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MOBILIZING CITIES TOWARDS A LOW CARBON FUTURE: TAMBOURINES, CARROTS AND STICKS

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Abstract

In the transition towards a decarbonized energy system, we need city authorities to lead by example as public actors, to govern the actions of the private urban actors as local policy makers, and to conceive and manage the implementation of an integrated approach as coordinators, which we introduce in this paper as three levels of city smartness. Local governments however have institutional disincentives to act, and if they do act, they are confronted with urban actors that are reluctant to follow. This paper analyzes how city pioneers in Europe have been able to overcome these disincentives thanks to a combination of local circumstances and interventions by higher levels of government. We categorize the state of the art instruments that have been used by higher levels of government into “tambourines”, “carrots”, and “sticks”, and reflect on how the state of the art could be improved.

Keywords

Cities, climate change, governance

Introduction[*]

Cities are home to about four out of five Europeans and are responsible for about the same amount of total primary energy use and carbon dioxide emissions (Eurostat, 2009). A global solution for climate change, even if achievable, would rely on the willingness of these citizens to cooperate so that it is essential to have policies at multiple levels, including at city level (Ostrom, 2009). There are three main roles that city authorities can play at the local level in the transition towards a decarbonized energy system. First, they can lead by example as they are actors themselves in the urban environment, e.g. public buildings and public procurement at the local level. Second, they are local policy makers that can govern the actions by private actors, e.g. via building codes, city entrance or parking charges, and land-use regulations. Third, they can conceive and manage the implementation of an integrated approach, for instance by involving urban infrastructure service providers, which they in some cases even own or control.

The capacities that local governments have to take up these roles can differ significantly between states that have relatively strong and independent local governments, as opposed to states with multiple intermediate governance levels that tend to have local governments that have less resources and powers (Bulkeley and Kern, 2006). Despite these differences in capacities, local governments have in common that they will not necessarily use their capacities, as they have institutional disincentives to act towards a low carbon future, and if they do act, they are confronted with urban actors that are reluctant to follow. Recent theoretical advances supported by empirical evidence, indeed emphasize that innovation is a process where technology and institutions co-evolve accumulating learning effects so that the institutional setup is typically adapted to and therefore favoring the old technological system (Foxon, 2003; Geels, F, 2002; Lundvall et al., 2002; Mytelka and Smith, 2002; Unruh, 2000).

Local governments have anyway started to become involved in climate change policy-making (Betsill and Bulkeley, 2007; OECD, 2010). The main contribution of this paper is to analyze how city pioneers have been able to overcome their disincentives, focusing on Europe. Europe already has ambitious energy policy targets for 2020, but even more ambitious objectives will be required to go towards a near-zero carbon energy system by 2050 (Jones and Glachant, 2010). The paper starts by discussing the three main roles of cities in the transition towards a low carbon future, which are introduced as three levels of city smartness (section 1: “Role of cities in the transition towards a low carbon future”). The paper continues with the main disincentives of cities to act (section 2: “Disincentives of cities to act towards a low carbon future). The paper then looks at how city pioneers have been able to overcome their disincentives, distinguishing between local circumstances and interventions by higher levels of government to mobilize cities (section 2: “How city pioneers have overcome their disincentives to act”). The paper concludes by reflecting on how the state of the art instruments used by higher levels of government to incentivize cities can be improved.

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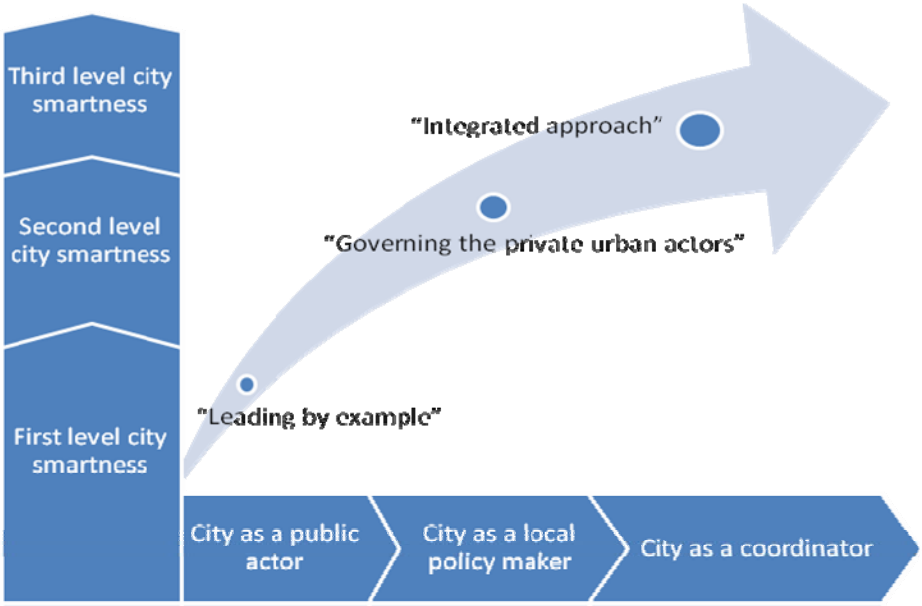
1. Role of cities in the transition towards a low carbon future

In this section, we elaborate on the three main roles of cities in the transition towards a low carbon future, which are introduced as three levels of city smartness, respectively featuring the city as a public actor, as a local policy maker and as a coordinator (Figure 1).

Figure 1: concepts of city smartness



1.1 First level of city smartness: city as a public actor

The city as a public actor can lead by example, for instance with regard to 1// public buildings; and 2// public procurement at the local level.

First example is public buildings, such as offices, schools, hospitals, social housing, etc. Buildings are responsible for about 40% of the final energy use in the EU and about 50% of this value corresponds to the demand for space heating and cooling (Eichhammer et al., 2009). Significant reductions can be achieved by reducing the heat losses of glazing, windows, doorframes and walls. Considering that a building in Europe has a typical life span of over 50 years and that a complete stock renovation takes about 100 years, 75% of the building stock that will still be around in 2050 has already been built today (Ravetz, 2008). Therefore, there is also a need to consider retrofitting the existent building stock. Public buildings can also be interesting sites to develop renewables locally. Even though public buildings only represent a fraction of the total building stock, they can lead by example stimulating local businesses to develop, making it easier for private actors to follow.

Second example is public procurement at the local level, such as the purchase of appliances, joint procurement of energy efficient lighting bulbs for schools, the choice of electricity supplier, etc. Public procurement is a considerable share of GDP, even though the figures differ depending on the source. Audet (2002) for instance reports figures for different EU countries, with shares of GDP ranging from almost 5% in Belgium to slightly more than 13% for Sweden, while Edler and Georghiou (2007) report an aggregated share of 16.3% for the combined EU-15 GDP. For many years the opportunity of using public procurement has been largely ignored in innovation policy, while empirical evidence is increasingly indicating that it can be a more efficient instrument than the more

frequently used R&D subsidies to stimulate innovation (Edler and Georghiou, 2007). Even though public procurement at the local level is only a fraction of the total public procurement, it can create a local demand for new and innovative products and services so that a market can develop.

1.2 Second level of city smartness: city as a local policy maker

Besides being a facilitator that can for instance increase awareness among citizens with brochures, websites, and trainings, city authorities often also have regulatory powers, e.g. via 1// building codes; 2// city entrance or parking charges; and 3// land-use regulations.

First example is building codes (IEA, 2009). The municipalities are typically in charge of the buildings' licensing. They are at first instance responsible for checking if the new and retrofitted buildings comply with international or local requirements, and in some cases they may even require performance levels for new buildings that are stricter than the national standards. A well-known example is the Merton rule in the UK where 10% of the energy consumed by new buildings has to be locally produced with renewables. Another example is Barcelona that requires the installation of solar thermal collectors for the hot water supply. In Freiburg, the municipality even created a network between energy companies and citizens, so the latter can rent their roofs to promoters interested in investing in photovoltaics.

Second example is city entrance or parking charges (Calthrop et al., 2000; IEA, 2009). A well-known example of the first is the creation of a congestion charging scheme in London, i.e. all the commuters entering and leaving the city have to pay a municipal fee; this action led to a significant decrease of traffic in central London. Other cities, such as Stockholm, have followed this example. A good example of the second is the case of Copenhagen where the local government has recently decided to reserve five hundred parking slots exclusively for electric cars to give an additional incentive to their purchase.

Third example is land-use regulations. The lower the density of a city, the higher its emissions from the transport sector (Newman and Kenworthy, 1989; EEA, 2006). This may be both because compact cities require inhabitants to travel smaller distances but also because compactness is essential to create a critical mass for efficient collective transport systems. City authorities often have responsibilities regarding land-use planning and the management of its resources, such as soil, water and waste so that they can promote city compactness (Southworth, 2001). Copenhagen is an interesting example where the city authority planned densely developed fingers sticking out of the city with green areas in between to allow for a better development of the public transport system. Other examples include Stockholm and Munich, where urban development is oriented around railway stations.

1.3 Third level of city smartness: city as a coordinator

A city as a coordinator can 1// conceive and 2// manage the implementation of an integrated approach.

First is to conceive an integrated approach, i.e. to design an energy action plan. A good example is the so-called Sustainable Energy Action Plan that signatories of the Covenant of Mayors need to elaborate to reduce their carbon dioxide emissions with at least 20% by 2020. Under the Covenant, cities are required to develop a baseline emissions inventory, set targets, and list a set of actions to reach the targets, with the build environment, the local energy networks, and the urban transport systems integrated in one plan. It is also mandatory for Covenant signatories to produce a report every second year to monitor progress towards the self-set targets. Already more than two thousand cities in Europe have voluntary signed the Covenant. Note however that under the Covenant, cities are allowed to continue using different accounting methodologies for carbon dioxide emissions and energy consumption, while it is a known problem that cities use different approaches in defining what sectors to include in their reporting, in establishing the city boundaries, as well as in aggregating data so that it is difficult to compare cities and replicate their achievements (Croci, 2010; OECD, 2010).

Second is to manage the implementation of an integrated approach, i.e. to involve urban actors, local business, and urban infrastructure service providers. A good practice is to involve stakeholders already at the planning stage with public consultations. The city authority is also well-placed to ensure the involvement service providers. The service provider can implement city-scale demonstrations of innovative infrastructures, and the city authority can ensure there is then a demand for the associated services because they are users themselves (i.e. first level of city smartness) and they can facilitate and/or regulate the use of these services by private actors (i.e. second level of city smartness). In Växjö, the municipality for instance promoted the use of district heating by obliging public and private buildings to connect to the district heating network, and not allowing the use of conventional heating systems in buildings (IEA, 2009).

2. Disincentives of cities to act towards a low carbon future

In this section, we discuss the disincentives of cities to act towards a low carbon future, distinguishing between simple market failures, other institutional failures, and multi-agent failures, respectively.

2.1.1 Simple market failures

Local governments as public actors and as local policy makers governing action by private urban actors, are confronted with simple market failures, such as 1// the involved cost; and 2// the preference of actors to save money upfront rather than to save on future energy bills.

First difficulty is cost. Renewable technologies are gradually coming down the learning curve thanks to national support schemes, but even with support cost can still be an issue for the uptake of certain renewable technologies in certain environments, such as the urban environment (Coenraads et al., 2007; Ragwitz et al., 2007). Then there is also a general lack of awareness of, and accounting for, energy costs. In companies, staff time is limited (hidden costs of staff overhead), and generally a low priority is given to energy costs (Schleich and Gruber, 2008). Actors also typically only replace energy consuming appliances when their lifetime expires, i.e. transition costs (Gillingham et al., 2009).

Second difficulty is the preference of actors to save money upfront rather than to save on future energy bills, while energy efficient technologies typically require a higher upfront payment (Jaffe and Stavins, 1994). Information asymmetry, can further strengthen this preference, like in case of the landlord that will not make a higher upfront payment for energy efficient technologies because the corresponding energy bill savings go to a tenant that is not willing to pay more rent for this due to the information asymmetry between the two (Gillingham et al., 2009). Regarding pay back periods, evidence from US cities shows, that these choose measures with short payback periods, typically no longer than 5 or 10 years (Kousky and Schneider, 2003).

2.1.2 Other institutional failures

Local governments also have institutional disincentives to act that are different from pure market failures, which can be simplified into 1// “not in my term”; and 2// “not my business”.

First issue is “not in my term” (Bai, 2007). Local governments have a diversity of priorities, and their human and financial resources are limited. Politicians are concerned over their re-election, and hence, tend to think and act on the short term. Actions and money spent need to demonstrate clear benefits and added value for their voters, while the transition towards a low carbon future might take decades. Especially in relatively poor Member States, it can be expected that climate change will not become a priority, if the citizens suffer from poverty, bad health care and high rates of unemployment (Sippel and Jenssen, 2010).

Second issue is "not my business" (Bai, 2007). Mayors are not necessarily energy experts. Furthermore, climate action requires integrated solutions covering urban planning, buildings licensing, energy infrastructures and transport. However, these domains are often classified under different departments, all having their own targets and budgetary constraints (and often even different interests and priorities). Then there is also the vertical institutional dimension whereby coordination between the local level and actions decided at higher levels of the administrative chain can be an issue (Bulkeley et al., 2009).

2.1.3 Multi-agent failures

When local governments overcome simple market failures and other institutional failures, they can reach the first two levels of city smartness, but to reach the third level they will additionally have to overcome multi-agent failures.

Climate action in the urban environment involves a high number and diversity of actors that can also have diverging interests so that coordination is complex. Coordination is especially complex between infrastructure service providers that can enable a smarter use of energy with technologies such as smart metering, smart appliances, smart applications for ticketing and intelligent traffic management, and the demand for the associated services. The demand is often distorted due to simple market failures, and even if there is a demand for these services, the infrastructure companies that are expected to develop the services are often subject to a regulated framework that discourages them to invest in innovative infrastructures that enable a smarter use of energy (Meeus et al., 2010).

3. How city pioneers have overcome their disincentives to act

In this section, we discuss how city pioneers have been able to overcome their disincentives thanks to a combination of local circumstances and state of the art instruments used by higher levels of government to mobilize cities towards a low carbon future.

3.1 Local circumstances

In what follows, we respectively discuss how the alignment with other local policies and the presence of a local policy entrepreneur has motivated cities to take climate action.

3.1.1 Alignment with other local policies

Sometimes the best way of dealing with a local problem can be to move towards a more sustainable decarbonized local energy system. Examples include the following: the city of Freiburg's climate actions originated from protest against a possible nuclear power plant being built nearby; the city of Växjö was confronted with severely polluted lakes, and hence, decided to undertake action; the city of Güssing faced high numbers of unemployment, and decided to take climate actions to generate jobs locally, such as jobs in the local construction sector for retrofitting buildings (IEA, 2009).

3.1.2 Policy entrepreneur

So-called policy entrepreneurs tend to play an important role in getting climate action on the local political agenda (Sippel and Jenssen, 2010). Reputation and gaining (inter)national recognition are drivers for pioneers, but being a pioneering city can also translate in business opportunities for local companies (green jobs), involving various stakeholders (public, local utilities, universities and local companies) and so leading to strong economic growth, and/or even attract tourists. A well-know example is the island of Samsø, which now serves as a model community, and attracts several thousands of tourists each year (IEA, 2009).

3.2 Interventions by higher levels of government in Europe

In what follows, we respectively discus how higher levels of government have used “tambourine”, “carrot” and “stick” type of instruments to mobilize cities towards a low carbon future.

3.2.1 Tambourines

In what follows we discuss how tambourine type of instruments can help achieve the three levels of city smartness, respectively, by raising awareness.

First level of city smartness (city as a public actor): higher levels of government can provide information to urban actors, including to city authorities as a public actor, to counter the lack of information and expertise. Well-know examples are information centers that offer independent and free energy advices. In France, the initiative “Espaces Info Energie” was launched to inform urban actors on the local, regional and national policies and plans, and to help them make energy choices. In Germany, the government developed a similar program but specifically dedicated to residential buildings, “Heizspiegel”.

Second level of city smartness (city as a local policy maker): higher levels of government can give recognition to the local level to encourage policy entrepreneurs. This is for instance achieved with awards, as in the European Energy Award (EEA), resulting from the collaboration between Switzerland and Germany.

Third level of city smartness (city as a coordinator): higher levels of government can promote an integrated approach. The state of the art example is the Covenant of Mayors promoted at EU level (see integrated approach, section 1.3.2).

3.2.2 Carrots

In what follows we discuss how carrot type of instruments can help achieve the three levels of city smartness, respectively, by enabling city authorities to act.

First level of city smartness (city as a public actor): higher levels of government can support the city as a public actor to compensate for the higher cost of renewable and energy efficient technologies. A good practice is the case of Finland (Jollands et al., 2009), where city authorities can receive subsidies for energy efficiency projects that concern municipality owned equipment and companies, and these are proportional to the energy saved and dependent on the technologies involved (higher the innovation level, higher the subsidy). The subsidy allocation is done through project competition, according to the quality of the city strategy. The selection criteria focus on the ambition and feasibility of the plan, which has to be based on a subsidized energy audit. Both energy audits and the monitoring of the implementation are done by a specialized public-private company, and city authorities that do not follow their commitments can be expelled from the program.

Second level of city smartness (city as a local policy maker): higher levels of government can support private urban actors so that it becomes easier for city authorities to govern these actors. Examples include the Strategic Energy Technology Plan (SET-Plan) and the European Economic Recovery Plan (EERP). These plans include industrial initiatives or public private partnerships with public funding for research, development and demonstration of low carbon technologies. Several of the targeted sectors are relevant for the urban environment, including the wind sector, the solar sector, the electricity grids sector, the automotive sector, the construction sector, and manufacturing sector. Additionally, higher levels of government can also provide human and financial resources to city authorities so that they can test climate action policies. In Europe, examples of such initiatives include CIVITAS and CONCERTO.

Third level of city smartness (city as a coordinator): higher levels of government can support city authorities in conceiving and managing the implementation of an integrated approach. Sweden is responsible for a state of the art local investment program that has been running for more than a decade (Baker and Eckerberg, 2007; Granberg, and Elander, 2007). Only cities that have already developed a local action plan towards a sustainable urban development are eligible. In order to receive funding, cities must go through a double selection process: firstly, cities are ranked according to the quality of their action plans and the evaluation is based on criteria such as the involvement of both the private sector and the involvement of the citizens in the plan; secondly, there is a selection of projects within the winning action plan, which is done according to their cost-effectiveness. In the Netherlands, an alternative more centralized approach has recently been conceived (Gupta et al., 2007). When applying to the Dutch program, city authorities have to perform an energy audit (subsidized by the program), where an independent entity instead of the city sets the targets and actions that can be subsidized.

3.2.3 Sticks

In what follows we discuss how stick type of instruments can help achieve the three levels of city smartness, respectively, by requiring city authorities to act.

First level of city smartness (city as a public actor): higher levels of government can set standards and regulations. An example is the Energy Performance of Buildings Directive (2002/91/EC). This Directive has recently been revised and now includes the mandatory target that public buildings have to reach a nearly zero energy standard by the end of 2018. Another example is minimum energy efficiency standards and rules for labeling for products, services and infrastructure that applies equally to all actors, including city authorities as a public actor.

Second level of city smartness (city as a local policy maker): higher levels of government can set policy targets for local governments, although this is not possible in every EU Member State. An example of a Member State where the multilevel governance structure allows it is the UK, and there is national legislation in the UK to oblige local governments to take action concerning energy efficiency.

Third level of city smartness (city as a coordinator): higher levels of government can require local governments to make energy action plans, and report progress. An example is Norway, where the central government obliged municipalities to develop local climate plans aiming at reducing carbon dioxide emissions, but the implementation of these plans remained voluntary and little progress has been made (Aall et al., 2007). At EU level there are currently only voluntary initiatives for cities, such as the Covenant of Mayors.

Conclusions

Without intervention, cities will slow down the transition towards a decarbonized energy system because of simple market failures, other institutional failures and multi-agent failures. This is unfortunate because cities do have relevant capacities to act and accelerate the ongoing transition. Higher levels of government have therefore intervened, raising awareness (“tambourines”), enabling action (“carrots”), and obliging action (“sticks”) by local governments. Thanks to these interventions and local circumstances, city pioneers have emerged, but not necessarily where action can have the largest impact, and not necessarily following an integrated approach (i.e. not yet reaching the third level of city smartness).

Because of the lack of comparable data regarding energy consumption and emissions at the local level, we do not even know where action can have the largest impact. With the Covenant of Mayors, Europe is successful at voluntary committing cities to follow an integrated approach using a common methodology, but this is only for cities that are willing to move, and the methodology allows cities to

maneuver in how they measure and report progress so that it is difficult to compare performance and derive good practices.

A promising stick to improve the state of the art in Europe could therefore be to require all cities, including those that are not yet taking action, to contribute to a benchmarking of cities with a legislative initiative at EU level. This would allow cities with a large potential that are not yet moving to be identified. The reporting methodology for this benchmarking should then account for the heterogeneity of cities, including the differences in capacities (resources and powers), and should also filter out the ongoing changes at the higher policy levels that have an impact on the performance of the local level, such as changes to the country's generation mix changing the emissions associated with consuming electricity at the local level.

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