



Strategic municipal energy planning in Sweden – Examining current energy planning practice and its influence on comprehensive planning

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ABSTRACT

The Swedish municipalities, which possess great autonomy for land use planning, are required to have Energy Plans (EPs) concerning the distribution and supply of energy. However, most municipalities no longer have operational control over these aspects of the energy system. Instead, many municipalities have initiated proactive, strategic energy and climate planning. Prior to a potential legislative revision, the current energy planning practice is examined with regards to the propagation of these different energy planning approaches and the influence of municipal energy planning on comprehensive planning. This study shows that 61% of Sweden's 290 municipalities adopted an EP during 2004–2015. Most of these EPs had a broad scope, and it is shown that during the studied time frame the focus of the municipal energy planning gradually shifted towards mitigating climate change. The municipalities' population size also has a significant effect on the propagation and currentness of energy planning. Furthermore, municipal energy and climate planning increases the potential for ensuring the consideration of energy and climate targets and strategies in comprehensive planning, which can facilitate a more sustainability-led municipal planning in line with the Swedish energy and climate objectives, and this relation is thus urged to be strengthened.

1. Introduction

In light of the rapid and ongoing changes to the world's climate, there is an urgent need to facilitate the transition from fossil fuels to renewable energy sources and to improve the efficiency of energy use (International Energy Agency, 2015; IPCC, 2011). The Paris Agreement is a milestone in global climate policy due to its wide international support (Fragkos et al., 2017). However, the emission reductions pledged by the parties lead to a trajectory towards a global warming of 2.6–3.1 °C above pre-industrial levels in 2100, and additional action will be needed from a variety of actors at different levels in order to reach the target of staying well below 2 °C and pursuing efforts to limit the global warming to 1.5 °C (Rogelj et al., 2016). Local communities or municipalities are one of these actors, as local action is seen as key to combating climate change (UN, 1992), and energy and climate planning at the municipal level is a vital part of this decarbonisation (Damso et al., 2016; Pasimeni et al., 2014; van Staden and Musco, 2010). In order to mitigate climate change, the member states of the European Union (EU) have agreed upon emission reduction targets as well as targets regarding energy efficiency and the share of renewables (Strambo et al., 2015). Based on these EU climate targets, and in order

to implement the Renewable Energy Directive (EU Directive 2009/28/EC) and the Energy Efficiency Directive (EU Directive 2012/27/EU) of the EU, the government of Sweden has established national targets for 2020 covering emissions of greenhouse gases (GHGs), the share of renewable energy (both in total and specifically for the transport sector), and energy efficiency (Government Bill 2008/09:162; Government Bill 2008/09:1639). Moreover, on June 2017, the Swedish Parliament adopted a new climate policy framework, further advancing Sweden's ambitions on climate change mitigation (Government and Government Offices of Sweden, 2017). The new long-term, overarching objective is to reach zero net emissions of GHGs in 2045, with interim targets for the so-called ESR-sectors (i.e. the sectors falling outside of the EU Emissions Trading Scheme, including sectors such as transport, buildings, agriculture, and waste management), aiming for a decrease in GHG emissions by 63% in 2030 and by 75% in 2040 compared to the baseline levels of 1990 (Government Bill 2016/17:146). Another milestone target is for domestic transport (excluding domestic aviation) for which emissions should be reduced by 70% until 2030, compared to the emissions in 2010 (Government Bill 2016/17:146). It has recently been assessed that Sweden's 2020 targets will be met with the current policy instruments (Official Letter 2015/16:87), whereas it has been

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prognosticated that the target regarding fossil fuel independency in 2045 will not be reached without tightening current legislation and policy instruments as well as introducing new ones (Swedish Environmental Protection Agency, 2015). Nor the required emissions reductions within the transport sector is predicted to be achieved with currently planned measures and instruments (Månsson, 2016; Swedish Transport Administration, 2015).

The Swedish municipalities are often seen as vital actors in implementing energy policies (Fenton et al., 2015; Palm, 2006) as well as for making further efforts in the energy and climate sector due to their broad and extensive operations and responsibilities concerning planning and decision-making (Granberg and Elander, 2007; Swedish Environmental Protection Agency, 2012). According to the Act on Municipal Energy Planning (1977:439), all Swedish municipalities are required to have an Energy Plan (EP) concerning the supply and distribution of energy. However, since the implementation of the Act, many municipalities have lost operational influence over these provisioning aspects of the energy system (Stenlund Nilsson Ivner, 2006), and some municipalities have instead initiated proactive energy and climate planning by developing Energy and Climate Strategies (ECSs) aiming at lowering GHG emissions (Gustafsson et al., 2015). Some previous studies have been conducted regarding the propagation of municipal EPs and ECSs in the Swedish context (e.g. Gustafsson et al., 2011; Swedish Energy Agency, 2011; Swedish Environmental Protection Agency, 2010). However, all of the studies with a broader selection of municipalities have conducted their investigations through surveys where the participation tends to be skewed towards more active municipalities and the respondents might possess an interpretive bias (Damso et al., 2016; Salon et al., 2014). Moreover, these mappings were conducted a couple of years ago, and some economic incentives (e.g. the Energy Efficiency Subsidy) have been put into effect since then. Hence, a more thorough examination and mapping of current energy planning practice is needed in order to provide insights when considering the future direction of municipal energy planning in Sweden and prior to a potential revision of the Act on Municipal Energy Planning, which is currently being discussed. Further, it is suggested by van Staden and Musco (2010) that smaller local communities often have more limited resources for local climate action, e.g. in terms of staff capacity and financial resources, and an examination of the effect of population size on the continuity and propagation of municipal energy planning might validate these claims.

Another feature that highlights the municipalities' role in shaping a sustainable society is that they have the main responsibility for planning the use of land and water within their geographical area (Elbakidze et al., 2015). Due to this high level of municipal autonomy, the Comprehensive Plan (CP) is a key element in the Swedish planning system (Persson, 2013). Because spatial planning can influence energy use in transport, housing, and the production of renewable energy, there is a need for considering these perspectives in comprehensive planning (Lundström, 2010; Ranhagen, 2013). Therefore, it is of interest to investigate if energy planning can promote the inclusion of targets or strategies concerning energy and climate in comprehensive planning.

The overall aim of this paper was to examine current energy planning practice at the municipal level in Sweden as well as its influence on municipal comprehensive planning. To accomplish this, two specific aims were set:

1. Map, analyse and discuss the propagation, function and use of Energy Planning Documents during 2004–2015.
2. Analyse and discuss the influence of municipal energy planning on municipal comprehensive planning concerning targets and strategies relating to energy and climate issues.

In this paper, the term Energy Planning Document (EPD) will be used as an umbrella term covering all municipal policy documents with

a focus on energy and climate, regardless of whether it is an Energy Plan or not.

2. Background

2.1. Energy planning in Sweden

Besides the responsibility for spatial planning, the Swedish municipalities are required to have a municipal EP concerning the supply, distribution, and use of energy according to the Act on Municipal Energy Planning from 1977 (1977:439). This legislation was developed in a time of energy crisis in order to secure the energy supply (Government Bill 1975:30). The Act is described as a soft regulation by Lundqvist and Kasa (2016) because it lacks both distinct time frames and a clear connection to the municipal land use planning, and no authority was tasked with supervising the municipal implementation of the Act. After the deregulation of the Swedish electricity market in 1996, however, many municipalities either sold or privatised their municipal energy companies (Högseilius and Kaijser, 2010; Stenlund Nilsson Ivner, 2006). Since then, many municipalities have been somewhat inhibited in their energy planning regarding supply and distribution because they have limited ability to influence these aspects of the energy system (Olerup, 2000; Palm, 2004).

Swedish energy policy shifted focus from oil reduction to the phase-out of nuclear power in the mid-1980s, and from the late 1990s there has been a growing recognition of the need to emphasise climate change and for shifting towards an energy system based on renewables (Nilsson and Mårtensson, 2003). This resembles the history of broader trends within EU energy policy, with emphasis put on securing supply from the 1970s and the emergent consideration of climate change in the 1990s, although with nuclear policies varying widely among the member states (Kanellakis et al., 2013). There has seemingly been a synergistic relationship between Sweden and the EU within climate change mitigation policy in the 2000s. The EU through its 2020 climate and energy package has induced national efforts in Sweden through binding targets and national action plans concerning renewable energy and energy efficiency (Kanellakis et al., 2013), and Sweden simultaneously often being in the forefront in terms of targets and emissions reductions. The shift of focus from energy supply to climate change mitigation within Swedish national energy policy has, however, not been reflected within legislation concerning municipal energy planning. Instead, in order to initiate a proactive municipal climate and energy planning, many state-funded programmes providing financial incentives for facilitating the municipalities' energy and climate work were initiated in the 2000s, in which the development of ECSs has been encouraged (Gustafsson et al., 2015). Three such programmes were i) the Climate Investment Programme (KLIMP) (2003–2012), which was administered by the Swedish Environmental Protection Agency and required a Climate Strategy in order to get funding for the implementation of measures (Azevedo et al., 2013; Swedish Environmental Protection Agency, 2013), ii) Sustainable Municipality (2003–2014), which was run by the Swedish Energy Agency in order to strengthen local practices, where the development of ECSs was promoted (Gustafsson et al., 2011; Ranhagen, 2011), and iii) the Energy Efficiency Subsidy (2010–2014), which provided subsidies for strategic energy efficiency work as a part of fulfilling the obligations in the EU's Energy Efficiency Directive (Swedish Energy Agency, 2015a; Swedish Government Official Reports 2008:110). A requirement for obtaining this subsidy, which 270 of 290 municipalities did, was that the municipality had to develop an Energy Efficiency Strategy that focused on the municipality's internal organisation, with targets and an action plan (2009:1533; Swedish Energy Agency, 2015b).

Apart from these policy mechanisms where financial incentives were provided, some 'softer' policy mechanisms focusing on raising awareness have also been in place both at the EU and the national level (Azevedo et al., 2013). Europe-wide, the most notable initiative of this

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