Starting low, reaching high? Sequencing in EU climate and energy policies

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Abstract: In order to achieve the UNFCCC Paris Agreement goals, climate policies worldwide need to be ratcheted up considerably. Policy sequencing provides a framework for analysing policy process dynamics and improving the scientific understanding of the mechanisms and conditions that facilitate this ratcheting-up. We apply a sequencing perspective to two key EU climate and energy policies, the Emissions Trading Scheme (ETS) and the Renewable Energy Directive (RED), to test the empirical relevance of sequencing and to uncover specific mechanisms. Our results confirm that sequencing is relevant for ratcheting-up climate policies, as policies create feedback effects that work back on the barriers initially restricting their stringency. From the cases we identify policy choices that may facilitate ratcheting-up. These include tools to control costs, the possibility to centralise and harmonise instruments in a multi-level governance context, options for the compensation of reluctant actors, and the encouragement of learning processes. We conclude that carbon pricing policies may stand good chances for successful ratcheting-up if a relatively low level of initial ambition allows for the creation of path dependency. Ratcheting-up of renewables policies may entail higher targets but lower support rates, with carbon pricing becoming a stronger driver for long-term decarbonisation.

Keywords: Policy sequences, policy feedback, energy policy, climate policy, emissions trading, renewable energy

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1 Introduction

In order to achieve the UNFCCC Paris Agreement goals, global greenhouse gas emissions will have to be reduced dramatically over the coming decades (IPCC, 2018). To incentivise the decarbonisation of economic systems and energy supply structures at the required scale and speed, policies for low-carbon transformations need ratcheting-up (UNEP, 2018). Recent research on climate policy sequencing (Meckling *et al.* 2015; Meckling *et al.* 2017; Pahle *et al.* 2018) provides a framework for analysing mechanisms and processes that support such ratcheting-up. The framework assumes that policies change over time, and that on these pathways 'each stage is conducive to achieving the subsequent, more stringent one' (Pahle et al. 2018, p. 861). This happens as barriers that restrict the stringency of climate policies are removed or relaxed through sequential policy-making.

Building on path dependency and policy feedback, the sequencing framework is interested in how policies themselves work back on their context's political economy, affecting actors, institutions and coalitions. While in the analytical perspective sequencing is not necessarily intentional, the framework can be used to identify tools that allow for strategic policy sequencing through anticipating and possibly channelling feedback effects of policies into the desired direction. As a novel analytical framework, climate policy sequencing yet has to be tested in case study research, and it lacks a thorough conceptualisation of the mechanisms that underlie observed or assumed sequencing effects.

This paper contributes to closing this gap by investigating sequencing dynamics in two key European Union energy and climate policies: The Renewable Energy Directive (RED) and the European Union's Emissions Trading Scheme (EU ETS). The EU has been playing a leading role in international climate policy since the early 1990s (Oberthür and Pallemaerts 2010). It adopted an emissions reduction target of minus 8 percent for 2010 relative to 1990 levels

under the Kyoto Protocol 1997, which was increased to 20% with the 2020 climate and energy package; the new 2030 framework is headed towards 40 percent for 2030. The RED and the EU ETS both have been central instruments in the EUs climate and energy strategy, evolving in the same context but exhibiting very different process dynamics.

The questions we address in this research are 1) whether sequencing effects were relevant in the development of the two policy instruments over time; 2) through which mechanisms sequencing effects affected existing barriers and thus shaped process dynamics; and 3) what can be learned from the two cases about conditions that facilitate ratcheting-up. Regarding the first question, we also aim to contribute to the conceptual challenges of assessing energy and climate policy stringency. The following Section 2 presents our theoretical framework and methodology. Section 3 presents the two cases and traces their dynamics, with summaries in Figures 1 and 2 and Table 2. In Section 4 we adopt a comparative perspective and discuss implications of our results for refining the sequencing framework. Section 5 provides conclusions and an outlook.

2 Research design

2.1 Theoretical framework

The climate policy sequencing framework (Meckling *et al.* 2015; Meckling *et al.* 2017; Pahle *et al.* 2018) draws on concepts of path dependency and policy sequences, including from the historical institutionalist tradition. It assumes that policy sequences may be self-reinforcing if existing patterns are strengthened via positive feedback effects (Pierson 2000), or reactive if connections between subsequent events include counterreactions and backlash (Howlett 2009; Mahoney 2000), and if early events produce responses that may lead the policy in a different direction (Daugbjerg 2009: 407). At the core of the sequencing framework are barriers that

initially restrict the stringency of climate policy, but that can be relaxed or removed by the policy itself over time, which may enable step-wise ratcheting-up. As an analytical perspective, the sequencing framework does not require these effects to be intentional. Sequencing may also occur across policies, as a certain policy may affect the barriers that stand in the way of introducing or ratcheting-up other, more stringent policies. A key hypothesis of the sequencing framework is that green industrial policies thus may pave the way for carbon pricing (Meckling *et al.* 2015; Meckling *et al.* 2017). Based on Pahle et al. (2018), we concentrate on the barriers shown in Table 1.

[Table 1]

To fine-tune the analysis of the specific mechanisms through which policies interact with barriers, sequencing research builds on the concept of policy feedback. We assume that the cumulative effect of different feedback effects determines the type and shape of a policy sequence. Policy feedback denotes 'the impact of existing policies on politics and policy development' (Béland 2010: 569). Positive feedback occurs if increasing returns dynamics increase the costs of switching to alternative solutions, and may underlie self-reinforcing process dynamics (Pierson 1993; e.g. Pierson 2000; Skocpol 1992). Negative feedback processes undermine the stability of a policy regime and may be a source of policy change (Jacobs and Weaver 2015; Oberlander and Weaver 2015; Weaver 2010). In the following we shortly elaborate on how the barriers may be affected by feedback mechanisms.

If a policy reduces the costs of technologies for emission reductions, the **cost barrier** is relaxed. Negative feedback reinforcing the cost barrier may come from mounting fiscal pressures or societal costs caused by policies (Weaver 2010). Cost concerns may be intensified if a national or regional policy affects the domestic industry's viability vis-à-vis international competitors (free-riding). Linking climate policies to those of other jurisdictions

or providing support to trade-exposed CO_2-intensive industries can help to alleviate this barrier (Pahle *et al.* 2018).

The influence of policies on **politics** has been at the core of policy feedback research. If policies create benefits for powerful clienteles or incentivise actors to make high up-front investments in abatement technologies, attempts to dismantle them later will be met by strong resistance. (Béland 2010; Jordan and Matt 2014; Pierson 1993; Skocpol 1992). Building winning coalitions can stabilise a policy (Meckling *et al.* 2015). Policies that generate revenues are likely to benefit from the support of the treasury (Edmondson *et al.* 2018). By contrast, a policy that creates concentrated costs for powerful actors may cause them to intensify their resistance (Jordan and Matt 2014; Meckling *et al.* 2017; Oberlander and Weaver 2015). Negative feedback from the resistance of affected actors may be mitigated through strategic transfers and compensation measures (Dorsch *et al.* n.d.).

The build-up of 'bureaucratic constituencies' (Béland 2010: 571; Skocpol 1992) is a positive feedback effect that might work back on the **institutions and governance** barrier. We expect policy learning to be a relevant feedback effect in institutions and governance (Daugbjerg 2009), as policy-makers develop new strategies or policies from experience with existing policies (Dunlop and Radaelli 2016; Heikkila and Gerlak 2013). Policies may encourage learning if they include monitoring and review systems that reveal deficiencies in performance (Jordan and Matt 2014: 234).

Policy changes may also be caused by external factors and conditions that are not affected by the policy itself. Also, the intersection with a separate independent policy sequence may cause the trajectory to change (Mahoney 2000). While external factors may be used as *alternative* explanations for policy changes, we assume that outcomes are determined by the interaction and relative strength of external pressures *and* feedback effects. Feedback scholars have pointed to the relevance of external processes and conditions such as the availability of policy

alternatives, pressures from international environmental regimes, the role of policy entrepreneurs, the complexity and consistency of policies within policy mixes, and the degree of partisan polarisation (Edmondson *et al.* 2018; Jacobs and Weaver 2015; Jordan and Matt 2014; Oberlander and Weaver 2015; Weaver 2010).

The EU's multi-level governance context creates specific conditions that influence feedback effects and the structure of barriers. Compromise solutions need to be created that are acceptable to 28 Member States with different national climate policy preferences. While decisions on high-level targets are taken by the European Council in unanimous voting, a strong pressure to achieve consensus is also present in energy and climate legislative processes without formal unanimity requirements (Fischer 2014). While outcomes determined by the lowest common denominator may be expected under these circumstances, the EU has in fact been able to take on an international leadership role on climate change mitigation. This implies that its complex decision-making processes also hold multiple options for actors willing to enact leadership (Schreurs and Tiberghien 2007: 41).

2.2 Methods

We perform process tracing to reconstruct the temporal sequence of policy choices with the aim to understand causal dynamics (Beach 2017). As material we use the official documentation of EU policy-making and scientific studies that analyse specific episodes or aspects of the policy processes. In addition, our research is based on interviews with 19 experts, including policy-makers from the European Commission and Member State governments and scientists. A list of interviewees is provided in the Annex.

Case selection follows a 'most likely' approach (Flyvbjerg 2006). As the EU's climate targets are ambitious in global comparison and have been continuously raised over time, there is reason to expect that a ratcheting-up of the corresponding policies can be observed. The EU

ETS and the RED lend themselves to comparison as they evolved in the same context and more or less in parallel. Both policies were implemented at the beginning of the century, both unfolded in the EU's multi-level governance under the same basic decision-making structures, and both underwent two major reforms with the EU's 2020 and 2030 climate and energy packages. Impact assessments for both instruments suggested that compliance costs would be moderate and not exceed 0.5% of GDP (Capros *et al.* 2011; European Commission 2000; European Commission 2006).

Yet the two cases differ fundamentally in policy type, with the RED being a regulation encouraging Member States to subsidise renewables via national support schemes, and the ETS being a market-based instrument directly imposing a cap-and-trade system at firm level for CO_2 emissions. Both the type of policy instrument and its specific design features influence policy process outcomes (Carley *et al.* 2018; Schmidt and Sewerin 2018). In Section 4 we discuss how the differences in sequencing dynamics that we observe relate to these different policy characteristics and conditions.

The sequencing framework does not provide an explicit definition of 'ratcheting-up' and of policy 'stringency'. However, as the occurrence of ratcheting-up eventually is the dependent variable for sequencing research, a clear and specific operationalisation of the concept is necessary. An assessment of policy stringency cannot only be based on the ambition of targets, but needs to consider whether the design features of the policy are likely to allow these targets to in fact be achieved (Oberthür 2019). In the EU's multi-level governance context, the degree to which policies are centralised and harmonised and to which they create 'hard', substantive obligations for Member States is likely to interact with their level of stringency. Generally, ratcheting-up can occur if targets are stepped up and existing instruments tightened, but also when policy instruments are adjusted and transformed

(Schaffrin *et al.* 2014). Drawing on Schaffrin et al. (2014) and Oberthür (2019), we propose two criteria to define whether a policy development may be classified as ratcheting-up.

- Are the *targets* of the policy becoming increasingly ambitious, and/or is the policy expanding in *scope*?
- Is the *policy design* becoming increasingly stringent, that is, suitable to ensure target achievement? This includes a consideration of monitoring and review provisions, the level of bindingness, and enforceability.

Ratcheting-up in terms of policy design does not necessarily mean 'more of the same'. For instance, as subsidies for renewable energy become costlier with rising targets, ratcheting-up may require reducing financial support and eventually phasing-out subsidies when they are no longer necessary for target achievement.

In the following, we describe each policy's evolution since its first introduction and discuss whether the process has been characterised by (continuous) ratcheting-up. We then discuss which barriers existed to higher stringency, and how they were modified by policy sequencing. We focus on the question how sequencing was built on process-internal feedback processes, while also considering the influence of external factors (Section 3.1 and 3.2).

3 Results: Tracing policy development of ETS and RED

3.1 EU ETS

Policy development: ratcheting-up?

As introduced in 2003 (Directive 2003/87/EC), the EU ETS essentially was a system of linked national trading schemes intended to achieve the relatively moderate 2012 Kyoto targets. Member States set individual caps and determined rules for the allocation of allowances to the

regulated facilities in their national allocation plans (NAPs) – subject to review by the EU Commission (Ellerman *et al.* 2016). The 2003 ETS Directive required that almost all allowances were allocated free of charge. The Linking Directive (2004/101/EC) adopted in 2004 allowed the use of emission reduction credits generated under the Kyoto Protocol's Clean Development Mechanism (CDM) and Joint Implementation (JI) within the EU ETS.

The reform of the ETS in 2009 (Directive 2009/29/EC) brought a strengthening of ambition and a centralisation of the system, introducing a single EU-wide cap that was to decline according to a linear reduction factor (LRF) of 1.74 percent per annum to arrive at the 20 percent emissions cut envisaged for 2020. Auctioning became the basic principle for allocating allowances that would apply to the power sector in 2013 and be phased in to the industrial sector more slowly. The remaining free allocation was based on centrally determined benchmarks. Rules for the import of third country credits became stricter. The ETS now also included the 10 new Member States who had joined the EU in 2004 (Ellerman *et al.* 2016; Skjærseth and Wettestad 2009).

A low allowance price and a growing surplus of allowances in the EU ETS that emerged from the economic crisis but also from the use of external CDM and JI credits gave rise to new ETS reform debates. In 2013, the auctioning of 900 million allowances was postponed until 2019/2020 ('backloading'). A Market Stability Reserve (MSR) was implemented through Decision (EU) 2015/1814 to start operation in 2019. If the total number of allowances in circulation exceeded a certain threshold (833 million), the MSR was to take away allowances from the market at a rate of 12 percent. It was to release additional allowances if the total number in circulation fell below 400 million.

While the initial MSR reform arguably increased stringency only to a relatively small extent (Perino *et al.* 2017), it paved the way for a subsequent ratcheting up with the 2018 ETS reform. The 2018 ETS Directive doubles the rate at which the MSR absorbs surplus

allowances to 24 percent between 2019 and 2023. Furthermore, from 2023 the reserve will be limited in size to the number of allowances auctioned during the previous year; all allowances above that number in the reserve will be cancelled (Art. 2 of Directive 2018/410). The 2018 Directive also implements the key decisions adopted by the European Council in 2014, setting the emissions reduction to be achieved by the ETS to 43 percent by 2030 and tightening the LRF to 2.2 percent from 2021 onwards (Directive (EU) 2018/410). The reformed EU ETS continues free allocation for industries with high carbon leakage risk and exemptions for Eastern European countries. After the 2015-2018 reform allowance prices increased considerably; they have been moving around 20 Euro since summer 2018 (time of writing March 2019).

In summary, the *targets* of the policy, that is, the cap and the rate of decrease of the annual quantity of allowances, were ratcheted-up in the subsequent steps of policy reform. *Policy design* also was continuously strengthened. Reviews were built into the policy from the beginning. Reforms enhanced not only static environmental effectiveness (that is, compliance with the cap), but also the instrument's dynamic efficiency (Knopf *et al.* 2014), as they increasingly aimed at incentivising investments that would allow achieving the long-term cumulative cap at low cost. While the MSR has been critically reviewed and other design features such as a minimum price have been proposed as more effective (Edenhofer *et al.* 2017; Ellerman *et al.* 2016: 103), the reforms do address major deficits and constitute improvements vis-à-vis the previous situation (Carlén *et al.* 2018; Flachsland *et al.* 2018). This general assessment is shared by the experts we interviewed on the ETS. Overall, we argue that the stringency of the ETS was continuously ratcheted-up over time.

Sequencing effects

The external processes and conditions that influenced the ETS policy process have been analysed elsewhere in detail (e.g. Convery 2009; Fitch-Roy *et al.* 2019; Jevnaker and

Wettestad 2017; Skjærseth *et al.* 2016; Skjærseth 2017; Skjærseth and Wettestad 2009; Skjærseth and Wettestad 2010). Many of these factors were also mentioned in our interviews. They prominently include leadership from individuals and institutions, with a strong role of the European Commission as policy entrepreneur supported by an associated network of actors across institutions and governance levels; a push from European governments in key phases of reform, and pressure from the European Parliament. Also, developments in international climate negotiations such as the withdrawal of the US from the Kyoto Protocol, and the degree to which climate change was a priority for European citizens and policy-makers, strongly influenced the process. The direct link of the EU ETS to the EU's international emission reduction commitments was highlighted in interviews as a key condition. As the emissions cap and LRF are almost directly translated from the EU's international obligations, and loosening them would imply increasing the burden on the non-ETS sectors, two interviewees argued that the ETS has a 'built-in ratcheting-up dynamic'. The existence of experience from pilot emissions trading in industry (BP, Shell) helped the introduction of the ETS, at a time when the EU was pressured to find a pan-European instrument compatible with the internal market logic.

Our research shows, however, that process-internal sequencing also strongly shaped the process, as feedback effects from the policy relaxed barriers to ratcheting-up (Figure1, Table 2).

[Figure 1]

Cost. Concerns about the economic costs to be expected from the EU ETS have featured centrally in arguments of opponents and initially constituted a barrier to its introduction. Cost issues have been closely interlinked with free-riding concerns, with affected industries claiming the ETS would negatively affect their competitiveness vis-à-vis international competitors not subjected to comparable regulation. At the same time, however, the ETS was

advocated by its proponents as a gain in efficiency that allowed reaching climate targets at *lower* costs than with national instruments and no possibility to trade emissions (European Commission 2000). Anticipated effects of ETS reforms on EU GDP were moderate (European Commission 2008a), and due to early overallocation the instrument in fact started at an even lower level of ambition. Resulting low allowances prices were important in facilitating the ratcheting-up of the ETS (4 interviews), signalling that the costs of the system were manageable and clearly contradicting more alarmist claims. With progressing time, the low allowance prices also provided a strong argument for increasing stringency, as it also indicated a lack of instrument performance. The ETS so far has not had negative impacts on the economic performance of regulated firms (Dechezleprêtre *et al.* 2018), but it has also not yet created price levels sufficient to incentivise the investments necessary to enable long-term and large-scale decarbonisation. Thus, prices will have to increase further to achieve environmental effectiveness, but if this increase follows a predictable pathway, the cost barrier might not become a limiting constraint (Edenhofer *et al.* 2017).

Politics. Opposition from industry stakeholders and from European Member States has been a persistent and strong barrier to ratcheting-up the ETS. Non-power industry has been the strongest opposing interest group, being more exposed to international competition than the power sector and less able to pass on costs to consumers. At the time of introduction of the ETS, there was little enthusiasm among the then 15 EU Member State governments (Skjærseth and Wettestad 2010). Later, resistance came mostly from Central and Eastern European Countries (CEECs) with a strong reliance on fossil fuels and a desire to keep electricity prices low. The ‘green’ constituency (environmental NGOs, Green Parties, RE industry associations) did not support the ETS initially, expecting a lack of environmental effectiveness and threats to renewables support policies (2 interviews).

Compensation measures that moderated the distributional impacts of the ETS have been key to overcome the resistance barrier and to control the potential for negative feedback from affected actors (Dorsch *et al.* n.d.). The free allocation of allowances to industry has played a very important role in this context (4 interviews). The continuity of compensation measures eased individual actors' cost concerns and created trust among industry stakeholders that policy-makers would continue to be responsive to their concerns. It also had the effect of channelling lobbying activities into securing compensation and away from opposition against the instrument more generally (4 interviews, Jevnaker and Wettestad 2017). Compensation measures also helped to win support from reluctant Member States. For instance, the CEECs were beneficiaries of several compensation measures introduced in 2009. A blocking minority on the MSR could be broken by the concession that the MSR would not absorb allowances from the Solidarity and Growth transfer, which means that CEECs contribute less to feeding the reserve than the Western Member States (interview, Jevnaker and Wettestad 2017). While compensation eased resistance at each single reform step, it did not lead to dynamic effects itself. Rather, it allowed for other self-reinforcing processes to unfold over time.

Positive dynamic feedback strengthening the supporting coalition came from constituency building effects that spanned different actor groups. In the EU institutions, national governments and government agencies, but also in the regulated firms, business associations, research, think tanks and NGOs, a community of experts emerged who developed ownership of the instrument and who were interested in improving its functioning – even if their specific interests differed. With an increase in the generation of revenues from auctioning that accrue to Member State governments, finance ministers may become more likely to join the ETS-supporting constituency (4 interviews). The ETS also may have produced reinforcing feedback from a strengthened power sector commitment, as some power sector companies are perceived to be increasingly active in pushing ambitious ETS reform (3 interviews).

Interviewees argue that the ETS contributed to a change of business models in the sector, although a decisive push may also have come from renewables support policies (see Section 3.2).

The green constituency's trust in the instrument's effectiveness was enhanced by the observation of industry opposition (2 interviews, Skjærseth and Wettestad 2009: 13). While NGOs have upheld a certain scepticism (Markard and Rosenbloom 2018), environmentalists and business actors have formed coalitions that helped find compromise solutions in the most recent ETS reform (Fitch-Roy *et al.* 2019), and the renewables industry today pushes ambitious carbon pricing solutions to improve market conditions (Fernahl *et al.* 2017).

Institutions and governance. Limitations in expertise and capacity, in particular the lack of data on firm level emissions, a lack of experience with emissions registries, and the allocation of responsibilities for implementation and monitoring in the Member States, was a major challenge when the ETS was introduced. Moreover, at the beginning there was resistance in Member State administrations from individuals who would have preferred to hold on to traditional command and control instruments (3 interviews). However, with the implementation of the system and during the first pilot phase, technical and administrative capacity was quickly built up.

In the reform processes that followed, the community of experts and stakeholders engaged in ETS policy-making went through a learning process, where experiences made with earlier versions of the instrument informed reform processes. Notably, learning from experience paved the way for centralisation. The decentralised structure of the early ETS system created incentives for all Member States to treat their own industries favourably, causing a 'race-to-the-bottom dynamic' (Wettestad *et al.* 2012: 76) and competitive distortions. The NAP process was experienced as cumbersome and frustrating (Ellerman *et al.* 2016: 92; Matthes and Schafhausen 2007; Skjærseth and Wettestad 2009), while overallocation threatened the

environmental effectiveness of the whole system (Skjærseth and Wettestad 2010). Against this background, Member States were arguably relieved to get rid of the task of negotiating with domestic industry and did not oppose the EU-wide cap and the harmonisation of allocation rules in 2008 (7 interviews). The fact that Member States actually welcomed centralisation and harmonisation, a rare condition in EU policy-making, suggests that Member States had a basic interest in a functioning ETS, and that a learning process led them to accept the reforms which the logic of the instrument required (Neuser 2014). Centralisation increased policy stability, as lobbying directed at national governments became less effective (interview) and the European Commission's information advantage increased (interview). It also reduced vulnerability to national rollbacks due to government changes (interview).

The reforms implemented between 2012 and 2018 also were the result of learning processes, as the strengthened ETS community observed the deficits of the existing system and developed solutions to improve – or rather restore – its functioning. While CO_2 emissions in EU ETS sectors were somewhat decoupled from GDP growth in Europe between 2004 and 2014 (Ellerman *et al.* 2016: 96), prices in the third trading period remained low and a surplus of 2 billion allowances was diagnosed (European Commission 2014: 8). Concerns about the resulting lack of dynamic efficiency of the instrument were a key motivation for the reforms for the fourth trading period (6 interviews). The experience of the economic crisis' effects facilitated arguing for an ex-post regulation of allowance volumes as performed by the MSR (2 interviews).

3.2 EU RE policy

Policy development: ratcheting-up?

The first European Directive on the promotion of renewable energy (Directive 2001/77/EC; 'RED 0') set an indicative target of 22 percent renewables in EU electricity consumption to be reached by the year 2010. Member States were required to set national indicative targets and to regularly report on their targets and measures. The European Commission was to monitor whether national indicative targets were consistent with the overall EU 22 percent target. Member States did not support proposals by the European Commission to introduce a pan-European tradable certificate scheme (Wettestad *et al.* 2012: 71).

With the EU's 2020 climate and energy package and the revised Renewable Energy Directive 2009/28/EC ('RED I'), the Directive's scope was expanded to include heating/cooling and transport. A share of 20% renewables in the EU's energy consumption was to be reached by 2020, with a specific target of 10% of renewable energy in transport. The Directive set national targets for Member States and made them legally binding. Members States were required to adopt national renewable energy action plans that set out their targets for transport, electricity and heating and cooling, with biannual progress reporting. The Directive described an indicative trajectory that Member States should follow to reach the targets. With an increasing slope, the trajectory allowed postponing action to relatively late points in time. The European Commission could require Member States who were not on track to submit revised national action plans.

The Commission made another attempt to introduce a mandatory scheme for trading RE certificates with the RED I, but again failed to gain the necessary support from Member States (Skjærseth *et al.* 2016: 65). However, mechanisms were introduced to provide Member States with additional flexibility in reaching their national targets, including a voluntary statistical transfer scheme for renewable energy.

The Directive was again recast with the 2030 framework. The 2014 European Council Conclusions removed the nationally binding targets (while the EU-level target is still

binding), and streamlined the monitoring, reporting and compliance control mechanisms with other energy and climate legislation in the Governance Regulation (GovR). The new Directive agreed in 2018 (”RED II”) sets the European RE target at 32 percent for 2030, stepped up from the 2014 European Council’s ‘at least 27%’, and at 14 percent in transport. Member States must publish integrated National Energy and Climate Plans by 2019 where they set their national contributions to the EU target and describe measures planned to attain them. The Directive sets an indicative trajectory that is steeper than that of RED I, so substantial action for reaching the targets will have to be taken earlier in the process. While support schemes continue to be designed at national level, the RED II requires that they incentivise integration into the electricity market and that market premiums shall be used in direct support schemes. The RED II maintains the intergovernmental flexibility mechanisms.

Without binding national targets under RED II, Member States in case of non-compliance will not face an infringement procedure as under the RED I. However, the GovR provides the European Commission with tools to put pressure on Member States, pinpoint national targets and intervene early in the process. For instance, when in assessing progress (Art. 25) the Commission finds a gap between the collective contributions of Member States and the EU target, it can determine appropriate national targets based on a formula in Annex IA of the GovR. Member States not on track with respect to the indicative trajectory must take additional action with the possibility to choose from different options.

In summary, the reform in 2009 with the broadening of scope and the stepped-up level of bindingness clearly increased the policy’s stringency. With RE shares in Europe at 17.4% in 2017, the EU as a whole is currently on track to achieve the 2020 target, although some Member States are not, and although progress towards the 10% target for transport is insufficient (EEA, 2018). The 2018 reform increased the ambition of the EU target; and national efforts will have to be stepped up to achieve it (ibid). However, it is less clear what

the effects of the changes in policy design will be. The loss of binding national targets may be considered a serious risk for target achievement (3 interviews, Bausch *et al.* 2017; Knodt 2018). On the other hand, the strengthening of the monitoring and control mechanisms in the GovR may counterbalance this (3 interviews, Oberthür 2019). Overall, while targets were made more ambitious with each step, the changes of policy design are at best ambiguous with regard to stringency.

Sequencing effects

As in the ETS case, external factors and individual actors played a strong role in shaping the process. Changing degrees of leadership by the European Commission and individual Member States, pressure from the European Parliament, and the role of 'entrepreneurial networks' of actors across institutions and governance levels are highlighted in the literature (Boasson and Wettestad, 2013; Bürgin, 2015) and by interviewees. The agreement on national binding targets by the European Council in 2007 is widely interpreted as being the result of surprising and only temporary support from the UK government under Tony Blair to the German initiative, with the UK afterwards quickly re-adopting its traditional 'CO_2-target only' stance (Bausch et al., 2017; Bürgin, 2015). The economic crisis increased cost sensitivity among governments and may have contributed to a generally less favourable spirit towards ambitious renewable policies (3 interviews). Also, the rise of EU-critical movements across Europe and re-nationalisation tendencies may have affected the process (Bausch et al., 2017; Skjærseth et al., 2016; Wettestad et al., 2012).

At the same time, we find process-internal feedback mechanisms that influenced barriers.

[Figure 2]

Costs. In general, renewable support policies have reduced the costs of technologies (IRENA, 2018), to a point where today new renewable energy installations start becoming financially

viable without support. Thus, the RED and national policies caused positive feedback that significantly lowered the technology cost barrier.

At the same time, design deficits in national policies reinforced the policy cost barrier. Just as technology costs decreased, many national support schemes generated highly problematic distributional effects. Policies provided overly generous support to certain technologies or were not flexible enough to adjust tariffs to sinking technology costs, so that profits of investors became disproportionately high and costs to rate-payers skyrocketed (Bürgin 2015; Kampman *et al.* 2015; Skjærseth 2017: 94–95). The financial crisis that struck around the same time interacted with the policy feedback effects and considerably reinforced them in many countries. National policy-makers, aiming to mitigate the cost problems, responded by dramatically cutting subsidies, putting support schemes on hold or abandoning them, and in some cases introducing measures that retroactively affected the financial viability of existing installations. The measures taken to limit the costs to public budgets came at the price of severe damages to renewables industry with massive loss of jobs, unstable investment environments, and dropping rates of installation of new renewable capacity. Spain was the first country to experience this dynamic around 2007-2008, with similar processes occurring in the following years for instance in the Czech Republic, Italy, and Bulgaria (Antonelli and Desideri 2014; del Rio and Mir-Artigues 2014; Gürtler *et al.* n.d.; Kampman *et al.* 2015).

In other cases, policy reactions to rising costs had less disruptive effects, and reforms reduced policy costs. In Germany, policies were reformed to increase their flexibility in dynamically responding to technology cost reduction (Pahle *et al.* 2018). The UK government, in an attempt to avoid boom-and-bust dynamics, introduced measures to contain policy costs, albeit with the side-effect of creating new uncertainty (Lockwood 2016). Reforms for more market orientation and cost-effectiveness were also pushed by the European Commission (see below).

Politics. Interest group opposition from fossil-nuclear electricity producers and from energy-intensive industry was present in the national policy processes (e.g. Gürtler *et al.* n.d.; Lauber and Jacobsson 2016) and at European level (Boasson and Wettestad 2013; Markard and Rosenbloom 2018). In policy debates, opponents of the RED often claimed a lack of compatibility with the ETS. When co-existing with an emissions trading regime, renewables policies may lower the CO_2 price while only shifting emissions to other locations ('waterbed effect', Fankhauser *et al.* 2010). While there is no conclusive empirical evidence so far on the size of this effect (Ellerman *et al.* 2016; Koch *et al.* 2014), it has been exploited heavily by political actors and lobby groups to delegitimise RE support policies (Markard and Rosenbloom 2018).

For the European policy process, resistance from Member State governments was emphasised by interviewees as the decisive barrier. First, there was resistance from Member States against the harmonisation of renewables support policies proposed by the Commission. Member States with advanced national RE policies have tended to support ambitious targets but block harmonisation because they wanted to safeguard regulatory traditions and protect national renewables industry (Boasson and Wettestad 2013; Klessmann 2009; Rowlands 2005). While the Commission argued that a greater centralisation and harmonisation of RE support would reduce overall costs (European Commission 2008b: 98), there were also arguments for maintaining some degree of heterogeneity, including the need for policies to reflect inhomogeneous technology-specific externalities and to prevent high producer surpluses for low-cost installations (Klessmann 2009; Strunz *et al.* 2014). In contrast to the ETS case, there was no unambiguous logic that warranted centralisation and harmonisation.

Second, there was resistance from Member States against the setting of ambitious and, after 2009, nationally binding targets. This was partly due to divergent climate policy preferences. The UK and the Netherlands supported ambitious climate targets but did not want the EU to

impose additional renewables targets (Fischer 2014). CEEC countries rejected national targets for different reasons, focused on protecting coal and not interested in promoting renewables (Skjærseth, 2018). In addition, the high-cost experience in national support regimes with in some cases extreme negative policy feedback and backlash (see above) translated into a lack of support from Member State governments for ratcheting-up the European policy (7 interviews).

Sequencing effects helped to mitigate barriers in politics based on the generation of positive and the control of negative feedback. First, in countries with ambitious national renewables support policies, powerful renewable industry lobbies and supporting coalitions emerged (Sühlsen and Hisschemöller 2014), who formed networks active also at European level. The renewable energy constituency was able to significantly influence the ambition and design of the RED I (Boasson and Wettestad 2013). National renewables support policies have also contributed to making reluctant incumbent power producers eventually change their business models and reorient towards renewable energy (Kungl 2015). Thus, the combined national and EU policies created positive feedback through constituency building effects, albeit to varying degrees in the different Member States.

Sequencing effects also occurred to some extent from the control of negative feedback through compensation. However, options for compensation were limited given the instrument logic of renewables support policies and the decentralised structure of the RED. At national level, industry consumers strongly affected by rising electricity costs could be compensated through exemptions, and case study research suggests that this type of compensation did stabilise support policies by mitigating resistance. In the Czech Republic, where policies did not include exemptions to energy-intensive industry, cost increases hit powerful players that went on to lobby strongly against the policy (Gürtler *et al.* n.d.). However, compensation also raises additional distributional concerns, and if the relation between investors' profits and

overall public costs becomes disproportionate, compensation measures that place an additional burden on rate-payers also become harder to justify.

At EU level the RED process provided only limited room for compensation across Member States, and no leverage for mitigating shocks experienced in individual countries. Side-payments to poorer Member States were made when the national targets of RED I were determined, as a formula was used that considered national GDP and thus reduced the relative ambition of targets for the less wealthy Member States (European Commission 2008b: 85; Skjærseth *et al.* 2016: 74). This facilitated agreement among Member States on the RED I (interview), but it did not provide tools to address uneven cost developments in Member States later on. The RED's flexibility mechanisms might lead to some transfer from more to less wealthy Member States, and Member States may come under pressure to use them more intensely as the RED I's 2020 deadline approaches (3 interviews). However, the design of targeted compensation measures that would effectively secure the support of hesitant Member States was not possible for EU policy-making.

Institutions and governance. Positive feedback on institutional set-up and governance emerged from learning process among experts in the European Commission and in Member State governments. The European Commission accepted that top-down harmonisation was politically not feasible and might in fact have undesired consequences, and used state aid governance instead to push for a stronger market orientation of national support schemes from outside the RED policy process. The 2014 State Aid Guidelines, which require the use of market instruments such as auctioning for the allocation of subsidies, put significant pressure on Member States and for instance nudged the German government toward reform already during the drafting process (Boasson 2019, 2 interviews). In parallel, Member State governments themselves became more open towards reforming support schemes, as confidence in RE technologies and regulatory institutions increased, and in response to the

experience of rising costs of FIT systems (interview). The reforms reduced policy costs and may to some degree lead to a bottom-up convergence of Member State policies (Strunz *et al.* 2015).

4 Discussion

This paper investigates the dynamics of the ETS and RED policy processes with the aim of identifying sequencing mechanisms that facilitated ratcheting-up. The tracing of the policy processes shows that in both cases sequencing effects were relevant for shaping policy evolution, in addition to external factors. Key barriers in both cases have been cost concerns, opposition from interest groups or lack of support from Member State governments. In both cases we observe positive feedback from constituency building and learning.

The process dynamics of the two cases also exhibit fundamental differences. First, this applies to cost-related policy feedback. In the ETS process, overallocation (reinforced by the effects of the financial crisis) effectively led to a very low initial ambition of the instrument, and the cost barrier appears not to have played out as a limiting constraint. Low allowance prices however had beneficial effects in a sequencing perspective, as they mitigated cost concerns and at the same time provided an argument for increasing the policy's stringency. The ETS process thus started with a low-ambition but politically feasible policy design, which initially caused neither large environmental benefits nor considerable economic costs, but which created a path dependency and a basis for ratcheting-up later-on. In the RED process, by contrast, positive feedback from reduced technology cost was overshadowed by backlash from high-cost crises in several Member States, where feed-in tariff systems could not be reformed quickly enough to account for technology cost decreases. Negative cost feedback was largely caused by policy design deficits and extreme cost developments in some Member

States. This resonates with insights from the US context that renewables support policies not only build constituencies, but that they can also trigger strong resistance (Stokes n.d.).

Second, the two processes differ strongly in the degree to which policy instruments were centralised over time. While the degree of centralisation and the levels of policy ambition do not necessarily correlate, centralisation is likely to make policies more stable and to facilitate the control of target achievement (Bausch *et al.* 2017). The RED was faced with strong and persistent barriers to harmonisation and centralisation, given the path-dependency at national level from existing regulation, diverging national climate policy preferences and uncertainty on harmonisation effects. By contrast, the evolution of the ETS was driven towards centralisation by the intrinsic incentive structure of the instrument. Centralisation benefited both Member State governments and industry actors by removing free-riding incentives and transaction costs, and there were no pre-existing national carbon pricing policies that directly competed with the ETS. Centralisation contributed to stabilising the ETS, while the lack of centralisation had ambiguous effects for ratcheting-up the RED.

A third key difference lies in the degree to which resisting actors or interest groups could be brought on board through strategic compensation. The lack of options for compensation across Member States in the RED's decentralised system made it impossible for EU-level policy-makers to prevent negative cost feedback at national level from becoming destructive. In the ETS process, by contrast, the potential for negative feedback from industry and reluctant Member States could be kept under control through targeted compensation measures that redistributed the assets generated under the system. Although compensation may cause problematic lock-in effects and may only buy time by postponing difficult distributional decisions (Pahle et al. 2018), our case results suggests that the presence of compensation options facilitates sequencing as it increases the flexibility of policy-making.

5 Conclusions and outlook

From the two policy cases, we draw several conclusions. First, our results confirm that sequencing mechanisms are relevant for ratcheting-up climate policies, as policies create feedback effects that work back on barriers, and they refine the understanding of these effects. We find that constituency effects are important not only in the business sector, but also through the creation of ownership in administration. We show that high policy costs and transaction costs can trigger learning and subsequent reform, thus turning from a barrier to a driver of improvements. While sequencing as an analytical framework is primarily interested in effects that relax barriers, feedbacks can also reinforce them. Thus, when applied strategically, sequencing should consider measures that can control negative feedback.

Second, we conclude from this that the conditions for sequencing depend on the choice of policy instrument, its ratcheting-up logic and the design options it offers. Our results point to the relevance of 1) tools to control costs and avoid sudden and extreme developments 2) the possibility to harmonise and centralise in a multi-level governance context, 3) the possibility to compensate resistant actors, and 4) the facilitation of learning processes. The relatively successful sequencing in the case of the EU ETS moreover suggests that a promising strategy is to start at a relatively low level of ambition and initially focus on the creation of an institutional path-dependency, which then provides a basis for improving instrument performance and ratcheting-up over time.

Third, as renewables support and carbon pricing policies play different roles in sequential policy-making for energy transition, their interaction may be more complex than assumed by earlier work. The sequencing literature suggests that green industrial policies are better suited to kick-start transition processes as they are more likely to produce positive feedback from reduced technology costs and constituency building, and that they may thus pave the way for carbon pricing at later stages (Meckling *et al.* 2015; Pahle *et al.* 2018). Yellow-vest type

protests point to the negative feedback potential of carbon pricing initiatives. Our results suggest, however, that in a multi-level governance context, there may be decent chances for successful ratcheting-up sequences of carbon pricing policies. As the logic of the instrument favours centralisation and as it creates wealth that can be strategically redistributed, the creation of path-dependence and a stable basis for subsequent ambitious reforms appears possible.

Nevertheless, there is a trade-off between the smoothness of the policy sequence and the need to create early incentives for deep decarbonisation. Renewables support policies can provide these incentives in a more targeted way in early stages of transition and play a complementary role in transition processes. As renewables policies are becoming more market-oriented, costs of renewables decrease further and ETS allowances prices rise as a result of recent reforms, the ETS moves closer to being able to trigger investments into renewable energy generation. Ratcheting-up of renewables policies will then likely be reflected by higher targets but *lower* support rates, while carbon pricing might become a stronger driver for long-term decarbonisation.

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Annex: Interviews

Buck, Matthias	Agora Energiewende, Germany	11.09.2018, Telephone
Boasson, Elin Lerum	Cicero (Center for International Climate Research), Norway	05.07.2018, Skype
Caekelbergh, Stijn	Climate Policy Advisor to the Flemish Government, Belgium	13.09.2018, Telephone
Dong, Yue	Ministry of Environment, France	30.08.2018, Skype
Goeke, Berthold	Ministry of Environment, Germany	04.10.2018, Berlin
Heer, Katrin	Ministry of Economic Affairs, Germany	21.09.2018, Berlin
Karcher, Silke	Ministry of Environment, Germany	19.07.2018, Berlin
Klessmann, Corinna	Ecofys, Germany	12.09.2018, Berlin
Neuser, Uwe	Ministry of Environment, Germany	26.07.2018, Berlin
Oberthür, Sebastian	Vrije Universiteit Brussels, Institute for European Studies IES, Belgium	23.08.2018, Hamburg
Runge-Metzger, Artur	European Commission, DG Climate Action, Belgium	25.07.2018, Skype
Sánchez García, Ignacio Ángel	Ministry for the Ecological Transition, Spain	18.09.2018, Telephone
Schafhausen, Franz-Josef	Institute of Energy Economics (EWI), University of Köln, Germany	09.05.2018, Berlin 05.06.2018, Köln
Tuma, Jan	Ministry of Environment, Czech Republic	05.09.2018, Telephone
Vis, Peter	European Commission, European Political Strategy Centre (EPSC), Belgium	19.06.2018, Skype
von Meyerinck, Lutz	Outrage Management, Germany	04.07.2018, Skype
Weinreich, Dirk	Ministry of Environment, Germany	26.07.2018, Berlin
Wettestad, Jørgen	Fridtjof Nansen Institute, Norway	20.06.2018, Skype
Zapfel, Peter	European Commission, DG Climate Action, Belgium	19.09.2018, Brussels

Tables and Figures

Table 1 Barrier types

Category	Specific barrier
Cost	High (technology) costs
	Lack of policy cost-effectiveness
Politics	Interest group opposition
	Lack of supporting coalition
Institutions & Governance	Lack of expertise and capacity

Adapted from Pahle et al. (2018)

Figure 1 Dynamics of the EU ETS policy process

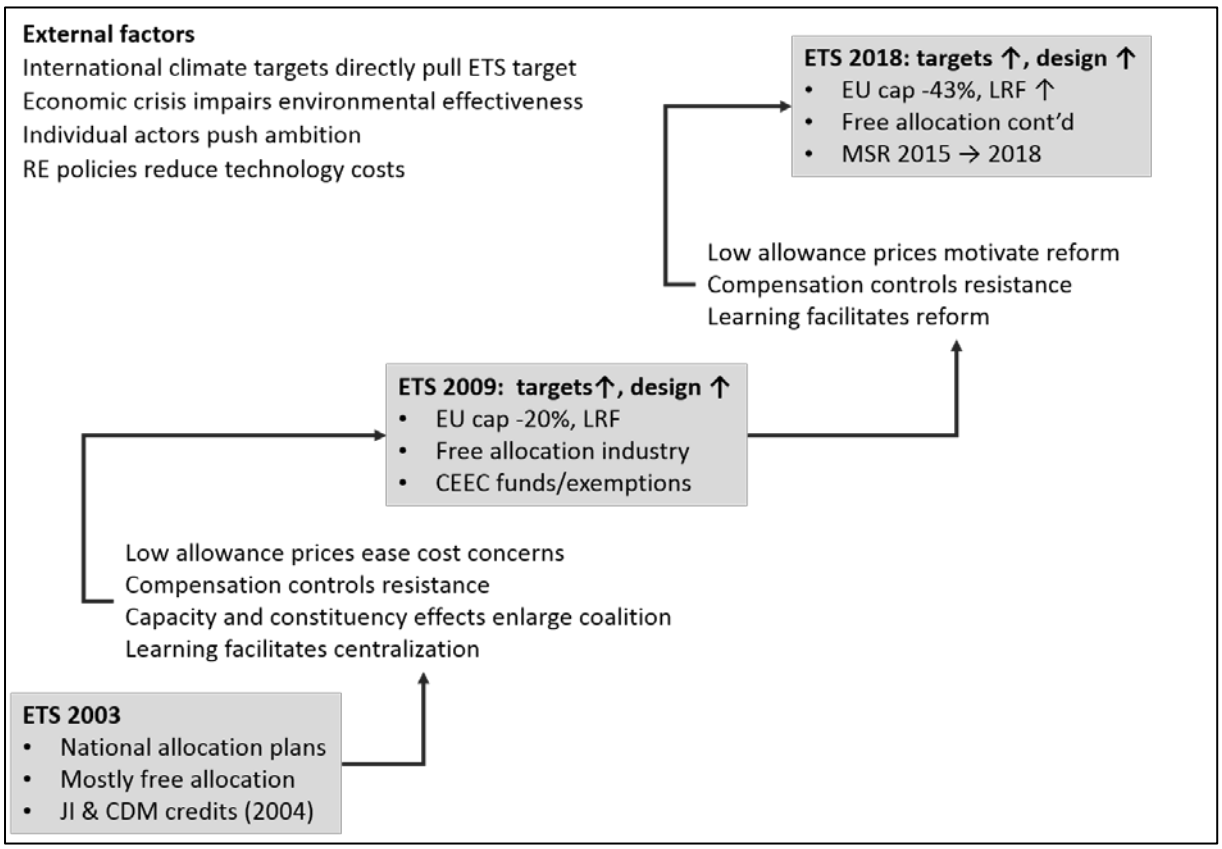

Figure 2 Dynamics of the RED policy process

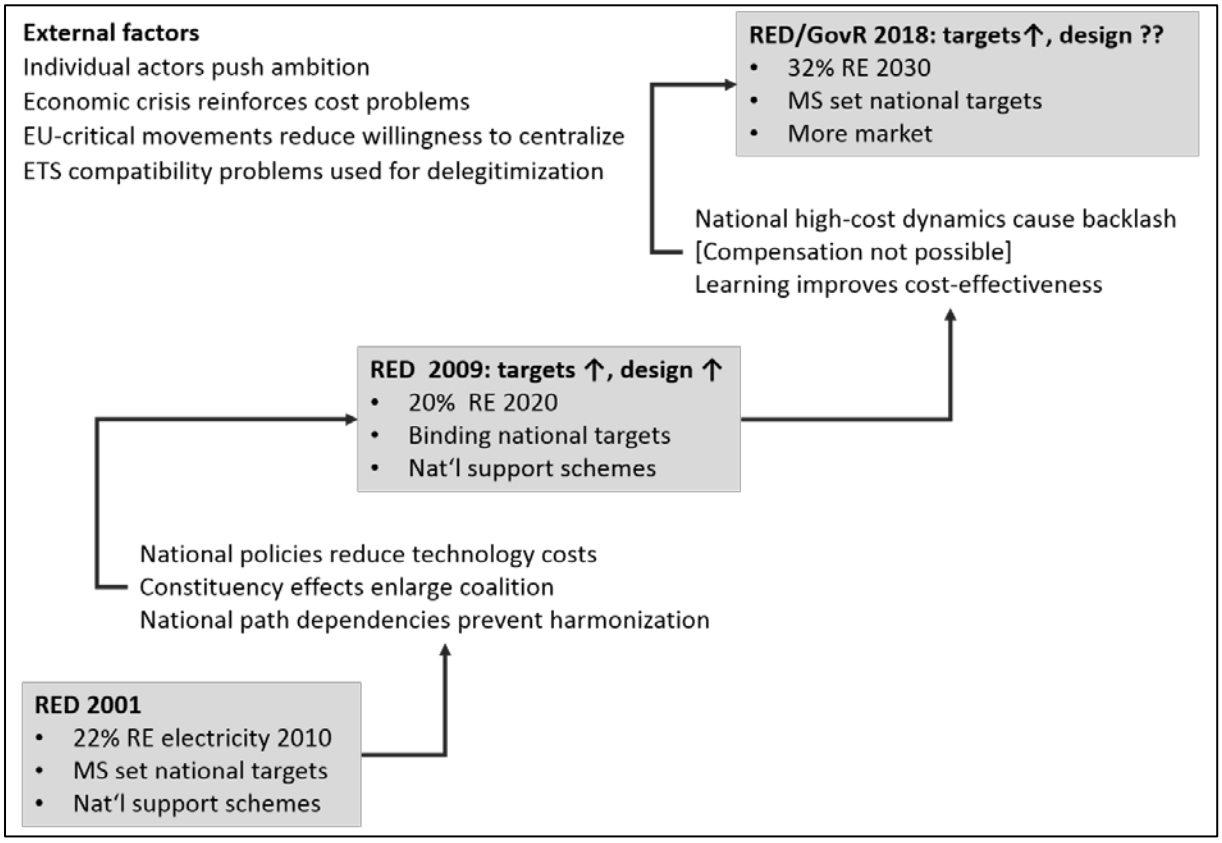

Table 2 Barriers and sequencing mechanisms in the ETS and RED processes

Barriers in Pahle et al. 2018		**Sequencing mechanisms**	
		ETS	**RED**
Cost	**High technology cost**	Low allowance prices ease cost concerns	National RE policies reduce technology costs
	Lack of policy cost-effectiveness		Increasing policy cost creates negative feedback; policy cost of national support schemes reduced through reforms
Politics	**Interest group opposition**	Continued compensation creates trust and controls negative feedback	Compensation in national support schemes controls negative feedback in some MS
	Lack of supporting coalition	Compensation of Member States helps loosen blocking minorities Constituency building effects enlarge coalition	Constituency (RE industry) is built in some MS [Compensation across Member States not possible]
Institutions and governance	**Lack of expertise and capacity**	Implementation builds capacity and ownership Learning facilitates centralisation and ratcheting-	Learning processes increase cost-effectiveness without top-down harmonisation

		up Centralisation increases policy stability	