

# Climate-smart Hyllie: enacting the vision of the smart city district

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Malmö is growing. Hyllie, a new district in the south of the city, is being developed with new residential buildings, commercial space and a conference centre. But Hyllie isn't just any other district: it is envisioned to be "the Öresund Region's most climate-smart district" and "a global role model for sustainable urban development."<sup>1</sup> The aim of this research project is to examine how visions of a smart and sustainable city are enacted in Malmö.

The responsibility for achieving this vision lies with the signatories to a 'climate contract' signed in 2011 by the City of Malmö and infrastructure companies E.ON and VA Syd. A smart grid is a central project for this vision, which received funding from the Swedish Energy Agency for three years of development (2012–2014)<sup>2</sup>. E.ON has also engaged the owners of two residential buildings, an office building and the Malmö Arena to participate in an EU-funded trial project to integrate smart buildings.<sup>34</sup> To encourage energy efficiency in buildings, Malmö's environmental department also runs a program called Miljöbyggprogram Syd where they provide capacity building for developers and encourage them to set higher energy efficiency standards. Figure 1 shows a timeline of Hyllie's development.

In this project, I will analyse how visions of a smart and sustainable city district are negotiated and translated in Malmö. I intend to study how these visions contribute to infrastructural change and how they affect the governance of urban development. In particular, I am interested in how coalitions of actors come to coalesce around certain visions and projects at the expense of others.

## Previous research on smart cities

Social science literature about smart cities can be traced back to Hollands' "critical polemic against some of the rhetorical aspects of smart cities" where he criticises the "rather self-congratulatory tendency" of cities that call themselves smart (2008, p. 303). He reviews how the term has been used in the early 2000's and identifies the key element of the definition to be "the utilization of networked infrastructures to improve economic and political efficiency and enable social, cultural and urban development" (p. 307), which in related research has also been called 'intelligent', 'wired' and 'digital' cities. The other four important elements of smart cities are identified as (1) business-led urban development, (2) concern for high-tech and creative industries, (3) an emphasis on social learning, education and social capital and (4) social and environmental sustainability (Hollands, 2008; Wolfram, 2012). Hollands concludes that smart

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<sup>1</sup> *Klimatkontrakt för Hyllie*, 17 February 2011. Quotations translated from Swedish by the author.

<sup>2</sup> *Smarta nät för ett hållbart energisystem i Hyllie – Ansökan till Energimyndigheten*, 21 September 2011

<sup>3</sup> *Future internet providing the sustainable Smart City energy eco-system*, [http://www.finesce.eu/Trial\\_Site\\_Malmo.html](http://www.finesce.eu/Trial_Site_Malmo.html)

<sup>4</sup> Schneider Electric Press Release: *Malmö Arena, E.ON och Schneider Electric i samarbete om smart energilösning*, 26 November 2014

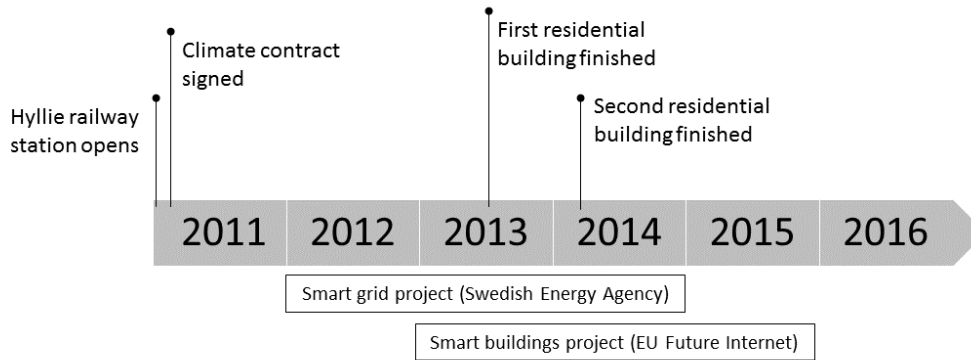


Figure 1: Timeline of Hyllie's development

cities must, in order to be progressive, shift focus from ICT to people and from economic development to improving democratic debate. His arguments have been developed into two strands of social science research into smart cities.

The first strand presents smart cities as desirable and provides definitions and metrics for measurement and comparison. An early example of this strand of literature is a ranking of medium-sized European cities according to six characteristics (Giffinger et al., 2007). According to Söderström, Paasche and Klausner (2014, p. 308), this strand “approach[es] smart cities as an object of analysis and attempt[s] to define the smart city as an assemblage of technologies such as advanced information and communications technology (ICT) infrastructure, smart cards in public transport, and e-governance functions aimed at increasing competitiveness, administrative efficiency and (in some cases) social inclusion (Allwinkle & Cruickshank, 2011; Caragliu, Del Bo, & Nijkamp, 2011; Deakin & Al Waer, 2011; Deakin, 2013; Kuk & Janssen, 2011; Schaffers et al., 2011).” Some of these authors present their definitions and metrics as responses to the self-congratulatory tendency identified by Hollands (2008). This literature tends to present smart cities as desirable and addresses how smart technologies can be implemented.

Another second strand of literature, which addresses the smart cities discourse with a critical perspective, has developed over the past few years. In the spirit of Hollands (2008), researchers have analysed how the discourse has been adopted by multinational technology companies (Gabrys, 2014; Hollands, 2014; Kitchin, 2014b; Söderström et al., 2014; Wolfram, 2012) and the funding policies of the European Union and national governments (Crivello, 2014; Vanolo, 2014; Viitanen & Kingston, 2013). These critiques warn of four consequences that could result from smart cities as they are currently imagined. First, they claim that the ambiguity of smart city discourses makes it difficult to oppose them, hiding the politics of investments in technology. Second, they criticise how the allure of technological solutions also shifts the focus away from other ways of dealing with urban issues. Third, they worry that this shift to technological solutions might cause a shift in decision making power from citizens and municipal governments to the corporations developing the technology. Finally, they describe how these technologies could affect the everyday lives of its citizens in undesirable ways.

However, it is unclear to what extent these warnings are relevant for all smart city developments. Kitchin's (2014a) review of critical scholarship identifies four shortcomings in current research: “(1) the lack of detailed genealogies of the concept and initiatives, (2) the use of canonical examples and one-size fits all

narratives, (3) an absence of in-depth empirical case studies of specific smart city initiatives and comparative research that contrasts smart city developments in different locales and (4) weak collaborative engagement with various stakeholders” (p. 2, numbers added). He criticises, for example, how so much research about smart cities is based on just four projects: Songdo in South Korea, Masdar City in the United Arab Emirates, PlanIT Valley in Portugal (three greenfield developments) and the IBM-designed municipal operations centre in Rio de Janeiro. He calls for “detailed case studies of specific cities, programmes or stakeholders based on extensive fieldwork” (p. 2) This call is echoed by Shelton, Zook and Wiig’s (2014) suggestion to study ‘the actually existing smart city’ and Luque, McFarlane and Marvin’s (2014) desire “to understand how the knowledge and expertise on smart urbanism is being constructed through specific contexts with a particular history and mediated through specific social interests and power relationships” (p. 88). There is only a limited amount of research that sets out to study smart cities in this way.

A few studies do critically analyse smart cities through detailed empirical work. However, even this literature presents little research on how visions of smart cities are translated into urban infrastructural change. Shelton et al. (2014) describe how Philadelphia developed a smart city vision, but this vision resulted in a limited program for improving digital literacy and no infrastructural change. Crivello (2014) studies the adoption of the smart city discourse in Turin, Italy and finds that “most institutions introduced smartness as a keyword in order to re-label pre-existing initiatives, without the need to meaningfully change them” (p. 11). Klauser, Paasche and Söderström (2014) present detailed, empirical work about two smart grid projects, but without analysing how these projects came to be.<sup>5</sup> There is a need to study how a smart city district such as Hyllie is developed and whether the concerns raised in critical literature are relevant in practice.

## Research questions

The following questions represent areas of interest for my study. I plan to use them to guide my first stage of empirical work throughout the spring.

### 1. What are the visions for Hyllie?

One vision of the “climate smart” city district is expressed in the 2011 climate contract, which describes a vision, goals and areas of focus for Hyllie. What is this vision? It can be compared with the visions expressed by the signatories in other settings, such as strategy documents and press releases. Several visions of smart city might co-exist among groups of actors (Hodson & Marvin, 2009). The climate contract might be the result of negotiating these separate visions. There might also be other actors with alternative visions that have been excluded from the climate contract. These visions can be analysed with reference to the critiques of smart cities presented in critical literature, or as an example of post-sustainable cities discourses (Hodson & Marvin, 2014). Visions might also change over time, depending on changing

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<sup>5</sup> The authors describe a planned paper exploring “the power struggles and coalitions of expertise and authority across different geographical sites in the making and subsequent exemplification of the ‘smart city’ as a novel urban policy model,” but this article has not yet been published.

constellations of actors, settings where visions are presented and negotiation during the implementation of projects.

## 2. How does the 'climate-smart Hyllie' change urban governance?

The governance of Hyllie's development process differs from the way in which city districts are normally developed. The climate contract can be seen as an experiment that provides new roles for actors (Bulkeley, Castán Broto, & Maassen, 2014) such as the infrastructure companies and the property developers who develop the district. It is unclear how these companies came to be involved in setting the vision for Hyllie. Should their recruitment be characterised as filling a competence gap, or as pushing technology on municipal administrators with the intention of creating new markets for products and services? These changes could result in a power shift from municipal government to private companies, for example through technological lock-in as vendor-specific technologies are integrated into physical infrastructure. There could also be changes in responsibility within the municipal government as certain issues are given priority over others. Other actors that might have taken on responsibility include technology suppliers, civil society groups or private citizens. On the other hand, the effect of the vision could be limited to the adoption of a discourse without any changes in practice.

The development of Hyllie is also influenced by previous efforts to develop sustainable city districts. The municipality gained experience in encouraging energy-efficient building construction as it developed the different stages of the Western Harbour residential district (Västra hamnen). Planners have used this experience while working with property developers in Hyllie. E.ON's work in Hyllie is also based on experience from the Western Harbour, where they purchased a residential building and used it to develop and test energy efficiency technologies in cooperation with tenants. Other projects that could have influenced how the municipality develops Hyllie include two districts in Stockholm, Hammarby sjöstad and Stockholm Royal Seaport.

## 3. How are visions of the smart city district translated into socio-material relations?

Since the climate contract was signed, these actors have begun developing Hyllie and its energy infrastructure. The Swedish Energy Agency provided funding to develop a smart grid in the district. E.ON has attempted to construct wind turbines, but has been held back by legal challenges. The municipal administration has engaged with builders to construct energy-efficient buildings. E.ON has recruited builders to connect their buildings to the smart grid and recruited households to test energy management solutions. Do these projects reflect an enactment smart city visions? Do actors make strategic use of visions to advance their own priorities? Or do they use the rhetoric of the visions as cover for business as usual?

'Smart' infrastructure is a particular area of interest for this research. How does the incorporation of information and communications technology change the socio-material relations of urban infrastructure? The climate contract states that the aim of the smart grid is to optimise the balance between energy production and consumption, in particular local renewable energy production. The smart grid project aims to integrate all forms of energy (not just electricity) through the development of a central energy management system, integration with building energy systems and feedback to households. Who develops these systems and who controls their operation?

It is also interesting to consider whether these translation processes result in other impacts. Do the successes and failures of projects result in modified visions for the district? Does the municipality make use of its experience in Hyllie in other urban development projects? Do intermediary organisations like E.ON and the Swedish Energy Agency make use of lessons learned in Hyllie to influence socio-material relations in other cities?

## Theoretical approaches

In this section, I explore the implications of three theoretical approaches: assemblage urbanism, social worlds and arenas, and urban political ecology. These three have been chosen because present potential ways of conceptualising the conflicts and negotiations of sustainability transitions, instead of focusing on transitions from one regime to another. The aim of this section is to compare these approaches, but it might also be possible to combine them to some extent. I expect that my theoretical approach will be informed both by more theoretical literature and by my experiences in the field.

### Assemblage urbanism

Assemblage urbanism is an approach that applies actor-network theory (ANT) and other ideas from science and technology studies to urban studies. Instead of treating a city as given, it involves studying how a city is made in practice. According to Blok (2014, p. 271), this approach “depicts the city as a de-centered object, consisting of multiple and overlapping socio-material assemblages, emerging through uneven urban practices.” In this view, the smart city district of Hyllie should not be seen as the object of study. Instead, the focus should be on how actors assemble the smart city district through socio-material relations. It is assumed that this process of assembling the smart city is contested, where some socio-material relations emerge at the expense of others.

Assemblage urbanism also means acknowledging the multiplicity of other objects and categories. In contrast with some critical urban studies, assemblage urbanism means treating capitalism “not as a global abstract logic imposing its forms into local spaces, but as a concrete process assuming multiple forms even within a city” (Fariás, 2011, p. 368). Similarly, when relating eco-housing to climate change discourses, Blok (2014, p. 271) calls for “more attention on the site-specific, heterogeneous and contested ways in which climate change is encountered, understood and engaged across unequal urban settings.” In this sense, Hyllie should not be considered a site that is acted upon by global discourses of smart and sustainable cities. These discourses are rather resources that can be used in different ways by the actors who assemble Hyllie as a smart city district.

### Social worlds and arenas

Clarke (2005) uses the concepts of social worlds and arenas as part of her approach called situational analysis. This approach is based on grounded theory, but draws also on Foucault’s ideas about discourse and discipline and is inspired by ANT’s explicit consideration of nonhumans. It also provides a systematic procedure for relational analysis, describing mapping exercises to help the researcher engage with data without relying too heavily on theory.

One of the analytical exercises that Clarke proposes is the mapping of social worlds and arenas. She explains that these maps “lay out the collective actors, key nonhuman elements, and the arena(s) of commitment and discourse within which they engage in ongoing negotiations” (p. xxii). Clarke defines social worlds as “universes of discourse” (cf. Strauss, 1978). Compared with assemblage urbanism, the concept of social worlds provides a more explicit conceptualisation of collective actors. In her examples, social worlds take the form of organisations, groups of companies, and groups of employees within a certain field (such as nurses or researchers of a specific scientific field). Arenas are defined generally, for example ‘the hospital arena’ or ‘cardiovascular disease arena’, not as specific projects.

Along these lines, my study could focus on an ‘urban development arena’ where Hyllie is a new form of urban development. Social worlds could be consulting companies, municipal governments, or an important central actor such as the Swedish Energy Agency. However, it seems that arenas and social worlds could be defined in other ways too. Could Hyllie or Malmö be defined as arenas? Is the municipal administration a social world, or rather individual departments?

### Urban political ecology

Urban political ecology is the study of relations between the political, economic and ecological aspects of urban development. Political ecology is a broad approach that can be described in terms of several sensibilities: to structures that produce winners at the expense of losers, relations between immediate outcomes and contextual forces, relational ontologies, storytelling that focuses on contradictions, and a tension between realist and constructivist perspectives (Robbins, 2012, Chapter 4). Heynen, Kaika and Swyngedouw (2006, p. 2) emphasize that “cities are produced through socio-ecological processes” and call for attention to “the political processes through which particular socio-environmental urban conditions are made and remade.” This perspective can be contrasted with the characterisation of socio-technical transitions within the multi-level perspective. Instead of “conceiving of urban infrastructure change as a move from one (more or less) stable regime to another,” an urban political ecology perspective “provide[s] a more dynamic, plural and fragmented account of the regimes within and through which urban infrastructure systems are maintained and contested.” (Bulkeley et al., 2014, p. 1476).

Compared with the two approaches described above, urban political ecology emphasises the politics of socio-material change. In my study, it might encourage an emphasis on the shifting power relations among private companies, the municipal government, and its departments. It would be sensitive to contextual factors such as the political situation in Malmö, regulations and goals set by the national government, and the economics of real estate development. The story of Hyllie could be told as a contradiction between the vision of the climate contract and the actions of the municipal government or E.ON. It would also call attention to the various regimes that help to maintain (regulations for siting wind turbines, building codes) or contest (municipal climate plans, national policies for smart grids) urban infrastructure.

### Empirical approach

This section describes how I will start to collect empirical data to answer each research question.

### Research question 1

*What visions of the smart city district have been expressed for Hyllie?*

This question can be addressed primarily with document analysis, with a focus on the climate contract. To start, it can be compared with the four documents that it references: Malmö's environmental programme and energy strategy, E.ON's "Cleaner and Better" corporate strategy, and VA Syd's waste plan. Other documents where the climate contract might be framed in particular ways include newspaper articles, press releases, funding applications, company reports, agreements with project partners, and the meeting minutes of municipal decision making bodies. The perspectives excluded actors could be found in newspaper articles, the minutes of public consultations, and the meeting minutes of municipal decision making bodies.

### Research question 2

*How is the development of the smart city district governed?*

The governance of Hyllie's development extends beyond the signing of the climate contract. Within the municipality, it can be related to the development of the environmental programme and the energy strategy. However, it is unclear where the initiative to develop the climate contract came from. I would like to understand how actor coalitions have formed around the climate contract, the smart grid project, and the smart buildings project. I plan to begin this investigation with an interview of the project manager for Hyllie at the municipality's environmental department. Based on this interview, I will investigate the history behind the project through municipal documents (particularly meeting minutes of departments, the executive committee and the council) as well as interviews with politicians and other administrators. To follow the ongoing development of Hyllie, I hope to gain access to the meetings (or at least the meeting minutes) of the steering group for the climate contract.

### Research question 3

*How are visions of the smart city district translated into socio-material relations?*

The empirical information I have collected points to several intended material impacts: energy-efficient buildings, renewable energy production, an energy management system connected to building management systems, and energy-efficiency technology in homes. I will investigate whether these intended impacts are realised and how they reconfigure socio-material relations. These relations include how the municipality and companies build and manage infrastructure, and how building managers and residents deal with energy in their daily lives. The final reports from publicly-funded projects are one source of information for this investigation. Other sources include interviews with project managers, site visits with building managers, and potentially home visits and interviews with residents.

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