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The Vicissitudes of Energy and Climate Policy in Stockholm: Politics, Materiality and Transition

Jonathan Rutherford

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Abstract

Through analysis of the orientations, conflicts and challenges of recent energy–climate policy in Stockholm, this paper interrogates how energy and climate become (translated as) a set of issues which come to matter in the local urban arena for different social and political interests. Drawing in particular on recent theoretical work on urban materiality, it is argued that ongoing, ‘everyday’ local struggles over the processes and practices of transformation of the urban fabric constitute repoliticised settings through and in which the orientations of urban energy transition are materially understood, experienced and performed in diverging ways. In ‘mapping’ the undulating politics of energy–climate matters, the paper outlines an alternative way of following and/or measuring energy and carbon flows through the urban environment.

Keywords: district heating, energy and climate policy, Stockholm, Sweden, urban materiality, urban politics

1. Introduction

In 2010 the European Commission made Stockholm, the capital city of Sweden, the first Green Capital of Europe. The city has long had a reputation of being one of the greenest cities in Europe and this reward recognised its long-established concern and policies for environmental protection and improvement (it is currently implementing its sixth consecutive Environment Programme). It regularly ranks amongst

the world’s most liveable cities according to surveys by media outlets and consultant firms including the Siemens/*The Economist* Green Cities Index and the Mercer Quality of Life index. Stockholm is therefore usually presented as an emblematic example of best practice in sustainable urbanism and in resilient city-making (see, for example, Girardet, 2000; Newman *et al.*, 2009; Lux-Research, 2012). The municipality’s

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international relations department co-ordinates more visits from foreign delegates seeking knowledge and ideas about environmental issues and ‘sustainable’ city planning than about any other policy topic. Practitioners and politicians play major roles in transnational or interurban networks about environmental policy, and especially energy–climate policy.

The municipality’s climate mitigation policies are not the sole element of this ‘green’ image, but they do constitute an important part of it, thus illustrating the emerging role of climate policy in city branding strategies (see Gustavsson and Elander, 2012). The environmental department of the municipality has had a climate action plan since the mid 1990s and there have been significant efforts to measure the carbon savings associated with specific projects and activities. These climate efforts work in turn to a large extent through energy policy where the municipality has, in theory, the most leverage (district heating, decarbonising public transport, energy efficient construction, retrofitting of existing buildings, etc.). It is here therefore that the discourse of decarbonisation encounters the materiality of the urban fabric. Policy documents present this encounter as largely unproblematic, with the municipality and other actors able to adjust and render malleable the urban built environment for a coming fossil-fuel-free age. Yet already in the recent past, the encounter between urban political regimes in Stockholm and material city-building has been ‘messy’ and contentious (Gullberg and Kaijser, 2004; see also Stahre, 2004). And a number of areas of tension and struggle have indeed emerged around energy–climate agendas and issues that problematise any actual idea of shared pathways, visions and goals, and therefore contribute to repoliticising the city’s environmental agenda.

The material politics of energy–climate agendas in the Swedish capital is thus the focus

of this paper. It goes beyond the question of the priorities and implications of policy discourse in this area to analyse how energy and climate become (translated as) a set of issues which come to matter in the local urban arena in a conjoined political and material sense. In short, the paper is less interested in the construction of Stockholm as an ‘exceptional’ green city than in the ordinary, daily politics of the urban environment as practised by a host of local actors and groups with diverging interests. By delving into the concrete actions and infrastructures through which energy–climate policy is being both implemented and contested in Stockholm, the paper aims to unpack the ongoing, ‘everyday’ struggles over the urban materialities of energy transition, thus highlighting the diversity of ways in which change is understood, negotiated, experienced and engaged with.

The paper is structured in five further sections. In section 2, we start from existing work on urban low carbon/energy transitions and urban materiality to argue that by thinking through the multiple materialities which are both inherently present in and the outcome of energy flows (broadly defined) in cities, we might develop a better understanding of the contested pathways of transition. The main body of the paper (sections 3 and 4) is given over to analysis of the orientations and (especially) the conflicts around energy–climate issues in Stockholm. Section 5 relates the findings from the Stockholm analysis back to the theoretical framework and offers some critical reflections on politics, urban materiality and energy transitions. The conclusion sums up the argument and briefly suggests some issues which merit further research.

2. Rematerialising Urban Energy Transitions

As part of a focus on urban environmental change within and beyond sustainable

urban development (see, for example, Low *et al.*, 2000; Coutard and Lévy, 2010), there is a growing, diverse literature in urban studies on cities and their positions with regard to wider evolutions in energy systems and climate change, and the actual and potential roles of urban actors in developing local responses to these evolutions. Many researchers have stressed the role of local and urban authorities in enacting responses to energy–climate issues within a dominant multilevel governance framework (Bulkeley and Betsill, 2003; Alber and Kern, 2009; Corfee-Morlot *et al.*, 2009; Gustavsson *et al.*, 2009) and a number of papers have provided case studies of these urban responses (Monstadt, 2007; Rutland and Aylett, 2008; Coutard and Rutherford, 2010; see also the papers in Bulkeley *et al.*, 2011). There is thus a widespread identification of the increasingly strategic and transversal place of these policies and their associated actions within urban governance and urban politics as a whole, in some cases to the point where a new urban paradigm or mode of governance is being seen to emerge around energy–climate issues (Hodson and Marvin, 2009; Jonas *et al.*, 2011). Notions of ‘resilience’, ‘security’ and ‘control’ are used here to capture an ecological turn in the central policy concerns of urban practitioners as they seek to ‘protect’ and ‘insure’ the reproduction of cities in a context of climate change, peak oil and constrained resource flows. In these analyses, whether normatively or critically oriented, urban actors are trying to ‘defend’ their cities from perceived (external) threats, but they are doing so by going on the offensive and (proactively) reconfiguring infrastructures and resource metabolisms to be more robust and autonomous.

This recent work is very attuned to the appropriation of discourses of resilience to particular political ends and the subsequent shaping of infrastructures for urban economic development goals and for a new

zero-sum game of interurban competition for dwindling environmental resources. Yet there is also a need to link this strategic, discursive level of infrastructure politics to more consideration of how energy and climate issues become politicised on a more locally contingent, everyday level, close to what Jonas *et al.* (2011, p. 2548) term the “politics of the urban living space”. This involves exploring the trade-offs and compromises in decision-making, the differential impacts of policy actions on the variety of groups and interests present, and issues of responsibility and accountability in new forms of urban energy governance (“Who is governing what?”: Wihlborg and Palm, 2008).

Part of this involves recognition of the multiple, contested roles of urban infrastructures in operating energy and low-carbon transitions (Hodson and Marvin, 2009; Monstadt, 2009; Coutard and Rutherford, 2011), thus reaffirming the mediating function of infrastructures in socio-natural transformations of urban environments (Kaika and Swyngedouw, 2000; Karvonen, 2011). This work inherently focuses on the evolutions and reconfigurations of infrastructures (thereby seeing the latter as dynamic rather than fixed and static) and sees the materialities of infrastructures as emerging as much in the socio-political negotiations they demand as in the actual technical deployment of physical networks (McFarlane and Rutherford, 2008). Understanding infrastructure thus always involves taking into account a wider set of materials than the basic, physical, largely inert equipment which makes up the network systems which are deployed in the urban environment. This set of materials cannot just be constituted by following a broader variety of objects and things as they are mobilised in policy-making and contestation. It invokes more a need to open out notions of urban materiality to

account for the multiple settings and arenas in flux through and in which urban energy–climate policies and issues are materialised and transformed. This is to argue that a focus on urban materiality is a focus directly on the contested processes and practices of change, because the diverse ways in which people understand and engage with the shifting sites and arenas of negotiation constantly work and rework the material constructions and experiences of their living space.

Such an approach builds on recent reflections on the materiality of the city as a fruitful way into thinking through reconfigurations of the urban in current times (Amin and Thrift, 2002; Lees, 2002; Latham and McCormack, 2004; Hubbard, 2006). This push to ‘rematerialise’ urban studies has been partly about taking issue with an increasing proliferation of work on immaterial culture and representations influenced by the ‘cultural turn’ of the 1990s, which has had a tendency to overdetach subjectivity, identity, experience, etc. from the tangible, evident artifacts, forms and processes of cities. Yet it has also been about a more fundamental recognition that urban studies scholars have generally ‘underconceptualised’ urban matter (Latham *et al.*, 2009). This is not merely a question of returning to empirical studies of concrete objects and things in cities. Rematerialisation arguments have indeed particularly called for, and highlighted in existing work (Lees, 2002), deeper and more varied articulations of the material and immaterial to get beyond a duality which has sometimes been used

as a shorthand for tensions between empirical and theoretical, applied and academic, concrete and abstract, reality and representation, quantitative and qualitative, objective and subjective, political economy and cultural studies, and so on (Lees, 2002, p. 102).

One way to rematerialise urban studies is to focus on the relations between people and objects, and the multiplicity of ways in which things are understood, used, mobilised and experienced. Materiality here is viewed as “a spatio-temporal *process* in which the more tangible, physical stuff of the city is a lively participant” (Latham *et al.*, 2009, p. 62, original emphasis). This does not imply that we can no longer study the (*a priori* less visible and less tangible) social meanings and power relations bound up in or cast into urban form and the built environment, but that we study these questions differently

as an active and engaged process of understanding, rather than as a product to be read off retrospectively from its social and historical context [by a] detached analytical observer (Lees, 2002, p. 107).

By not just focusing on policy representations (which have been the centre of attention of much research on urban energy–climate issues), but by foregrounding instead urban materialities which articulate the everyday engagements of people (inhabitants, users, practitioners, politicians, operators, etc.) and artifacts within a policy context of low-carbon discourses and visions of imagined cities, we privilege an approach focused on “the practical negotiation of the city” (Hubbard, 2006, p. 96). This does not just account for things in the urban environment, but is especially concerned about how things come to matter to the various interest groups of low-carbon, energy efficient cities in the making. This approach focuses on the different ways in which objects, points of contention and policy orientations are made visible, tangible and/or durable by or for these groups through, for example, practices of ‘ordering, circulation and manipulation’ (Latham *et al.*, 2009). Such a perspective is implicit

when Betsill and Bulkeley (2007, p. 452) discuss the need to reframe global climate change as a local stake, often by linking it to issues already on the local agenda—i.e. what matters to people—or when research focused on energy production highlights the combination of local decisions and situated power plants and networks through which national policies and national systems pass in connecting consumers (Wessberg, 2002; Akerman and Peltola, 2006). In this approach, what is material (or what matters) is not just or not so much physical objects *per se* but more the varying relations bound up in them in the ways they are used, experienced, performed and understood in different ways. As Latham and McCormack argue, urban materiality must be viewed as present in the connections between things, technologies, people, bodies, signs, texts, etc. with none of these as inherently more material or immaterial than the others

We only begin to properly grasp the complex realities of apparently stable objects by taking seriously the fact that these realities are always held together and animated by processes excessive of form and position (Latham and McCormack, 2004, p. 705).

The production and reproduction of cities is a ‘hybrid’ affair, not just operated by people, but equally by other more ‘fluid’ (‘more-than-human’) presences (see Whatmore, 2002; Latour, 2005), such that we are called *in fine*

to explore the way these materials combine in particular instances with particular forces, and to scrutinise how this play of effects and affects produces particular urban formations (Hubbard, 2006, p. 248).

It follows that this is crucially an inherently politicised process, as different powers and

capacities to act confront through and over matter/materiality (Latham *et al.*, 2009, p. 64). This *process of making things matter* is not merely about top-down imposition or decision-making, but is constantly inflected by people’s differing positions with regard to the objects in question (what matters, how and to whom). As Hubbard puts it: “After all, cities may be scripted, but our performances do not always follow the script” (Hubbard, 2006, p. 126). Prescribed policy goals, visions and actions can therefore be reinterpreted (or misinterpreted), reiterated and contested by the different groups and interests present according to what matters to them. Urban materiality thus becomes a key arena for urban politics as a set of “everyday struggles over ecological (re)production and consumption” (MacLeod and Jones, 2011, p. 2450).

In this way, introducing some of the recent thinking around urban materiality into debates around energy and climate issues could therefore complement and extend existing work around strategic infrastructure and systemic socio-technical change by showing how the process of making things matter is an inherently contested operation or encounter of multiple co-existing engagements with the concrete objects, natures and flows of the urban living space. What this approach to materiality offers for the study of urban energy–climate issues is a more precise understanding of the disparate settings and arenas in and through which policy discourse and goals are actively translated into actual concrete actions and political interventions. These material settings and arenas are constituted by shifting relations and engagements between multiple urban actors and all kinds of objects, including, but not reduced to, infrastructures. They are also therefore inherently constitutive of (the potential for) socio-political struggles as the orientations of ongoing and future urban ecological

transition are materially understood, experienced and performed in diverging ways.

In empirical terms, the intersections between local politics, planning and urban materiality have been implicit in varying guises in much recent urban research on Stockholm, which has thus been attentive to the shifting nature and varied implications of urban development and environmental objectives in the city within the context of the widely observed 'ecological modernisation' of Sweden (Lundqvist, 2000; Fudge and Rowe, 2001; Anshelm, 2002; Vail, 2008; Gunnarsson-Östling and Höjer, 2011; Hilding-Rydevik *et al.*, 2011). These intersections have been studied through: a study of the very different long-term (sustainable) urban development scenarios for Stockholm analysed from an environmental justice perspective (Gunnarsson-Östling and Höjer, 2011; see also Höjer *et al.*, 2011); a focus on the practice of sustainable urban planning and both its equity and justice implications (Bradley, 2009) and the actor networks translating nature–society relations into specific projects (Bylund, 2006); a historical perspective on the differing planning regimes in the city over the past few decades (Gullberg and Kaijser, 2004); highlighting of the role of social movements in urban change and evolutions in local politics (Stahre, 2004); and analysis of changes in infrastructure and network service provision in the light of economic and environmental reforms (Rutherford, 2008). These studies come to a shared conclusion that the traditional social equality goals of urban and environmental planning in the Swedish capital have evolved and that the ongoing material planning processes, practices and struggles in the city thus merit great attention.

Having outlined a way of thinking about how ongoing debates around energy, climate and urban development might be framed by notions of urban materiality, in particular as

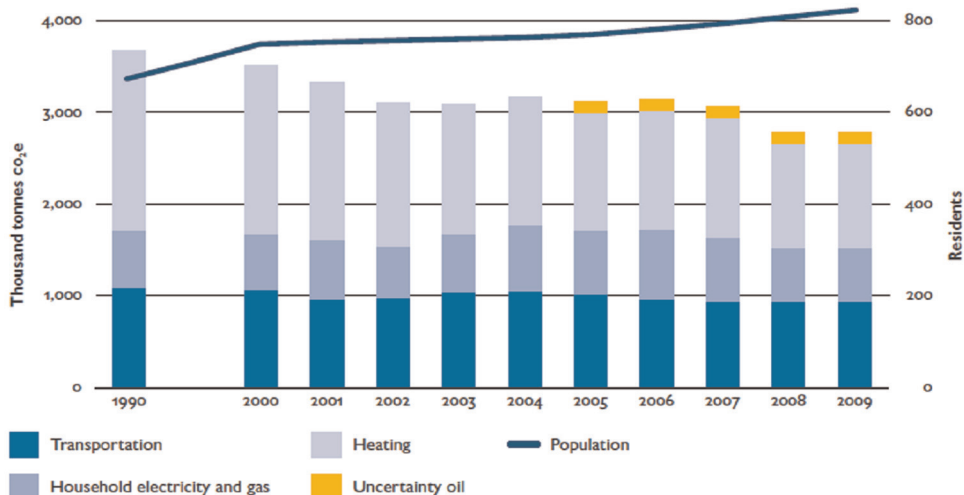
a contested, politicised process of multiple engagements between particular interest groups and urban matter, we now turn to explore the orientation of energy–climate policy in Stockholm (section 3) and, in particular, how energy–climate issues effectively materialise in the local political arena as a set of struggles over pathways of (low-carbon) urban transition (section 4).¹

3. Energy–climate policy in Stockholm

The municipal policy of the City of Stockholm in the domain of energy and climate change dates back at least two decades, with the Swedish capital achieving international recognition for being one of the few municipalities to have initiated a major energy and climate policy programme which has generated measurable success. This was one of the main reasons for Stockholm becoming the first Green Capital of Europe.² Before the Action Plan for Climate and Energy adopted in 2010 (City of Stockholm, 2010d), the City of Stockholm implemented three *Action programmes against greenhouse gases*, covering 1995–2000 (City of Stockholm, 1998), 2000–05 (City of Stockholm, 2003) and 2005–15 (City of Stockholm, 2007b), the first two of which met their objectives in terms of emissions reductions.

Greenhouse gas emissions are estimated to have decreased by over 24 per cent between 1990 and 2009, during which time the population of the city actually increased by 22 per cent (Figure 1). This meant a reduction in greenhouse gas emissions of 38 per cent per resident between 1990 and 2009 (City of Stockholm, 2010d, p. 7).

Energy and climate policy in Stockholm has taken advantage of the combination of the orientations of the *national* policy context in Sweden³ and *local* factors and



Graph 3. Reduction in the emissions of greenhouse gases over the period 2000–2009 divided by sector, and the population trend throughout the same period. The figures for 2008 and 2009 are preliminary. “Uncertainty oil” is a statistical error that has been adjusted and reported separately.

Figure 1. Greenhouse gas emissions reductions in Stockholm, 1990–2009.

Source: City of Stockholm (2010d, p. 10)

resources, including a dense urban core (with further densification as an explicit planning goal) and a star-shaped urban structure (RTK, 2002, p. 85; City of Stockholm, 2010e, p. 10; Gunnarsson-Östling and Höjer, 2011, p. 1055), which allow policy orientation to draw on economies of scale relative to the size of the city.

The decentralisation of many responsibilities and mandates to local government means that municipalities hold many powers, including over land use and planning, and have real possibilities for discretionary action on energy and climate issues, even if they have no obligations in this domain⁴ (Gustavsson *et al.*, 2009). So, although the City mentions a number of factors which account for its apparent success (City of Stockholm, 2003, p. 11), the simultaneous expansion and decarbonisation of district heating in Stockholm is primordial. Figure 1 shows clearly the weight of the district heating sector in emissions reductions since 1990. Expansion of the heating network has been an explicit policy of the City

with local detailed plans encouraging both new-build and renovations to be connected to the network and to use energy efficient methods to reduce consumption.⁵ District heating now covers almost 80 per cent of heating demand in the city. Decarbonisation of the heating sector in Stockholm (as in other Swedish cities) has to be seen as a direct result of the national carbon tax introduced in 1991 which has been levied on the emitted quantities of carbon dioxide from all fuels except biofuels and peat, which pushed district heating companies into abandoning fossil fuels in favour notably of biofuels. The Stockholm heating system runs now on almost 80 per cent renewables.

The overarching long-term policy objective for energy and climate in Stockholm is for the city to be ‘fossil-fuel-free’ in 2050 by “continu[ing] to reduce greenhouse gas emissions at the same rate as in the past [1990–2005]” (City of Stockholm, 2010a, p. 8). Yet, at the same time, major strategic planning orientations in Stockholm are currently guided by the *Vision 2030: a*

world-class Stockholm document which was adopted by the right-of-centre Moderate/Alliance-led Stockholm City Council in June 2007 (City of Stockholm, 2007c). This sets out a “sustainable growth” vision for “a denser and better connected Stockholm” as well as around 200,000 new residents over the next 20 years, but is also (and primarily) about taking Stockholm to the world. In the introduction, the Mayor of Stockholm talks about “sharpening Stockholm’s competitive edge” and creating “an internationally competitive capital region”. As she argued: “We are sufficiently large to offer the sort of qualities that will enable us to compete with the world’s great metropolises” (City of Stockholm, 2007c, p. 3). This vision underpins all subsequent planning documents and work

All the administrations and companies within the City of Stockholm are required to help make this vision a reality, both in their daily activities and through long-term development work (City of Stockholm, 2010e, p. 11).

Thus, the more recent City Plan (adopted by Stockholm City Council in March, 2010)⁶ is seen as “a clear example of how this vision of the future can be made more concrete” (City of Stockholm, 2010e, p. 11), through its outlining of a number of urban development strategies and focus areas representing ‘public interests’.

This begins to get at some of the underlying tensions to energy–climate policy in Stockholm. Although the City of Stockholm has clearly made a far greater contribution to local climate mitigation than the majority of other European cities, it is still important to highlight areas, arenas or issues of recent contention which problematise the idea of a set of municipal actors speaking for the city and engaging it on a single, already-marked-out pathway to reach already-agreed-upon goals for the short term and the long term.

Following Hubbard’s call to study the urban performances which do not necessarily follow the script prescribed by policy discourse, in the next section I analyse three areas of conflict which constitute particularly important *material* struggles over urban transition.

4. Three Matters of Contention around Energy–Climate Policy

4.1 Trajectories, Resources and Redistribution

The ‘world-class’ vision mobilises a particular idea of how energy and climate issues can contribute to urban development. Indeed, although it engages the City on a pathway to ‘an ecologically sustainable city’ and mentions the ‘fossil-fuel-free’ goal, these are discussed within the theme of ‘innovation and growth’. It is clear therefore that, far from being contradictory or incompatible, the two objectives of becoming ‘world-class’ and ‘fossil-fuel-free’ are presented as achievable in parallel, with the latter contributing to the former, while “technological developments and economic growth now provide a solid foundation for an ecologically sustainable society” (City of Stockholm, 2007c, p. 11). The Green Capital of Europe award in 2010 fits well with this parallel trajectory as environmental actions and the ‘fossil-fuel-free’ goal bring the prestige, extra (eco)-tourism and new investments that are advertised as the main benefits of the award (European Commission, 2010, p. 13).⁷

By contrast, other observers are far from certain that the two goals are wholly compatible. As well as a number of social movements that have been active since the late 1990s in contesting the neoliberal tendencies of ‘competitive city’ discourses (Stahre, 2004), the Green Party in Stockholm has more recently been particularly critical of the overarching influence and implications

of the majority's 'world class' strategic planning document

Vision 2030 conflicts with the creation of an environmentally sustainable city and with the achievement of the city's climate goals. The process should have been formulated in other ways than the vision of 'Stockholm as a world-class city'. We question the extent to which this captures people's vision of their Stockholm. It is our assessment that most Stockholmers simply want a good place to live, for themselves and their children (City of Stockholm, 2010c, p. 16).

They also criticised how this vision permeated down into the comprehensive City Plan which

is based on a false self-image and a short-term thinking ... Climate change is a major issue in urban planning, but in the draft [of the City Plan] it is only sparingly taken into consideration (City of Stockholm, 2010c, p. 17).

The very ambitious fossil-fuel-free objective for 2050 has not met with universal support either. There has been a lack of a precise definition of what would actually constitute a 'fossil-fuel-free' city and debate about the methodology for measuring mitigation (Green Party representative, interview, May 2010). In fact, 'fossil-fuel-free' in this case (only) concerns emissions from traffic, electricity and heating. Emissions associated with long distance travel, Arlanda airport and especially from consumption of goods produced elsewhere (which are estimated to represent half of Stockholm's CO₂ emissions) are therefore excluded from measurements

I think that the politicians probably think that it includes all emissions but it only includes emissions from heating, cooling, electricity

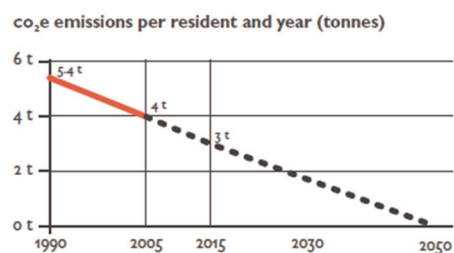


Figure 2. The trajectory to 'fossil-fuel-free'.
Source: City of Stockholm (2010d, p. 9)

and traffic. So they might reach this target, I'm not sure if it is possible or not. But the problem is, when they say that they are fossil-fuel-free, it won't be absolutely true (KTH researcher, interview, March 2010).

Moreover, but linked to this, is the fact that the 'fossil-fuel-free' goal was actually officially adopted and taken up as a policy objective by the municipality after a handful of City politicians saw the existing declining curve on the CO₂ emissions graph for 1990–2005 (see figure 2) and decided that, if the line was extended, it could be made to reach zero by 2050 (City of Stockholm Environment Department official, interview, May 2009). Inevitably, given this debatable method and rationale for deciding on a major policy objective, both technicians within the municipality and other local environmental actors are dubious about both its achievability and the extent to which the current majority in power takes the objective seriously (various interviews). The dual purpose of this 'fossil-fuel-free' policy for decarbonising Stockholm but also marketing the city throughout the world is another tension between 'inward' and 'outward' policy-making (see Gustavsson *et al.*, 2009, p. 68) in which the presence of concrete, material local issues and ways of dealing with them appear at first glance to be at odds with the

fluffy, discursive need for international recognition, leadership and ‘green’ credentials.

Yet, there is a material dimension to these attractive long-term goals which emerges when trajectories are connected to resource availability and use. One of the main factors highlighted by local practitioners as influencing the degree and form of municipal engagement in the energy–climate domain has been the availability of resources. There have been specific central government funding programmes for local environmental actions (see Granberg and Elander, 2007 for details). Between 2004 and 2008, the City thus received government subsidies of around 80 million kronor for the financing of its energy and climate policy actions in the form of the KLIMP (climate investment) programme of the national Environmental Protection Agency. This allowed more measures to be taken by supplementing the City’s own ‘Environmental Billion’ funds.⁸ The two pots of finance have been closely intertwined

It was easier to get money from the City if you got 30 per cent or more from the national. But we also needed the City money to get the national money (City of Stockholm Environment Department official, interview, May 2009).

Other resources in terms of availability of personnel and work time have also been important, as the Environmental Department of the municipality has always tended to have a certain number of people working on climate mitigation, although this work and the associated actions were made more difficult during the occasional periods when City politicians wanted these people to work on other environmental issues or when they said there was less money to do climate policy (City of Stockholm Environment Department official, interview, May 2009).

Since the majority’s decision to end the City environmental funds, the work required to put the ‘fossil-fuel-free’ goal into practice increasingly has to take place within a context of persistent budget constraint

We have seen for the past four years that people who are in charge of environment in Stockholm, they don’t get new money, they just have *ad hoc* projects or schemes on their day-to-day tasks (Social Democrat advisers, interview, June 2010).

The ‘environmental’ budget of the municipality was, in effect, cut by almost half between 2006 and 2009 “primarily for efficiency and prioritisation of core business” (City of Stockholm, 2007a, p. 114), before being increased slightly to coincide with the Green Capital award. Nevertheless, municipal environmental work in 2011 had a budget more than 30 per cent lower than in 2006 and constitutes less than 1 per cent of the City’s total budget.⁹ As a political adviser to the Moderate majority stated

Our bottom line is really result oriented ... If you’re using tax paid money you should be sure that you get some kind of refund or result with it, you should be really careful with this money (interview, April 2010).

This means that the hardest and most expensive measures for a ‘fossil-fuel-free’ city are put back to some point in the future in favour of ‘business as usual’ (Green Party representative, interview, May 2010). The figures for budget restrictions and the reasoning behind them thus nuance any idea of a durable ‘green’ urban policy paradigm.

Following the availability and evolution of budgets, staffing resources and flows of money are thus important ways in which energy–climate actions materialise and become sources of conflict in cities. This helps to connect up externally oriented

discourses and aspirations such as ‘world class’, ‘green capital’ and ‘fossil-fuel-free’ with actual commitments to and practices of urban change. While environmental actions have contributed to international prestige for Stockholm, it is far from clear that the material benefits of this in terms of new resources and investment will be funnelled back into reinforcing these actions for the collective good. Ongoing work towards the ‘fossil-fuel-free’ objective is still having constantly to prove its cost effectiveness and value for money which will affect the forms and outcomes of work that can be done. In this way, there is an inherently material dimension to how discursive goals translate into everyday policy work and how this in turn produces (or not) change. This can also be seen when we turn to other specific areas of energy–climate policy.

4.2 The Municipality, the Heating Company and ‘Darkness’ on the Edge of Town

Another major area of controversy concerns the rather ambivalent position of the City of Stockholm with regard to the Stockholm district heating system. This ambivalence can be seen in material struggles around the physical aspects of the system, constantly rising heating bills for users and the energy mix and pollution from one particular plant.

The district heating system covers nearly 80 per cent of Stockholm’s total heating needs, is still being actively expanded and is, as indicated, a major part of urban energy policy for CO₂ emissions reductions. The system was formerly owned and run by the municipality, but between 1998 and 2002 a quasi-privatisation process merged the municipal company with the Finnish energy company Fortum with the City of Stockholm keeping just 9.9 per cent of the shares (but 50 per cent of the influence through half the seats on the board) in the

new entity called Fortum Värme. The Mayor of Stockholm argued at the time that the deal was good for Stockholm taxpayers and energy consumers since it limited the city’s business risks and freed up capital that could be invested in other projects, notably environmental projects. The problem has been that district heating is a technical monopoly (i.e. the owner of the network is the sole service provider) and there are substantial costs involved for city-centre households wishing to switch to alternative heat systems such as heat pumps (see Hellmer, 2010). Indeed, Fortum Värme has been free to set its own prices according to competing alternatives, leading to price rises in Stockholm of over 60 per cent in the past 10 years (see Figure 3). The price of district heating in Stockholm far surpasses that in other major Swedish cities, with this difference emerging especially in the period post-privatisation (Nils-Holgersson-gruppen, 2010). The City of Stockholm has not used its presence in the board of Fortum to contest the price rises and seems happy with the financial benefits it receives from its minority shareholding. “We only own half so we can’t tell what to do. All the decisions are though strictly economic” (City of Stockholm Environment Department official, interview, May 2009). At the same time, this increase in district heating prices is heavily contested by another part of the Stockholm municipality in the form of its housing companies which are, logically enough, defending their tenants’ rights on the energy market. One of these housing companies, Stockholmshem, has become so critical of the high prices of Fortum Värme that they are by-passing the Fortum network in the city either by reactivating heat production from old boilers of their own or by using geothermal heat pumps (Stockholmshem head of energy department, interview, June 2010). In this case here, we have an internal set of conflicts in which some of the

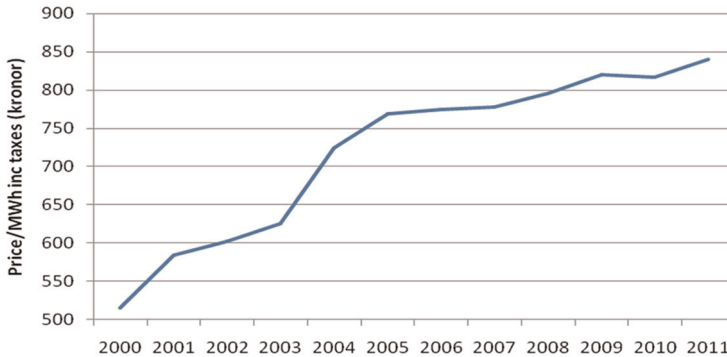


Figure 3. The rising price of district heating in Stockholm, 2000–11.
Source: author with data from Nils-Holgersson-gruppen (n.d.).

subsidiary companies of the City are actively contesting the services provided by another co-owned municipal company, while, in this reconfigured governance of a core local socio-technical system, the question of who is ultimately accountable (and for what exactly) remains far from clear (see Wihlborg and Palm, 2008).

A further source of controversy concerns a single-district heating plant in the city. On 29 May 2010, a group of protesters tried to gain access to the Värtaverket (*värta* means black or dark in Swedish) district heating plant run by Fortum Värme in the north-east of Stockholm. Although nine people were arrested (Bolling and Svahn, 2010), this highly organised and well publicised demonstration by the action group ‘Shut It Down’ brought the ecological credentials of the city’s heating system (and, some would argue, of the city itself) into question in the year in which Stockholm was the ‘Green Capital of Europe’.

The issue is that this particular heating plant is still half-fired by coal and, given that the City is joint owner of Fortum Värme, this is seen as being contrary to the objectives of decarbonisation promoted in the City’s climate policy. Although the company has outlined plans to partially convert the plant to biofuels with an aim of at least a 50

per cent admix of biofuels by 2015, environmental groups and the city’s Green and Left parties argue that this is not quick enough and, in particular, that Fortum has not stated whether and how it intends the plant gradually to become fossil-fuel-free in the longer term. In 2010, Värtaverket topped the Naturskyddsförningens (Swedish Society for Nature Conservation) list of the worst environmental polluters in the Swedish district heating industry (Aberg, 2010).

This issue has mobilised political opinion across the board. A 2010 report from the Left party suggested that the plant produced roughly the same quantity of CO₂ equivalent emissions as all the cars in Stockholm and that it was responsible for fully a quarter of the city’s total CO₂ equivalent emissions (Holmbäck and Warlenius, 2010). It also quoted a Fortum representative as saying that to decommission and replace the existing plant would cost in the region of 4 billion kronor, which the report authors calculate as being either the equivalent of the operating profit that Fortum made in just the first quarter of 2009 or the estimated cost of building 3 km of the controversial proposed Stockholm by-pass road (see section 4.3) (Holmbäck and Warlenius, 2010).

There is even evidence of tension and disagreement about this issue within the

Table 1. Changes to the text of Stockholm's action plan for climate and energy

<i>Text in report</i>	<i>Correction in annex 'errata'</i>
An entire transition to renewable fuels is not considered being <u>economically viable</u> by Fortum	An entire transition to renewable fuels is not considered <u>technically feasible</u> by Fortum
The single largest source of greenhouse gas emissions in Stockholm is CHP Plant 6 in Värtan	(deleted)
Cost efficiency [of using renewable fuels instead of coal] <u>High</u>	Cost efficiency [of using renewable fuels instead of coal] <u>Low</u>

Source: City of Stockholm, (2010d).

City. Fortum's aim for at least a 50 per cent admix of biofuels at Värtan by 2015 is calculated by the City as leading to CO₂ emissions reductions of 235,000 tons/year or 0.3 tons/inhabitant/year (City of Stockholm, 2010d). In their current *Action Plan for Energy and Climate* (p. 36), written by the Environment Department, the City also raises (as a "conceivable measure") the possibility of Fortum replacing this coal-fired CHP plant with an alternative, cleaner plant—a move that would decrease emissions by another 265,000 tons/year or 0.3 tons/inhabitant/year. It is clear that the City's Environment Department considers this measure to be highly beneficial for Stockholm climate policy.

However, several phrases in the main text of the 2010 Action Plan have been revealingly corrected by errata at the end of the document (Table 1). While the possibility of replacing the Värtan plant with a cleaner alternative is considered as "unprofitable" or "not economically viable" in the main body of the report, this has been corrected to "not technically feasible" (p. 36), as the Left Party report cast doubt on the economic argument. Furthermore, the phrase identifying Värtan CHP Plant 6 as "the single largest source of greenhouse gas emissions in Stockholm" has been corrected (i.e. deleted) in the Action Plan (p. 37). Other

corrections attempt to nuance the potential of this "conceivable measure", notably by stating that there would be municipal "need for reinvestment in the range of billions SEK to replace the lost CHP production capacity" (p. 37) which would change the possible cost efficiency of such a measure from "high" to "low". This issue highlights quite significant tension and even disagreements between the City's environment division and the Fortum heating company not just concerning policy direction and responsibility for policy coherence, but crucially over different forms of knowledge and their flexible interpretation.

In short, there is a very real material politics to district heating provision in Stockholm through which things like the configuration of the technical system, heating bill increases, choices of energy mix and levels of pollution from plants become sources of everyday struggle over both energy production and consumption, and the extent to which long-term energy-climate goals can be subject to compromise and trade-off in the here and now.

4.3 The Congestion Charge and the Motorway: By-passing Climate Goals?

The other main area of contention concerns recent shifts in mobility and transport policy

and their effects on urban energy and climate objectives.

The Stockholm congestion charge is a tax that has been imposed on the majority of vehicles in Stockholm “to deal with congestion and traffic disturbances” (City of Stockholm, 2010d, p. 11). It was first introduced as a trial between January and July 2006. A referendum was held in September 2006 in which a majority of residents of Stockholm municipality voted to implement it permanently. The charge was therefore introduced permanently during the first half of 2007. Since 2007, the City calculates that traffic to and from the city centre has declined by an average of almost 20 per cent per year, while greenhouse gas emissions “have decreased by just over one per cent as a result of congestion tax” (City of Stockholm, 2010d, p. 11). Another report by SLB Analys measured emissions reductions as 4 per cent between 2006 and 2008 (SLB-Analys, 2009, p. 4).

Compromise and conflict have emerged, though, in the use of the money obtained from the congestion charge. The incomes received were originally supposed to be used to finance public transport improvements in the Stockholm region. The Moderate/Alliance majority decided, however, to use the money to partly finance a new six-lane by-pass road (Förbifart Stockholm) aimed at displacing traffic from the city centre to the western outskirts and facilitating links between the north and the south of the region. This road will cost approximately 27 billion Swedish kronor to construct and will be financed to the tune of 80 per cent by congestion charge income (Swedish Society for Nature Conservation, 2010). This decision has been subject to virulent debate at the local level between the City government, opposition parties and environmental groups, and in particular between the Moderates who argue that “it is absolutely

necessary to build it” (Moderate Party representative, interview, April 2010) and the Greens who argue that the project is a travesty which has withdrawn a much-needed source of investment in local public transport (Öjemar, 2010). Indeed, in interviews conducted in 2010 about political differences between parties on energy and climate work in Stockholm, the new by-pass road was unanimously cited as the biggest area of conflict between the different groups.

The by-pass project was included in the comprehensive city plan voted by the City Council in spite of much opposition including from the Green Party and the Left party who wanted the “insane project” (City of Stockholm, 2010c, p. 23) removed from the plan (City of Stockholm, 2010c, p. 13, p. 22). Some have argued that the by-pass project is “the clearest example” of the City not wanting or being able to meet its own environmental objectives (City of Stockholm, 2010c, p. 73). Here again, therefore, we have an arena of contention created and working through a politicisation of various materialities. Most obviously, there is a contested shift in the objects of policy orientation from public transport routes, suburban trains and collective city-region mobility to road infrastructure, cars and individual-level automobilities.¹¹ However, this shift is enabled by a complex infrastructure of cameras, databases and financial transfers which proceeds to translate payment for access to the city centre into tarmac for the motorway by-pass instead of into the maintenance and extension of the public transport system. There will also in the longer run clearly be concrete outcomes of this policy shift in terms of the changing mobility possibilities of different social groups, the upkeep and maintenance of trains and tracks, and the environmental effects on the declining curve of the CO₂ emissions graph of financing car use over public transport.

5. Energy–Climate Issues and the Politics of Urban Materiality

These policy controversies and contestations can be seen as the arenas within and through which energy–climate issues have come to matter in Stockholm. They come to matter in at least three ways which rework our understandings of the intersections between politics, urban materiality and energy transitions.

First, focusing on the arenas of debate—i.e. the issues which matter to people on the ground and through which energy–climate goals are being implemented, translated and contested—demonstrates the multiple or alternative analytical ways in which we can follow, trace or count energy and carbon flows in the urban environment. While the municipality of Stockholm is evidently keen on highlighting its success in local climate policy by measuring and charting the city's decreasing greenhouse gas emissions year by year, the contradictions, compromises and conflicts which lie behind the downward trend line on the municipality's graphs serve to nuance this 'success' and constitute alternative 'measures' of flows. The areas of contention we have focused on can thus be seen as performances deviating from the official urban policy script (see Hubbard, 2006). Instead of framing energy transition and climate change as a locally relevant issue (see Betsill and Bulkeley, 2007), the tensions and conflicts around energy and climate issues in Stockholm may partly derive from the lack of connection between local issues (what matters to people) and the proposed policy responses, or indeed from deviations in the latter. Many people are sceptical about the fossil-fuel-free discourse (its achievability and its usefulness), but concretely it is the transfer of public funds from the congestion charge away from public transport to road construction, the continuing use of a 'dirty' heating plant,

the profit-maximising strategy of the heating company and the decreasing resources for energy policy work which local actors talk most about, discuss and contest. The tensions around budgets and resources, district heating and the congestion charge suggest indeed that any notion of success or good practice is blunted by a series of trade-offs (emissions reductions for heating price rises and profits, financing environmental policy by privatising energy provision, regulating car use in the city centre but facilitating automobility in the outskirts, etc.). Following the evolving, diverging positions, interests and knowledges of actors (including the opposing partisan views between the right-wing majority and the green and left-wing opposition), and the relations and (financial and other) flows between them is a way of highlighting both the always-contested nature and repercussions of energy and carbon flows in cities and the potential ways in which change might come about (see Stahre, 2004).

Second, this helps to raise the crucial issue of which or whose city is being prioritised in the formulation, implementation and contestation of energy–climate policy. The types (and implications) of city, urban environment and energy/carbon flows underpinning urban life are likely to be quite opposing according to whether one is interested in promoting a 'world-class' Stockholm, a 'fossil-fuel-free city', or 'a good place to live'. Following the details and the modalities of operationalising these objectives and the changes of direction which allow politicians to shift resources away from one objective towards other perhaps contradictory ones, foregrounds these questions of who is speaking for what kind of city, how (based on, for example, what interpretation of which knowledge), why and with what forms of accountability. At the same time, it has been highlighted that we need to be aware of the conflicting and

shifting positions of the actors involved—for example, the multipositionality of the City of Stockholm in the district heating system—who can rarely be grouped together or made readily identifiable as a homogeneous coalition driving urban energy–climate policy in one coherent direction. The lack of a clear division of responsibility in some areas (and indeed a clear vision of ‘who is governing what?’) problematises the issue of the extent to which the municipality can be held accountable for its decisions and policy orientations (when ‘the municipality’ is always multiple).

This kind of ‘messy’ urban energy governance also implies that it remains wholly debatable the extent to which there is an ongoing shift to some kind of new dominant ‘green’ urban paradigm wherein shared green values drive environmental issues to structure or cut across whole urban political agendas. It is striking the relatively limited resources attributed to environmental issues even in the ‘green capital of Europe’ when education, care and transport still constitute the main policy priorities (see also Granberg and Elander, 2007). Furthermore, there is a persistent context of compromise and trade-off, also highlighted in previous work on the politics of city-building in Stockholm and cities elsewhere (see for example, Le Galès, 2002), which results from both the presence of strong diverging interests (majority, opposition, social groups) and the limits to the strength and diffusion of green values, and thus to the environmentalisation of urban policy (when a suburban motorway can, for example, be deemed more ‘necessary’ than ensuring coherence of actions and decisions with regard to the ‘fossil-fuel-free’ policy).

Third, the Stockholm case illustrates the centrality of urban materiality to debates and negotiations over low-carbon and/or energy efficient urban futures. On a first

level, it shows how climate mitigation discourse (‘fossil-fuel-free’) becomes confronted with the materialities of energy (policy), whether it be technical infrastructure such as networks, plants and roads or everyday objects like heating bills, board meetings and the placards of protesters. The politics of urban transition is here a set of struggles over the evolving, everyday materialities and infrastructures that matter to Stockholm citizens.

On another level, however, it suggests the need to go beyond materiality solely as (static, fixed) infrastructure/object to a discussion of the dynamics of materiality through which transition is elaborated, operated and contested. There is indeed a performance (or a set of performances) of urban materiality: work, activity, operation and people generally fulfilling tasks to both sustain and evolve energy and climate matters, whether it is the work of everyday policy implementation or the activity associated with the organisation of protest and formulation of policy alternatives. Tensions inherent to energy–climate issues in Stockholm do seem to be effectively performed through a shifting ‘ordering, circulation and manipulation of things’ (Latham *et al.*, 2009). The City’s emissions graph, the chimney of Värtaverket and the map of the by-pass organise certain (linear) flows and relations, but at the same time each of these means different things to different groups and can be mobilised to support diverging interests. Indeed, it is through processes and practices of disordering and deflection of linearity that these objects come to matter: debate over the trajectory and implications of the emissions graph, protest at the heating plant because of what comes out of the chimney, the use of alternative sources of heating to combat price rises, contestation over road building and its financing. This suggests that the politics of urban energy and climate issues emerges

not just over infrastructure and concrete objects *per se*, but more specifically in the processes of overflowing of these infrastructures and objects, and therefore the ways in which urban materiality is inherently manipulated through the practices and performances of varying groups and interests.

This brings us in turn back to the first point, because this suggests that mapping urban materiality and the politics of this materiality may be an alternative way of ‘counting’ carbon or ‘measuring’ energy flows in cities. Taking into account the multiple flows (of waste emissions, heat, people, money, best practice ideas, etc.) related to urban energy–climate issues and the different orderings and disorderings through which they circulate helps to disrupt the linear pathways which normative transition discourse proclaims and enacts. Unpacking the diverse and undulating processes through which energy and climate issues come to matter in the urban arena is thus a useful means of tracing how transition is being performed, contested and repoliticised.

6. Conclusion

There has been significant debate over the proposed visions for Stockholm’s future ‘green’ development. This debate is captured by the unresolved question of whether the city is concretely aiming to be both/either fossil-fuel-free by 2050 and/or world-class in 2030, and by the (quite different) means and resources which are being or could be attributed to working concretely and materially towards these objectives. In unpacking not just these discursive visions and ideals, but also the more contingent political processes and tensions through which energy–climate policy is being actually formulated, implemented and contested in Stockholm, this paper has contributed to deepening the level of analysis of urban energy–climate

policies. We have gone beyond a simple reaffirmation of both an ‘implementation gap’ between generic, ambitious policy discourse and actual policy action, and an emerging ecological modernisation agenda in which energy–climate policy is seen as creating new opportunities for urban development and growth which will inevitably and automatically contribute to the creation of ‘a world-class city’ in the near future. The paper has argued that a core focus on the nitty-gritty politics and everyday struggles around urban energy and climate issues is a highly useful means of grasping how long-term orientations are (materially) translated here and now (in diverse ways by diverse urban actors) onto the local political stage.

We have argued that urban energy–climate issues inherently articulate transition, politics and materiality in shifting configurations. Transition must be seen as a heterogeneous process replete with (potential for) controversy and contention because change inherently operates through a set of urban materialities, not just represented by instruments, objects and infrastructures *per se*, but more performed by the multiple arrangements, mobilisations and control of these things by particular interests and groups.

While this opens up the potential for a repoliticisation of urban energy and climate issues, it also at the same time poses the practical question of how municipalities can conceive and implement durable energy and climate policies in a constantly shifting urban policy context. While energy, environmental issues and carbon management are sometimes portrayed as central now to the whole of urban policy, this must be nuanced by the still relatively limited resources actually attributed to green issues in many municipalities. This means that more often than not they need to be in symphony with other policies, needs and interests (as with the current ‘green growth’

agenda). When they conflict too much with more important priorities, they may be bypassed, reconfigured or even abandoned (as in the case of the financing of climate-neutral public transport from the congestion charge in Stockholm). These moments of the ‘unfixing’ of environment–energy–climate priorities are important because they reveal the logic of reversibility which seems to dominate current policy in this field. This brings us back to changing notions of materiality and transition because the Stockholm case suggests that policy oriented towards embedding path dependencies in the form of major physical infrastructure projects may be increasingly contested as it materialises a fixed, singular pathway of transition. More reflexive and adaptable policy is increasingly demanded, which might take into account more open notions of materiality and transition as explored in this paper. The question that remains unclear though is how to mobilise more diverse ideas of urban materiality and urban change to construct stable, longer-term actions for energy and climate issues which would prove to be durable and resilient in the face of threats of diversion of policy attention and resources to other short-term needs.

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Notes

1. The empirical research on which the Stockholm analysis draws was conducted between 2008 and 2011 and took the form of in-depth analysis of policy documents, reports and other secondary material, supplemented by a series of semi-structured interviews with more than 30 local officials from the municipality, regional and state bodies, energy companies and environmental associations.
2. The reasons given for Stockholm being designated European Green Capital 2010 included: the presence within the municipality of an integrated administrative system that guarantees that environmental aspects are considered in budgets, operational planning, reporting and monitoring; its success in reducing carbon dioxide emissions since 1990; and its adoption of an ambitious objective of being fossil-fuel-free by 2050 (City of Stockholm, 2010b).
3. ‘Reduced climate impact’ and ‘a good built environment’ constitute two of the 16 environmental quality objectives adopted by the Swedish Parliament (Swedish Environmental Protection Agency, 2011). The ‘integrated climate and energy policy’ outlined in two government bills in March 2009 has set out a ‘national roadmap’ for 2050 with an overall aim for Sweden to be ‘an emissions-neutral country by 2050’ (Swedish Government, 2008a, 2008b, 2011a). This translates into a number of interim targets for 2020 which as a whole go beyond EU objectives: 40 per cent reduction in climate emissions (on 1990 levels); 50 per cent of energy use to come from renewable energy sources; 20 per cent more efficient energy use; and 10 per cent use of renewable energy in the transport sector. Action plans focused on renewable energy, energy efficiency and a fossil-fuel-free transport sector have been, or are in the

process of being, initiated to work towards these targets (Swedish Government, 2010, 2011b; Profu, 2012). The current government (like a high proportion of the population) is also in favour of continued use of nuclear power in electricity production, thus reversing the 1980 decision to phase out Sweden's existing reactors. The government sees win-win opportunities for the economy and the environment from working towards its energy and climate objectives

Investment in renewable energy and more efficient energy use are strengthening Sweden's competitiveness and putting Swedish research and Swedish enterprises at the forefront of the global climate transition. We are laying the foundations for new innovations, new enterprises and new jobs in green industries of the future (Swedish Government, 2009).

4. The 2009 energy bill mentions 'voluntary agreements' between central government and local authorities on energy efficiency objectives, as well as the need for municipalities to identify 'appropriate sites' for wind power in their planning documents (Swedish Government, 2008b, p. 149). The 2009 climate bill mentions the proposal made by the Climate Advisory Council that municipal comprehensive plans should have to show how they contribute to emissions reductions objectives (Swedish Government, 2008a, p. 131).
5. These goals are also quite coherent with those of regional planning which promotes reductions in energy consumption (through energy efficiency measures) and a transition to renewable energy sources (Regionplanekontoret, 2010).
6. This is a comprehensive plan—i.e. a steering document and not legally binding for local detailed plans which officially regulate new building, renovations and extensions (City of Stockholm, 2010e, p. 3).
7. Indeed, the City of Stockholm took out a full page advertisement in *Dagens Nyheter* newspaper in December 2009 to 'advertise'

"a world-class environmental city" (City of Stockholm, 2011b, p. 19).

8. These funds representing around a billion kronor (almost 100 million euros) for environmental projects in Stockholm between 2004 and 2009 came into being after the sale of the municipal energy company to Fortum in 2002 (City of Stockholm Environment Department official, interview, May 2009). We should note that this sale generated 14.5 billion kronor (see Rutherford, 2008), so actually only around 7 per cent of this money was directed to the environment. Interviewees alleged that the remainder was used for various building and infrastructure projects, but also as a means of avoiding increasing municipal taxes.
9. These figures are extracted from budget reports on the City of Stockholm website.
10. In 2007, the new Moderate majority also took the decision to transfer 165 million kronor from the Environmental Billion funds which was planned to be used for biogas projects to the City's Traffic and Waste Management Committee for road maintenance (City of Stockholm, 2011a, p. 2).

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