “The eco-district therefore appears to afford a rough template for mixing an array of eco-innovations into a modular system...” (2013, p. 94) The characteristics of eco-districts as facilitators of cleantech growth are also noted by the OECD: “The eco-district as a building block for the green city also offers a format for testing the technical and financial viability of various applications as well as their acceptability to residents.” (2013, p. 94) This in turn relates to the proceeding goal of applying green technologies used in eco-districts to wider development projects, and especially to the retrofit of existing building stocks where a vast majority of energy and resources savings potential exists (Shahrokni, Levihn, & Brandt, 2014).

With this in mind, we chose to focus on eco-districts as fixed spaces where urban development projects are carried out to meet three core goals:

1. To act a basic urban developments that add to the building stock, meeting the need for housing and business space.
2. To include environmental goals going beyond current legal mandates.
3. To test and promote a wide array of eco-innovation: particularly in terms of building and infrastructure engineering and design, as well as new business models and planning processes.

We will show how Stockholm’s eco-districts adhere to all three goals, with a particular focus on the third goal, where the municipality attempts to use eco-district developments as a means to support the growth of cleantech firms. Thus, we will specifically focus on tangible product and service developments by private sector companies, which we identify as “cleantech firms”. This is in no way to discount the importance of innovative business models, planning practices and broader economic perspectives that often go hand-in-hand with cleantech developments and eco-innovation more generally, but is instead a means of concentrating the analysis on an economic component that can be isolated, and therefore analysed, as far as possible.

As in the case of eco-districts, there is no steadfast definition of what constitutes cleantech (Davies, 2013). We identify characteristics of “cleantech firms” as: firms producing ‘a range of innovative products, services and solutions that optimize the use of finite and renewable natural resources for long-term commercial and environmental sustainability’ (Ernst and Young, 2011, p.6). It can be problematic however to assume that classifications according to terms such as ‘eco-innovation’, ‘environmental economy’ or ‘cleantech’ are synonymous when scoping research across a number of sources. However, robust analysis when scoping BAD requires a balanced approach, simultaneously being consistent in terminology usage, flexible in analysing different sources of information and transparent by making note of when alternate terms are used.

3. Combining urban development projects and regional growth in cleantech

The nexus between eco-districts and promoting local cleantech firms can be described in relation to an array of intervention areas. This includes technical components of the building; ranging from the building envelope, to efficient electricity, heating and cooling systems, to construction processes that reduce a buildings’ overall

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