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**Multi-level reinforcement in European climate and energy governance:
mobilizing economic interests at the sub-national levels**

by

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Abstract

In this article we explain the relatively successful performance of the EU in climate and energy governance by essentially two factors: (1) multi-level reinforcement and (2) the mobilization of economic interests at different levels of governance through low-carbon industrial policy. The article adds to the literature by further developing existing arguments on multi-level reinforcement in climate and energy policy and discussing the role of sub-national actors in this context. Multi-level governance is most advanced in the EU compared to other world regions and is actively harnessed for climate policy and the promotion of low-carbon development objectives by the European Commission. It represents a multi-impulse system, which fosters interactive learning from best practice and provides an opportunity structure for innovation and rapid diffusion. Moreover, the authors stress the point that economic co-benefits of climate protection have been successfully mobilized at all levels of governance, including the sub-national level, in recent times. As a result, sub-national levels of governance are beginning to assume an increasingly important role in reinforcing climate and energy governance, initially promoted at the national and EU level. This is illustrated by examples from both pioneer countries and laggards in terms of national climate and energy policy.

1. Introduction

Global climate governance can be conceived as governance across levels and sectors, as governance within a multi-level and multi-sectoral global system. This governance model has its origins in the European Union as well as in the UN Earth Summit in Rio de Janeiro in 1992 (Jänicke in this Special Issue). *Multi-level* climate governance means essentially to activate the dynamic potential of each level and the interaction between all levels to achieve a global mobilization of actors. *Sectoral* climate governance addresses the climate-related challenges and opportunities (or co-benefits) of different economic sectors within the logic of a “green industrial policy”.

In this article we discuss the dynamic potential of both, of multi-level governance - with a particular focus on the sub-national level - and its close inter-relationship with sectoral governance. Our main hypothesis is that European leadership in climate governance is enabled by mobilizing economic interests in various sectors and across multiple levels of governance. We consider the EU to be the core of the global system of climate governance (see Jänicke in this SI).

Schreurs and Tiberghien have proposed that multi-level reinforcement within this system of governance has played an important role in enabling Europe’s relative ambition in climate and energy policy compared to other large parties on the international scene. This concept of multi-level reinforcement is applied in this article to provide an analytical lens for understanding policy innovation within the European Union. It considers not only the dynamic interaction between the national and European level within the global system of multi-level climate governance but also includes the sub-national levels of policy-making. It is in this area that developments have been particularly dynamic in the recent past. Hence, while European level policy instruments, like the European Emission Trading System (ETS) may not be delivering the promised returns, they have unleashed a dynamic process of multi-level reinforcement, extending to the sub-national levels. This can be observed even in member states like Poland, which are relatively weak players at the national level of climate governance.

The paper argues that these vertical and horizontal dynamics of reinforcement within the European system of multi-level climate governance have been driven to a high degree by sectoral economic co-benefits. This is the field, where climate protection in terms of industrial policy has been relatively successful. Therefore the article also asks how economic interests are related to the multi-level system of climate governance. This is linked to a discussion of

the changing nature of the sub-national level of governance and how it is contributing to multi-level reinforcement in European climate and energy governance.

The article begins with a review of the literature on multi-level climate and energy governance and the role of multi-level reinforcement in that context. It then discusses the literature on green and low-carbon industrial policy, linking this to the dynamics of multi-level reinforcement. Next the article provides an overview of climate policy achievements of the EU and places these in the context of relevant characteristics of the EU system of climate governance. It places particular emphasis on EU policy instruments targeting sub-national actors, highlighting their importance for supporting dynamics at the sub-national level. Then we propose that – parallel to processes of Europeanization - the sub-national level of European climate governance has increasingly evolved from a locus and enabler for grassroots, citizen-led climate and energy policy initiatives to an increasingly important arena of innovation and industrial policy and a key enabler of multi-level reinforcement. The article offers case examples from climate and energy policy in different European member states to illustrate its claims

2. Climate governance across levels and sectors

2.1. The relevance of the concept of “multi-level governance”

Since its introduction in the early 1990s, the concept of multi-level governance (MLG) has stimulated a broad research agenda, gaining strongly in popularity over the past 10 years (see Jänicke in this Special Issue). It was first used as a new approach to characterize the process of decision-making in the field of structural policy in the European Union, emphasizing parallel processes of decentralization and Europeanization (Marks, 1993). Later, it was broadened to also capture the broader theme in the governance debate that non-governmental actors and issue-specific coalitions and institutional arrangements play an increasingly important role in addressing societal challenges. This is important for the debate on multi-level governance as these non-state actors do not necessarily align with the jurisdictional boundaries of the State’s administrative structure (Hooghe and Marks, 2003).

In addition, it has been suggested that the dispersion of governance across multiple jurisdictions is in fact “more efficient and normatively superior to the central state monopoly.” (Marks and Hooghe, 2004). This message is echoed by Ostrom for the field of global climate governance. According to her, such multi-level, multi-actor systems offer

important benefits in terms of fostering innovation and learning and in achieving “more effective, equitable and sustainable outcomes at multiple scales” (Ostrom, 2010: 552).

In this article we start with the argument that the concept of MLG has become indispensable for understanding the dynamic nature of global climate governance. Although it is undisputed that effective climate protection requires a global response, such a response would be unthinkable without engagement at all levels of the global political system. Without active participation at each level of governance, the far-reaching economic and societal changes, which are needed to meet international climate targets, will not be forthcoming (Brondizio et al. 2009). Moreover, developments in the arena of international climate negotiations have made clear that a traditional top-down approach, based on a binding international climate agreement to be implemented and enforced in a hierarchical fashion does not offer a realistic solution (Stern et al. 2014). At the same time, many promising developments at different levels of governance have emerged and are demonstrating that more complex dynamics of governance, characterized by different forms of competition, cooperation, networking and mutual learning, are driving progress in climate policy. These include both non-traditional “horizontal” elements, like peer-to-peer learning or regulatory competition, and vertical processes of scaling-up and adoption of best-practices at higher levels of government (Kern/Bulkeley 2009). We regard the multi-level system of global climate governance as a “multi-impulse system” (Jänicke in this SI), where several climate governance impulses from different points of the system can have the same effect as a strong, centralized instrument (which is not always feasible).

Schreurs and Tiberghien (2007) have adopted such a dynamic and multi-polar perspective to help explain advances in climate policy within the European Union. They highlight the importance of multiple leadership opportunities in stimulating what they call “a dynamic process of competitive multilevel reinforcement among the different EU political poles within a context of decentralized governance” (Schreurs and Tiberghien 2007: 26). Particular interests and opportunity structures in a number of member states have played a key role in driving EU climate action. Among other things, extending national policy innovations to the European Union has represented a strategy of member states to stabilize their national pioneer role, while creating a European market for domestic innovations in climate-friendly technologies. Rather than focusing on the architecture of Europe’s multi-level governance system (Biermann 2014, Jänicke in this Special Issue), this perspective highlights the dynamic

process by which policy change has been realized and emphasizes the dynamic potential of the polycentric systems of governance.

As alluded to above, the article published by Schreurs and Tiberghien in 2007 was followed by an article by Jordan et al. (2012), which presents a number of caveats to the hopeful perspective offered by Schreurs and Tiberghien (2007). They note challenges like the Commission's relatively weak capacity for implementing its ambitious policy goals or – related to this – the narrow set of policy instruments at its disposal.

Both articles present valid perspectives and point out important dimensions of Europe's system of climate governance. Both focus on the interplay between the *national* and supranational levels within European multi-level climate governance. As pointed out above, the term MLG was originally coined to describe the twin processes of Europeanization and decentralization. Starting with the "Agenda 21" (1992), it has also been used to describe a new model of global sustainability governance with a strong focus on the local level but also on multi-sectoral economic development.

This article returns to this original approach to global sustainability governance, arguing that sub-national levels of governance play an important role for understanding the dynamics of multi-level reinforcement in the European Union and beyond. It will show that sub-national politics and policies have played a distinct and evolving role in processes of multi-level reinforcement in European climate and energy governance and that this is closely related to the mobilization of sector-based economic benefits and interests.

2.2. The local level in multi-level reinforcement

In traditional perspectives on environmental policy making, sub-national levels of government are primarily viewed in terms of their roles in implementing and enforcing environmental regulations developed by national governments and possibly agreed to in the form of international treaties (Stewart, 1977; Swanson et al., 2001). However, with the emergence of the concept of sustainable development and its emphasis on local participation (Green and Chambers, 2006), this began to change gradually, culminating in the "local Agenda 21" process launched at the Earth Summit in Rio in 1992 (Rowe and Fudge, 2003). While the ultimate impact of the local Agenda 21 is difficult to measure, it is generally viewed as a successful measure for promoting awareness and participation of local civil society in the promotion of sustainable development (Barrett and Usui, 2002; Lafferty and Eckerberg, 2009).

At the same time, it is frequently pointed out that the local Agenda 21 was not particularly successful in fostering private sector involvement (Lafferty and Eckerberg, 2009; see also Jänicke in this Special Issue). In the field of climate and energy governance, this has begun to change over the past decade (Fuchs and Hinderer, 2014). Simultaneously, local level policies and initiatives are increasingly framed as potential drivers of competitiveness and economic development (OECD, 2008). The database of the Covenant of Mayors provides empirical evidence that in recent years, the climate policy process has mobilized strong economic interests at the local level, especially in the building sector (30% of the activities) and in local energy production. Among other things, private ownership of green power has emerged as a driver of change at the local level in several countries. In Germany, more than half of the green power installations are owned by private persons. Cities and local communities, often organized as networks (Kern / Bulkeley 2009), use national and European policies and incentives – whether regulations, subsidies or public procurement – to mobilize economic interests for climate-friendly technologies, such as renewable energy or low-energy buildings. The EU Directive on Energy Performance of Buildings, for instance, has stimulated a strong activity among local communities with pioneer cities such as Freiburg, Manchester, Copenhagen and Malmö playing an important role (REN21 2013).

We argue that these changes can be understood as a new phase in a dynamic process of multi-level reinforcement, in which sub-national levels of governance are beginning to assume an increasing role in reinforcing industrial policy, initially promoted at the European and national level.

2.3 Sectoral governance: Climate and energy governance as industrial policy

In the context of climate and energy governance, the mobilization of sector-based economic benefits has taken the form of technology-based innovation and industrial policy (OECD, 2011a, 2011b; Soete, 2007). Contrary to the disappointing development of climate policy towards a legally binding international framework, climate policy as sector-based *industrial policy* has been fairly successful (IPCC, 2014: 1174-1178). While the concept of industrial policy has been the subject of substantial dispute in the past (Landesman 2015), there has been an important revival of industrial policy in recent years (Stiglitz / Lin 2013). Environment and climate policy have been strong drivers of this revival (Hallegatte et al. 2013, Altenburg / Lütkenhorst 2015).

Warwick has defined industrial policy as „...any type of intervention or government policy that attempts to improve the business environment or to alter the structure of economic

activity toward sectors, technologies or tasks that are expected to offer better prospects for economic growth or societal welfare than would occur in the absence of such intervention, i.e. in the market equilibrium“ (Warwick 2012). „Green industrial policy“, according to Walz (2015), „aims at contributing to reaching environmental goals as well as fostering prospects for increased economic growth...From a technological perspective, a delineation of green technologies yields green energy supply and energy efficiency, but also green transportation, waste and material efficiency technologies, and water-related technologies. Green industrial policy, however, also requires strategies through which new technologies are complemented by organisational and institutional changes“. Another way of putting it is that green industrial policy requires not only supply-side interventions in support of technology development and investment but also a strong market creation component to stimulate the demand for clean technologies and sectors, in this case clean energy and other low-carbon technologies. The rationale is that ambitious demand-side support will translate into economic advantages within an emerging low-carbon economy (Fankhauser et al., 2013; Quitzow, 2013; Quitzow et al., 2014; SRU, 2002; Walz and Schleich, 2009).

Climate-related industrial policy can be observed at all levels of the European governance system and represents an important motor of reinforcement in the context of multi-level governance. Moreover, as will be shown in the following section, it can be frequently observed how higher levels of government, in particular the European Commission, employ policies explicitly directed at stimulating such local level action, representing an important enabler of multi-level reinforcement.

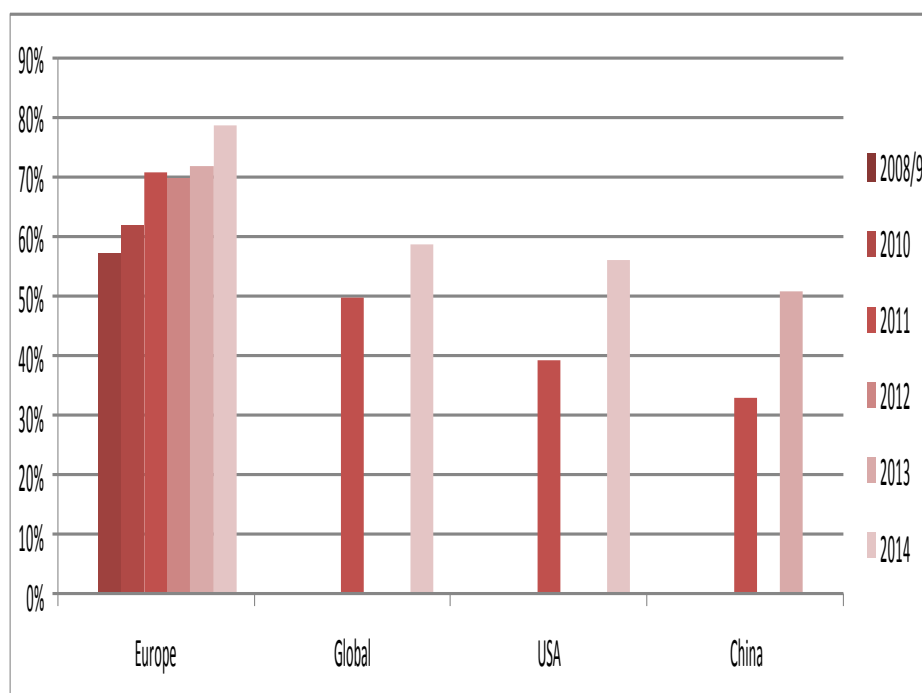
3. The case of the European Union

In terms of both targets and outcomes, the EU remains an international frontrunner in climate policy. Its recently agreed target to reduce greenhouse gas emissions by at least 40% by 2030 represents the most ambitious pledge among industrialized countries. Similarly, the already realized greenhouse gas reduction exceeds the achievements of all other major countries and world regions. The reduction between 1990 and 2014 was 23 percent. The Kyoto-target of the EU 15 has been surpassed (Figure 2) and the target for 2020 already nearly achieved.¹ Moreover, the share of renewable energy has been increasing steadily. From 2000 to 2014 the capacity of wind power increased by 116.7 GW, solar power by 87.9 GW. Coal power (net) capacity was reduced by 24.7 GW in the same time (EWEA 2015). In 2014 renewables

¹ It should be noted that performance has not been equally high across all targets. Targets for energy efficiency and renewable energy as share of total primary energy consumption have not been reached.

accounted for 79 percent of new electric power capacity, up from 57 percent in 2008 and 71 percent in 2011 (REN21 2014). As depicted in figure 1, the EU holds a clear leadership position in this arena.

Figure 1: Renewable Energy as Share of the New Added Power Capacity



Source: REN 21 2009-2015

In terms of climate policy measures, the introduction of the European Union's Emission Trading Scheme (ETS) represents the most visible and comprehensive policy action. As the first large-scale scheme of its kind, it has received broad international attention and has represented an important learning ground for the policy instrument. In terms of its impact on greenhouse gas emissions, however, it has been a disappointment. Studies suggest that the instrument has had no significant impact on emission reductions, and the low prices for certificates suggest that this is unlikely to change in the near future (Laing et al., 2013).

Explanations for the relatively strong performance of the European Union on climate change must, therefore, be sought elsewhere. Rather than the result of one strong, centralized instrument, it is rather the outcome of mutually reinforcing dynamics at different levels of governance. It is supported by an increasingly multi-level approach to low-carbon development policy at the European level. In the following, we describe the main elements of this multi-level system, placing particular emphasis on the role of the sub-national level and the corresponding policies at the EU level in support of local level initiatives.

3.1.The green opportunity structure of the European Union: a platform for the diffusion of policy innovation across member states

The achievements of the EU's climate and energy policy can be partly explained by an *opportunity structure*, which often enables environmental and climate policy innovation. Important elements of this opportunity structure are a number of environment-related articles in the legal framework of the EU (De Sandeleer 2014), including of the principle of a “high level” of environmental protection (Treaty on the Functioning of the European Union, Art. 3.3) There are also green political parties in several member states and in the European Parliament. Some member states have strong public media, or relatively strong local communities. To a certain degree the EU has turned the “free European market” into a market with relatively effective environmental framework conditions. The formal avenue of the European Union's legislative process, aimed at the harmonization of environmental regulation within the context of the single market, has represented an important institutional mechanism of multi-level reinforcement. Environmental policy innovation in member states can with a certain probability become a European regulation. Under certain conditions, the European Commission can allow member states to maintain or introduce “more stringent protective measures” of environmental policy to promote harmonization. When a member state is authorized to do this, “the Commission shall immediately examine whether to propose an adaptation to that measure” (i.e. an adaptation to the pre-existing measure at the EU level) (Treaty on the Functioning of the EU, Art. 114.7). This can lead to an up-scaling of national best practice or environmental policy innovation. Climate policy is part of the EU environmental policy (Art 191).

The potential Europeanization of a national measure can stimulate regulatory competition between member states to become the frontrunner of a European regulation (Héritier et al. 1994, Schreurs/Tiberghien 2007). In general there is the possibility of lesson-drawing by the European Commission based on empirical best practice (rather than more time-consuming experimentation) and with political and technical support from frontrunner member states. The UK emission trading scheme (2002) may be taken as an example. It was also intended to deliver ‘first mover advantages’ to UK companies before the introduction (2005) of the EU emission trading scheme (Rayner/Jordan 2011). Other examples are the UK Energy Efficiency Commitment (2002) and the German Renewable Energy Law (2000), both of which were followed by EU Regulations (2001, 2012).

Complementing its formalized legislative process, the European Union frequently functions as a forum for benchmarking and lesson drawing among member states in a framework referred to as the Open Method of Coordination (OMC). In the 2030 framework for climate and energy policies, European leaders have not only agreed a domestic greenhouse gas reduction target for the year 2030 of at least 40% compared to 1990 and at least 27% for renewable energy and energy savings. This 2030 policy framework also aims to make the European Union's economy and energy system more competitive, secure and sustainable and (in the spirit of OMC), it includes a new governance system based on national plans for competitive, secure and sustainable energy as well as a set of key indicators to assess progress over time (European Commission, 2014).

3.2.Climate and energy policy as industrial policy: sectoral support to low-carbon development

This opportunity structure for multi-level reinforcement is supported by the Commission's low-carbon industrial policy. Industrial policy has a long tradition in the EU. After a period of neo-classical laissez-faire (e.g. in the Lisbon strategy, 2000), there was a revival of industrial policy under the umbrella of the green economy (Walz 2015, Pianta 2015). Low-carbon development is the most prominent aspect of this approach. As early as 2007, the European Commission published a communication titled "Renewed EU industrial policy in times of climate change and globalization". It aimed to „[s]timulate the development and commercialisation of low carbon and energy/resource efficient technologies, products and services, for example by developing lead markets and creating incentives for frontrunners“ (EU Commission, July 4, 2007).

This sustainable industrial policy approach was further developed and upgraded in the context of the "Europe 2020" strategy (European Commission, 2010). Its flagship initiatives entitled "An industrial policy for green growth" and "Resource-efficient Europe", explicitly target green industrial objectives (including the „shift toward a resource-efficient and low-carbon economy“). The EU has also linked its 2020 climate and energy package (2009) to the goal of promoting green growth, jobs and competitiveness (EU Commission 2015). These high-level strategic objectives are underpinned by a mix of demand- and supply-side policies. On the demand-side, they include relevant regulations to be implemented at national and sub-national levels, e.g. the Renewable Energy Directive (2009); national targets for non-ETS sectors such as housing, agriculture, transport or waste; the Energy Efficiency Directive (2012), the Energy

Performance of Buildings Directive (2010), including regulation for new buildings (“nearly zero energy” by the end of 2020).

On the supply-side, the “Roadmap for moving to a low-carbon economy in 2050” sketches out an investment program of about €270 billion with an expected additional employment of 1.5 million (EU Commission 2011). Moreover, the European Strategic Energy Technology Plan (SET-Plan) promotes the development and deployment of low-carbon technologies by coordinating research and supporting the mobilization of financial resources for investment. Implementation of the SET-Plan includes the European Energy Research Alliance, which seeks to align the programming of research organizations with the SET-Plan priorities, as well as the European Industrial Initiatives, which represent large-scale collaborative technology development programs for various low-carbon energy technologies. Additionally, the EU has created facilities under the auspices of the European Investment Bank (EIB) for the financing of low-carbon demonstration projects with funding from the sale of carbon allowances. The first program known as NER300 channeled over €2 billion from the sale of 300 million carbon allowances into low-carbon energy projects. The successor program NER 400 will channel the proceeds of 400 million carbon allowances into low-carbon projects in the energy and industrial sector. In addition, the EIB has committed to direct at least 25 percent of its lending to so-called “climate action projects” (including mitigation and adaptation). (European Investment Bank, 2015).

3.3.Supporting multi-level reinforcement at the local level

Complementing these sectoral policies, activities explicitly aimed at mobilizing climate action at the sub-national level via its Regional Policy have gained increasing relevance in recent times. The EU’s Committee of the Region has established the concept of multi-level governance as a guiding vision for EU Regional Policy. Its aim is to make the “European Union's actions more effective by establishing a new culture of inter-institutional and political cooperation” (Committee of the Regions, 2012:2). In this spirit, EU Cohesion Policy for 2014 to 2020, accounting for approximately one third of the total EU budget, requires the development of so-called Partnership Agreements with the active participation of regional and local authorities as well as other local stakeholders (van den Brande, 2014). Moreover, Cohesion Policy is now explicitly aligned with the EU’s 2020 strategy and serves as a vehicle for its implementation (European Commission, 2013). Correspondingly, climate change adaptation and mitigation and low-carbon development represent key elements of the investment priorities agreed for in the Cohesion Policy for 2014 to 2020. Based on these

investment priorities, Member States and regions are now required to develop so-called smart specialization strategies. The vast majority of the emerging strategies explicitly address climate change and sustainable energy (European Commission, 2015). Two-thirds of regions have chosen energy as a priority (Wiesenthal and Nill, 2015).

In addition to the traditional channel of Cohesion Policy, DG Energy launched the „Covenant of Mayors“ in support of the implementation of the 2008 EU Climate and Energy Package. It is recognized as an explicit instrument of multi-level governance “where common objectives and support are fixed at the EU level, but action takes place at the local level.” (Cerutti et al., 2013). The Covenant of Mayors has proven successful, particularly in the Southern European member states. It now has over 6,500 signatories representing 211 million citizens. More than 4800 signatories have developed so-called Sustainable Energy Actions Plans. According to an assessment in 2013, the average CO₂ reduction of the agreed targets (2020) is 28% (Cerutti et al., 2013). Members receive technical support from the European Commission’s Joint Research Centre for developing and monitoring their Sustainable Energy Action Plans. Financing of measures is supported by a variety of mechanisms under the umbrella of the European Bank for Reconstruction and Development’s Sustainable Energy Initiative. Horizontal learning and competition across signatories are stimulated by an official Benchmark of Excellence, which is also a database of best practice. The European Innovation Partnership for Smart Cities and Communities (previously Smart Cities Partnership Initiative) of the European Commission is a similar mechanism, focusing on the use of ICT in transport and energy management to support the EU’s climate targets.

4. The dynamics of local level reinforcement in EU member states

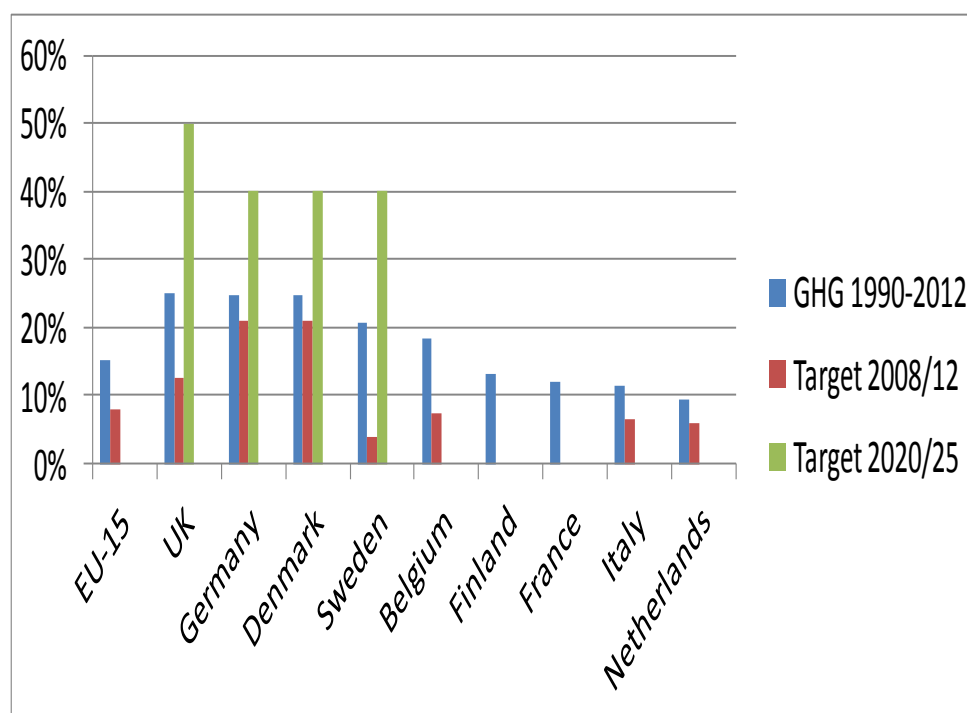
The multi-level approach to climate and energy governance at the European level is mirrored in the actual dynamics in individual member states. As demonstrated by the following empirical examples, local level initiatives are playing an important role both by reinforcing dynamics in pioneer countries and by filling gaps in a number of countries with weaknesses at the national level.

4.1.Pioneer countries

Germany, Denmark and the United Kingdom, all leaders in climate policy, are exhibiting strong local initiatives, which are further bolstering national leadership and in some cases even surpassing national ambition. The four countries have achieved the highest GHG reduction rates. They also have the most ambitious GHG reduction targets for the period

1990-2020/25 (Germany 40-45% by 2025, UK 50% by 2025; Denmark and Sweden 40% by 2020). These ambitious climate strategies are the result of what Jänicke (2013) describes as “interactive cycles of climate-friendly innovation”, where initially unexpected advances in technology trigger policy-feedback following market growth and innovation in relevant clean energy technologies (see Figure 2). In innovation research, these positive feedbacks between national sectoral policy and technological innovation have been referred to as “virtuous cycles” and processes of “cumulative causation” (Hekkert et al., 2007; Jänicke, 2012). In this paper, we argue that these processes are also characterized by important reinforcing mechanisms at sub-national levels of governance. In the following, we consider local level dynamics in the three countries. The German case, in particular, demonstrates how local level dynamics are increasingly linked to the mobilization of sub-national economic interests, which has had an important stabilizing effect for national renewable energy policy.

Figure 2: GHG Reduction in EU Member States 1990-2012 plus Targets 2008/12 and 2020/5



Source: Based on data from Eurostat/EEA 2014

Germany


Germany’s climate policy had the special advantages that the breakdown of the energy-intensive industry in the former GDR together with its lignite-coal based power supply reduced the fear of a radical change of the energy system. Already in 1987 a parliamentary

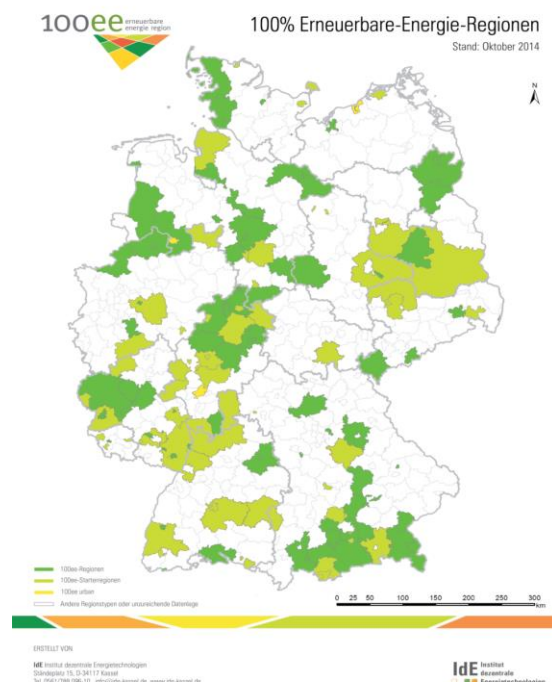
Enquete Commission on climate policy was installed. Its conclusions and proposals (1990), which explicitly included other countries as well as the global context, had a strong impact at the European level. A first result was an ambitious GHG reduction target in Germany (minus 25% by 2005/1990). This policy was based on a cross-party consensus (including pro-nuclear interests of the right-wing parties). Early on, Germany translated its environmental and climate policy into the language of industrial policy and “ecological modernisation” (OECD 2007). It was a national policy with European and global ambitions (Jänicke 2011).

It could rely also on earlier experiments at lower levels of governance. In the field of solar energy, the first cost-covering feed-in tariffs for solar energy were pioneered at the local level. In 1995, the *Solarförderverein Aachen* succeeded in establishing Germany’s first solar feed-in tariff against the resistance of both the local utility and the regional (Länder) government. In the subsequent years, this model diffused to over 40 communities in Germany, frequently against the opposition of the local energy providers. It was based on this experience that the newly elected Red-Green government finally launched the 100,000 rooftop program in 1999. This was followed by a cost-covering feed-in tariff at the national level in 2004 (based on the revision of the Renewable Energy Act) and obligatory grid connection. In the ensuing phase of market growth, the State governments, in particular in Eastern Germany, offered attractive investment incentives, frequently financed with EU structural funds, to PV manufacturers. The resulting economic interests at the regional level led to strong action by several *Länder* governments in support of renewable energy deployment. When the federal feed-in tariff came under pressure in 2010 and 2012 (mainly due to increases in overall costs), *Länder* governments actively prevented more radical revisions of the Renewable Energy Act, blocking legislative proposals in the *Bundesrat* and hence effectively stabilizing renewable energy deployment in Germany.

Further examples of pioneering activities by individual states have emerged recently (in Schleswig-Holstein, North Rhine Westphalia, Baden-Württemberg). The state of Hesse intends to be “climate-neutral” (Hölscher / Radermacher 2013). Some States have introduced special climate-laws. The most remarkable development, however, has occurred at the municipal level. More than 140 municipal governments have formulated the goal of attaining 100% of their electricity from renewable sources. Already 30 percent of the country is organized as 100%-renewable-energy regions, which have been created basically at the local level (BMU 2013). The number of people involved in this network has remarkably increased since 2010 (Figure 3). The private generation of green power, in many cases in the form of cooperatives, has proven to be a strong driver for this development, particularly after 2000.

Figure 3: 100%-Renewable-Energy Regions in Germany

- **2010: 72 EE-Regions 7,8 Mio. inhabitants,**
- 
- **2014: 146 Renewable-Energy Regions 25 Mio inhabitants**



Source: BMU 2013, Map: IdE

Denmark

Denmark can be regarded as the motherland of clean energy transition in Europe. It has been the lead market for wind power. 1976 it introduced regular energy plans supporting renewable energy and energy efficiency. Already between 1980 and 2003 it reduced its consumption of fossil fuels by 10 percent. The domestic CO₂ emissions have been reduced between 1988 and 2003 by 17 percent. The export of clean energy technologies increased from €540 million (1992) to €4 billion (2003). Today Danish electricity production based on renewables accounted for 43.1 percent of domestic electricity supply (2012), and the country aims to achieve a 100 percent share by 2050. At about 50 percent, Denmark has the highest share of co-generation in Europe. Denmark's adjusted greenhouse gas emissions show a reduction of 28.3 percent from 1990 to 2014) (Danish Energy Agency, 2015). Climate policy remains conceived in terms of industrial policy. The Energy Strategy 2050 (adopted in 2011) underlines the advantages for Danish firms in the global market for low-carbon technologies (Danish Government 2011). Being already a strong exporter of clean energies, Denmark aims to be one of the three leading countries worldwide in this respect.

From its inception, local level actors have played an important role in the Danish process of renewable energy development, frequently referred to as a combination of “bottom up – top down” action (Reiche, 2005; Mendonca et al. 2009). By 1992, more than 3,000 co-operative wind turbines were installed (Reiche 2005). Enabled by a supportive national renewable energy policy, citizen cooperatives remained important players, owning approximately 40 percent of installed wind power capacity in 2002. Individual owners – primarily farmers – owned a similar share, while utilities accounted for only 20 percent of installed capacity (Gotchev, 2015). In addition, power from decentralized combined heat and power production (CHP) increased from 1 percent in 1990 to 30 percent in 2001 (Hvelplund, 2013). In other words, Denmark climate and energy strategy has been strongly linked to a process of decentralization, both in terms of generation and ownership.

The importance of the Danish cooperative model has also survived a period with a highly unfavorable policy environment for investment by cooperatives between 2001 and 2008, coinciding with an sharp downturn in renewable energy deployment, following the election of a conservative government in 2001 (Mendonca et al., 2009). Due to strong path dependency of the Danish energy reform (see Jänicke in this issue), however, its strongly decentralized process of renewable energy deployment was revived in 2008. In 2013, the trading cooperative called Vindenergi Danmark (Vindenergi DK) accounted for 70 percent of traded electricity from onshore wind farms. Though not its original mission, Vindenergi DK, set up by the Danish association representing individual and cooperative owners of wind turbines (DK Wind), enabled Denmark’s cooperatives to respond to an abrupt switch to a market-based tariff model. Since 2008, government support to renewables has been renewed, which has gone hand in hand with municipalities emerging as important actors in renewable energy policy. According to a survey in 2008, 63 of 93 responding municipalities were actively engaging in climate-related activities and 22 were planning to do so (Sperling et al., 2014). Finally, cities are emerging as important frontrunners in climate governance. Copenhagen and Aarhus intend to be climate-neutral (by 2025, respectively by 2030).

United Kingdom

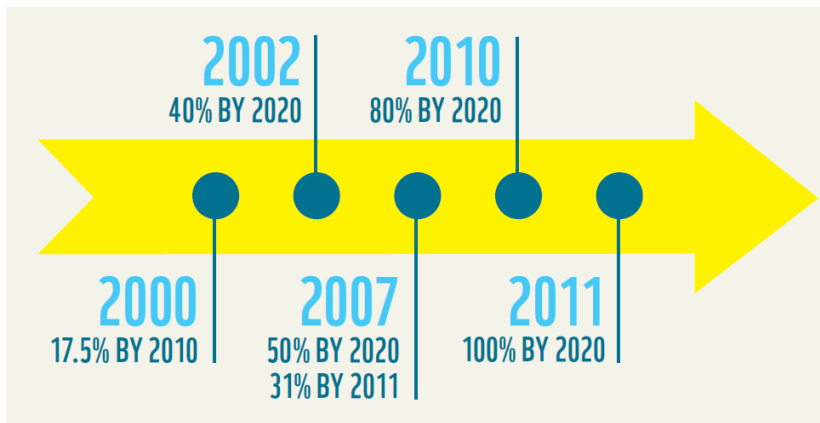
The *United Kingdom* had a special advantage in its climate policy. Power generation from coal was reduced early on for political reasons by the former Prime Minister Margaret Thatcher. This had “the completely unintended effect of lowering the UK’s emission throughout the 1990s” (Rayner / Jordan 2011). Therefore it was easier to establish a more ambitious climate policy. The country was a pioneer and promoter of the European emission

trading scheme. The Climate Change Act (2008) was a pioneering policy innovation in Europe. The greenhouse gas reduction target for 2020 was increased several times. After 2005 the Blair government conceived climate policy strongly as business opportunity. The focus of the country's climate investment is on energy efficiency.

In the UK, climate policy started mainly as a top-down approach. Moreover, the implementation of the Climate Change Act (2008) since the election of the Tory government in 2010 has been criticized for lowering its initial ambition (Lockwood, 2013). Nevertheless, it has helped stimulate substantial dynamics at the sub-national level. In particular in Scotland, the above-mentioned policy feedback of successful deployment of green electricity can be observed. Figure 4 shows the progressive increase of targets in response to the rapid achievements on the ground. It now has the target to meet 100 percent of electricity demand from renewable sources by 2020 (The Scottish Government, 2013). It also aims to achieve an 11 percent share of renewables in the heat sector and a 10 percent share in the transport sector by 2020 (WWF, 2014). . Scotland's greenhouse gas emissions target of 42 percent by 2020 (Climate Change (Scotland) Act 2009) exceeds the national target of 34 percent (Department of Climate and Energy, 2014). Scotland's ambitious climate targets received unanimous support in the Scottish Parliament and are supported by the business community and a range of civil society organizations. It is further bolstered by a strong anti-nuclear stance of the Scottish society and government (WWF, 2014), and it is underpinned by a Low Carbon Economic Strategy, a key component of the government's overall Economic Strategy (The Scottish Government, 2010).

The UK is also relatively strong at the city level. According to a comparative study the UK is leading Europe in terms of the number of cities that have climate change mitigation or adaptation plans (Reckien et al. 2014). Most cities have ambitious climate policy targets. London's GHG-reduction target exceeds the national target (60% by 2025/1990). Edinburgh plans to have a zero-carbon economy by 2050 (Heidrich et al. 2013). This has also an industrial policy dimension. Manchester has for instance the ambition to play a leading role in the global market for energy-efficient building technologies.

Figure 4: Changes in Scotland's renewable energy targets over time



Source: WWF (2014)

4.2.National laggards and sub-national drivers

In the previous section, we discussed the role of local level reinforcement in the case of three national frontrunners of climate mitigation and market support for low-carbon technologies. The example of Poland shows that relevant sub-national dynamics are also beginning to take shape in laggard countries in terms of national climate policy. The country is a prominent opponent to many aspects of the European climate policy (together with the Eastern European Visegrad Group). However, a survey conducted among the authorities of the Polish communes between August and October 2013 comes to the conclusion that there is „large enthusiasm for the development of dispersed power sources, especially solar and wind”. Moreover, they find that the interests are frequently “even exactly opposite to the interests expressed by the Polish government”. This is often related to opposition to government plans for the building of new lignite power plants (Ancygier and Szulecki, 2013). In 2009, a number of municipalities even held local referendums, in which citizens voted against the construction of new coal-based power plants (Skorupska, 2015). Cities such as Bielsko-Biala, which established its Energy Management office as early as 1997 and was the first Polish municipal government to establish a Sustainable Energy Action Plan within the Covenant of Mayors, are offering pioneering examples for others to follow.

It is also noteworthy that by far the largest number of municipalities to have joined the Covenant of Mayors are from Spain and Italy, accounting for 87 percent of signatories and 79 percent of Sustainable Energy Action Plans as of May 2014 (Cerutti et al., 2013). Despite a high share of relatively small municipalities, this still represents approximately 36 percent of the population covered by the signatories and 29 percent of the population covered by

municipalities with Sustainable Energy Actions Plans. This is a disproportionately high share relative to their combined share of 21 percent of the total EU population. It should also be noted that about 4 percent of signatories are not from EU member states. The over-representation of Italian and Spanish municipalities suggests that the relatively ambitious renewable energy policies in these countries, which were then largely abandoned in the wake of the financial crisis, have helped stimulate significant local level activities. With the weakening of national support, these local governments now appear to be seeking support at the European level. In other words, dynamics triggered by national policy seem to be reinforcing climate and energy governance by a combination of European and municipal action.

4.3. Discussion of empirical examples

The various cases demonstrate the importance of the sub-national level in multi-reinforcement in a number of different country contexts, including both national pioneers (UK, Germany, Denmark) and countries with less ambitious climate policy, like Poland, Spain and Italy. These cases reveal a number of different patterns of reinforcement. In the example of Germany's solar sector, citizen-induced policy innovation at the municipal level was important at the early stages of development, spilling over onto the national level with the introduction of the 100,000 rooftop program and the provisions for solar energy in the revisions to the Renewable Energy Act introduced in 2004. This in turn mobilized investment both on the demand- (i.e. electricity generation from solar resources) and supply-side (i.e. manufacturing of solar modules, project development, etc.). In particular the latter has been translated into economic interests at the sub-national level, which were then articulated in political terms by *Länder* governments. In the Danish wind energy sector, municipal government was less involved in the process of policy innovation. However, citizens, organized in the form of locally embedded cooperatives and their national associations, have represented the backbone of the economic development of the sector. Municipalities have started to enter as players at a later stage, apparently responding to developments at the national and sectoral level. In the UK, Italy and Spain, climate and renewable energy policy, respectively, were initially pioneered at the national level with relatively weak sub-national dynamics. Resulting sub-national initiatives (in particular Scotland) are now surpassing national-level ambitions in the UK, while in Spain and Italy municipal actors are seeking to fill a vacuum left by abrupt policy changes at the national level. Finally, municipalities in Poland are showing signs of developing a progressive agenda on climate and renewable energy issues in the face of strong national level resistance.

5. Conclusions

This article explains the relatively high performance of the EU in climate and energy governance by two inter-related factors: (1) the mobilization of economic interests by conceiving climate policy in terms of industrial policy, and (2) multi-level reinforcement. The industrial policy dimension is equally present in the renewable energy-focused strategies in Germany and Denmark, and the energy efficiency centered approach in the UK. In all cases, the resulting mobilization of economic interests has created strong incentives for reinforcing climate action at the sub-national level. Simultaneously, sub-national governance is emerging as a locus of ambitious climate and energy policy in a number of laggard countries. Support from the European level represents an important support mechanism for these actors.

This dynamic system of multi-level governance is most advanced in the EU compared to other world regions. It provides an opportunity structure for innovation and its rapid diffusion. It is a system of interactive learning from best practice and a “multi-impulse system” with impulses from different points of the system which can have a strong combined effect. Stagnation at certain levels or countries can be compensated on other levels and in other countries. Sub-national levels of governance are beginning to assume an increasingly important role in reinforcing climate governance. This is taking a number of different forms, depending on the particular national context. As indicated, the importance of EU level support to sub-national action appears to most relevant in countries with relatively weak national climate policies. In Italy and Spain, in particular, it seems to be filling a gap left by a weakening of national level policies.

This development of the multi-level model of climate governance has given the European climate system a certain independence from centralized EU decision making. It could make the EU system of climate governance comparably robust in times of recession or competing priorities, such as the Euro zone crisis or challenges related to the increasing number of refugees entering the EU.

Central to this are the economic co-benefits, which have been explicitly addressed by the EU in terms of its industrial policy (IRENA 2016). Co-benefits mean that there is a change from burden-sharing to opportunity sharing and from norm-driven to interest-driven solutions (Schaik / Schunz 2012). The important implication is that an effective climate policy must not only rely on legal obligations but can also use voluntary mechanisms and support mechanisms

at different levels of governance in support of policy experimentation and interactive learning. This shift towards interest-driven, opportunity-based and more voluntary approaches can also be observed in the new strategy of “progression over time” in the Paris Agreement (Art. 3, UNFCCC 2015). This is a shift of paradigm in the in global climate policy which seems to be an essential cause for the successful outcome of the Paris climate negotiations (Jänicke 2016). It may also help to implement the new dynamic COP 21 strategy of climate governance.

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