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Implementing the EU Renewable Energy Directive in Norway: From Tailwind to Headwind

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Abstract:

Following the 2009 EU Renewable Energy Directive (RED), Norway has overachieved its national renewables target and taken the European lead in new wind power. This seems puzzling as Norway had a surplus of renewable energy and the government opposed the EU-induced national target. Employing a dynamic approach to implementation and its consequences, we examine three explanations. From an *EU adaptation-pressure perspective*, the RED enabled joint implementation, which Norway utilized through its flexible certificate system with Sweden. From a *domestic politics perspective,* internal pressures led to favourable depreciation rules that stimulated pro-windpower interests. Third, from a *policy feedback perspective,* protests from municipalities resulted in a reform of the licensing system. These explanations proved complementary – the main alternative explanation is drastic cost reduction in windpower technology. Our findings speak to the energy democracy, energy policy and implementation literatures.

Keywords: EU policies, implementation, renewable energy, wind power, Norway

1. Introduction

In 2007, the EU leaders determined that 20% of energy consumption should come from renewable energy by 2020. To achieve this goal, the 2009 EU Renewable Energy Directive (RED) was adopted, involving various binding national targets. The aim was to reduce emissions of greenhouse gases (GHGs); promote security of energy supply; accelerate technological innovation; and stimulate regional development.[1] Norway, through the European Economic Area (EEA) Agreement, should contribute to achieving the overall EU RED target by increasing its renewable energy consumption from 58.2% in 2005 to 67.5% by 2020. This was the highest renewable-energy target among the EU/EEA countries, for collective achievement of the EU 20% goal.

[1] Renewable Energy Directive (229/28/EC), Preamble (1).

Norway's energy-economic situation deviated fundamentally from other European states and the basic purpose of the RED. Hydropower already provided nearly 100% of Norway's on-land electricity production, thus limiting the GHG reduction potential from the power sector. Moreover, the government held that the RED would accelerate the renewable power surplus, depress power prices, reduce energy-efficiency incentives and have limited effects on innovation. Norway's energy technological innovation basis was mainly confined to hydro- and petroleum-production technologies, which have played a major role in the country's industrial and economic development. Unsurprisingly, then, the Norwegian government opposed any binding EU-induced national renewable energy targets for 2020 (Norwegian Government 2007a; White Paper 2016).

One proposition for EU implementation 'success' or 'failure' holds that low alignment between EU policy outcomes and national preferences, interests and policies will lead to implementation failure, as countries tend to defend their status-quo situation (Knill and Lenschow 2000, Knill 2001, Treib 2008). However, Norway *overachieved* the binding EU-imposed national renewable energy target by 2020 – as well as the related electricity-certificate system target together with Sweden. How to explain Norway's 'successful' implementation under these conditions of low alignment? What are the consequences of Norway's overachievement for the development and reform of renewable energy policy?

Here we focus on renewable electricity production and wind power in Norway.[2] Windpower development represents the main technological change in Norway's energy mix from the adoption of the RED in 2009. Indeed, in 2020, Norway took the European lead in establishing new on-land windpower. Then, issuance of new windpower licences ground to a halt. Norwegian windpower policies and development have been examined from both the local and central levels, mainly concerning the licensing process and potential trade-offs with nature protection (Gulbrandsen *et al.* 2021, Inderberg *et al.* 2019, 2020, Saglie *et al.* 2020, Vasstrøm and Lysgård 2021). From a dynamic approach, this study complements the literature by examining the role of the EU, the related electricity certificate system, the politics of depreciation rules and reform of windpower policies.

In addition to adding new empirical insights to Norwegian renewable- and windpower policies, we contribute to the EU implementation literature (e.g. Treib 2008, Thomann 2015) by developing a dynamic approach to the study of EU implementation including policy feedback from implementation experiences and other factors (Skjærseth 2018). A dynamic approach to implementation can explain how EU and national renewable energy policies go through the policy cycle of EU adaptation pressure, implementation, and reform towards long-term, net-zero climate targets. This also speaks to the acceptance and energy democracy literature (e.g. Szulecki 2018, Inderberg *et al.* 2020) by underscoring political feasibility in the energy transition. Intensified land-use pressure and related nature-conservation challenges must be addressed, to prevent local opposition that might impede renewable energy production and achievement of long-term climate targets. Such knowledge has relevance for most democratic countries struggling to meet net-zero targets while addressing nature concerns.

[2] The RED included a separate mandatory target of 10% renewables in the transport sector.

We trace the process from the RED to policies, behavioural change, and policy reform in Norway through a qualitative case study (Yin 1989). Data are based partly on successive Norwegian position papers to the EU, public consultations on the RED and national policies, official White Papers on energy and wind power, research papers and media articles. Written sources are supplemented by interviews with key representatives of the regulating authority (Norwegian Water Resources and Energy Directorate, NVE), the interest organization for the windpower industry (NORWEA), the industry organization for electricity (Energy Norway), Norway's (and Europe's) largest supplier of renewable energy (Statkraft) and a regional power company heavily involved in windpower (TrønderKraft).[3] Collected data were verified through triangulation, to ensure data validity.

First, we outline the conceptual framework for assessing and explaining EU implementation and its consequences. We then assess RED implementation in Norway, focusing on the rise in windpower, before explaining what happened. Concluding remarks are offered at the end.

2. Conceptual framework

Traditionally, implementation of EU legislation refers to legal transposition and application – the process of converting EU-adopted policies into national policies and measures, resulting in behavioural change, like subsidies for increasing renewable energy that lead to greater production (Treib 2008, Skjærseth *et al.* 2016). Legal transposition concerns the formal aspects of EU implementation, such as the adoption of new laws, or regulations. Application concerns the adoption of new policies and measures, like electricity certificates or feed-in tariffs for increasing renewable energy production. There is no automatic relationship between transposition and application: transposition will not necessarily lead to effective application, and national policies and behavioural change may occur independent of EU-level policies. Goal attainment by 2020 is used as the main criterion for implementation 'success'.

From a multilevel-governance perspective, implementation can be explained by EU adaptation pressures and domestic politics (Treib 2008, Di Lucia and Kronsell 2010). *First,* the alignment between EU obligations and the national status quo is likely to affect implementation and goal attainment. Differences between EU requirements and national preferences, energy interests and existing policies may lead to low alignment, pressuring countries to agree to a change from the status quo.[4] The EU institutions will be involved here, to make implementation more uniform among the member states (Egeberg 2006). This *adaption-pressure perspective* builds on the assumption that countries will resist implementation of EU policies that require fundamental changes to their own status quo (Knill and Lenschow 2000, Knill 2001, Treib 2008).[5] Low alignment between the national status quo

[3] We interviewed three NVE key officials who oversee the electricity certificate system and have experience from the EU negotiations. Interviews are based on confidentiality and are used as background information for interpreting written sources.

[4] 'Energy interests' refers to energy import dependency and the energy mix.

[5] The 'goodness-of-fit approach' has been criticized for having weak explanatory power, for excluding actor interests and for being static (Treib 2008). When this approach is applied to implementation in Norway, preferences, energy interests and dynamic development are included.

and the final EU outcome is expected to reduce the likelihood of policy implementation in line with goals. Alternatively, EU legislation may be 'customized' to fit the national context: Thomann (2015) has argued that transposition can result in tailor-made solutions in a multilevel system.

Second, the complementary 'domestic politics' approach relaxes the assumption that countries are necessarily motivated to preserve the status quo (Treib 2008, Di Lucia and Kronsell 2010, Borras *et al*. 2015, Skjærseth *et al*. 2016). A simple 'model' of domestic politics is used to explain responses to common EU policies by the state, society and the relationship between state and society. After EU-induced targets and policies are adopted, domestic politics may change, affecting implementation. New governments or energy authorities may have different preferences and may introduce new windpower priorities when policies are implemented. At the level of society, affected actors such as the windpower industry may be strengthened or weakened by new EU and national policies, gaining or losing political influence. Changes in domestic politics after EU-induced targets and policies are adopted are generally expected to challenge the status quo. Specifically, change towards a more pro-windpower authorities and societal actors will increase the likelihood of policy implementation in line with or exceeding EU renewable goals under conditions of low alignment.[6]

Third, we explore the consequences of RED implementation for *policy reform*. This adds a dynamic approach to implementation – but also complicates tracing the process from the RED, as the complexity of explanatory factors tends to increase over time. The policy feedback literature provides a starting point for understanding how implementation can affect policy reform (Béland 2010, Edmondson *et al.* 2019). Policy feedback can be defined as effects flowing from adopted policies on actors' original preferences and the reformed policy in question (Jordan and Matt 2014). Implementation processes may affect actors' interest in new and reformed policies, as new experiences and information can change basic policy preferences (Bennett and Howlett 1992).

Positive policy feedback from RED implementation experiences will reinforce subsequent policy initiatives (Skjærseth 2018). High alignment between EU requirements and national priorities is likely to lead to policy feedback based on positive implementation experiences for municipalities, and support to more ambitious policies by the state authorities – pivotal actors in licencing Norwegian renewable energy policies (Tsebelis 2002).[7] However, implementation may also involve negative implementation experiences, with resultant opposition. This can spur *negative* policy feedback that undermines or weakens policy reform. Low alignment between EU requirements and national priorities is likely to produce negative policy feedback, manifested in negative implementation experiences, and opposition to more ambitious policies (Bayulgen and Ladewig 2017). Here we examine policy feedback from the chain of events affecting municipal preferences and reform of windpower licensing policy in Norway.

Combining these three perspectives, we have developed a conceptual framework for examining the policy cycle from EU adaptation pressure via implementation to policy reform.

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[6] The domestic politics perspective can be expanded to include additional variables such as potential changes in policy style and administrative organization (see Skjærseth et al. 2016).
[7] 'Pivotal' actors are those whose agreement is necessary to change the status quo.

This offers a dynamic approach to the study of EU implementation which is responsive to the relationships between EU and national renewable energy policies towards long-term climate targets. We will also examine two alternative expiations to 'successful' implementation and overachievement: lower windpower technology costs due to technological innovation (Eikeland and Skjærseth, 2019); and local-level 'green growth' opportunities related to economic development, jobs and ownership, as Norwegian host municipalities have almost veto-power over windpower applications (Inderberg *et al.* 2019, Hickel and Kallis 2019).

3. Implementing EU renewables policies in Norway

In 1990, Norway liberalized its energy market by making energy a commodity based on market supply and demand. Four years later, the European Economic Area (EEA) Agreement gave Norway access to the Single Market in exchange for implementation of EEA-relevant EU legislation. In March 2007, following the first (2001) EU Directive on renewable electricity production, the EU leaders decided to increase the consumption of renewable energy to 20% by 2020 – a doubling compared to 2005. Also agreed were a 20% cut in GHGs (from 1990 levels) and 20% improvement in energy efficiency compared to business as usual. The European Commission followed up by proposing a Renewable Energy Directive (RED) as part of a package of EU climate and energy policies to deliver on the 2020 targets.[8] The 2009 RED covered renewable energy consumption and included an optional cooperative trading instrument (Art. 11). The Directive was based on differentiated binding national targets calculated on the basis of the combination of existing renewables shares and GDP/cap.

The RED's binding national targets and optional trading instrument re-activated the Norwegian–Swedish deliberations on a trade-based certificate system that had started in 2004 to promote more stable incentives for producing electricity (Jevnaker, 2014). However, negotiations on a common certificate market with Sweden had stranded after two years. Norway's Ministry of Petroleum and Energy (MPE) and Ministry of Finance were sceptical to the certificate system, fearing cost increases for renewable energy and lower public revenues resulting from power surplus and reduced prices.

The RED now linked the two processes – a new EU-imposed binding renewable energy target and an electricity certificate system with Sweden. EU-member Sweden demanded that Norway should transpose the RED in national legislation to establish a common certificates scheme (Jevnaker 2014, 2016). Parallel negotiations ensued between Norway and the EU and Norway and Sweden, on the ambitiousness of the renewables target and the certificate system, respectively.

Norway had strongly opposed any EU binding national renewable energy targets (Norwegian Government, 2007). Norway did not view a binding target as cost-efficient or as contributing to GHG emissions reduction, and attempted to influence the EU informally by contacting EU and national representatives (Jevnaker 2014). When these efforts failed, Norway had to start negotiations with the EU on a new renewable energy target. A public consultation on the RED showed that nearly 30 organized stakeholders would support the

[8] Other parts of the package included a revision of the EU Emissions Trading System, an Effort-sharing Decision on the non-ETS sectors and a directive on Carbon Capture and Storage.

Directive, but domestic interests were divided on the need for an ambitious national target (MPE 2009, Jevnaker 2014). Nevertheless, in July 2011 the Norwegian target was fixed at 67.5% renewable energy consumption by 2020, as against 58.2% in the reference year 2005. Sweden's target was fixed at 49%. The MPE was not pleased with the outcome (Jevnaker 2016), fearing that, in the absence of growing demand, higher supply of electricity would reduce power prices. An official report from the government concluded that the power surplus was likely to increase towards 2020 and beyond (NOU, 2012), and that the new renewable energy target would *not* lead to reductions in GHGs from the power sector.

To meet the target jointly, the overall additional capacity to be funded through electricity certificates in Norway and Sweden was set at 26.4 TWh by 2020 (later increased to 28.4 TWh). This represented approximately half of the total electricity consumption of all Norwegian households (NVE 2021). The certificate system was technology-neutral, with hydro- and wind power as the cheapest options in Norway (initially in that order). Actual capacity addition in each country would be determined by the market; the power plants in the certificate market could receive certificates for up to 15 years. The deadline for commissioning new installations within the certificate system was set to the end of 2021.[9] Electricity consumers, except for parts of the industry, would pay the extra costs of operational support (Boasson and Jevnaker 2019). The supply/demand relationship would determine the price of the certificates and thereby the subsidies for producers of renewable electricity. Renewables would be funded regardless of whether production took place in Norway or in Sweden.

The certificate system was formalized in 2011, to take effect from January 2012 in accordance with the RED's cooperation mechanisms under Article 11. The Standing Committee on Energy and the Environment in the Norwegian Parliament unanimously declared that the certificate market would '…contribute to fulfil the requirements and agreements we have committed to by implementing the Renewable Energy Directive' (White Paper 2020:12). The Norwegian certificate idea can be traced back to domestic factors, but the RED and the certificate system became closely interlinked. The RED formed the basis for the common certificate system with Sweden and its design for promoting renewables in Norway by 2020/2021.

Basically, the EU imposed a binding renewable energy target on the Norwegian government against its will. The main instrument adopted for implementing the RED and achieving the national target was Norway's electricity certificate system with Sweden.

The rise of wind power

In June 2012, Norway's plan for attaining the binding renewables target was submitted to the European Commission. The National Renewable Energy Action Plan (NREAP) presented the electricity certificate system with Sweden as the main measure for achieving the 67.5% renewable energy target. The plan assumed that half of the total production of 26.4% would be realized in Norway, and that half of this volume should be wind power – the other half being hydropower (MPE 2012).[10] Both assumptions initially proved wrong. Transposition of

[9] Extended from the end of 2020.
[10] Sweden increased its target by 2 TWh. From 2016, the total target for electricity certificates is 28.4 TWh.

the RED also led to additional measures introduced in 2012 for improving new power connection to the grid and flexibility with end-users (MPE 2012).

From 2012 to 2016, application of the RED through the certificate market showed that Sweden added significantly more renewable energy than Norway. The Swedish increase was mainly in wind power, whereas Norway's investments were largely in hydropower. Only two relatively small windpower projects were developed within the certificate system in North Norway (MPE 2015). By 2016, 11.6 TWh had been added within the certificate market in Sweden (8.9 TWh wind power) compared to 2.2 TWh in Norway (0.3 TWh wind power) (Ministry of Finance, 2016). Most of the increase in Norwegian renewable energy production within the certificate system concerned smaller-scale hydropower and upgrading/expansion of existing hydropower installations (White Paper 2020).

Table 1: Actual renewable energy production based on electricity certificates in Norway (in GWh)

Year	*Bio*	*Solar*	*Hydro*	*Wind*	*Total*
2012	0	0	40	3	43
2013	0	0	397	39	436
2014	0	0	717	218	934
2015	0	0	1712	344	2055
2016	0	0.3	2052	358	2411
2017	1	2	3116	695	3812
2018	2	4	3692	1940	5636
2019	3	9	4201	3486	7696

Source: NVE/SEA, 2020.

From 2017 to 2020, Norway experienced a windpower boom (Table 2). By April 2020, there were 800 wind turbines in Norway in 42 windpower plants. Moreover, 19 plants were under construction, which would bring the share of wind power to some 10% of total power production. In addition, 26 new plants had been licenced within the certificate market by December 2021.[11] From 2019 to 2021, most new renewables plants in Norway would be wind power – not hydro (NVE/SEA 2019).[12] Moreover, Norway took the European lead in establishing new, on-land wind turbines (E-24 2021). However, new renewable electricity production was expected to decrease significantly after 2021, as power plants must be operational by 2021 to be covered by the certificate system (White Paper 2020)

[11] It is uncertain how many new plants will be realized.
[12] 2281 GWh in hydropower; 8571 GWh in windpower

Table 2: New windpower plants in Norway 1998–2020 (per year) [13]

Year constructed	*Number of plants*	*Installed effect (MW)*	*Estimated production (GWh)*
1998-2011	13	497.2	1359 (cumulative)
2012	5	315.6	901
2013	–	–	–
2014	1	45	189
2015	3	15.8	44
2016	–	–	–
2017	3	324	1106
2018	7	466.5	1603
2019	10	917.9	2989
Total	42	2582	8191

Source: White Paper 2020

Assessing RED implementation

Norway has overachieved the EU-imposed renewable energy target of 67.5% and the joint 26.4 TWh target with Sweden within the electricity certificate market. The former was reached well before the deadline, due mainly to increased hydropower production (Statistics Norway 2014, Energi og Klima 2016). By 2020, approved installations within the electricity certificate system amounted to 10.7 TWh in Norway and 26.1 TWh in Sweden. As this totals 36.8 TWh, the 2020 target had been achieved with a good margin (White Paper 2020).

However, the relationships involving the RED, transposition and application of the electricity certificate system in Norway are not straightforward, as the certificate system applies jointly to Norway and Sweden. Although the idea of a certificate system was not new, the RED formed the basis for the system and spurred the agreement with Sweden. The relationships between the electricity certificate system and the windpower increase are complex. The realization of new windpower licences depended on other factors that affect profitability (including relative costs compared to hydropower and to Sweden). The certificate price has varied since 2012, dropping sharply after 2018 (White Paper 2020) – indicating that factors other than the incentives provided by the certificate system have been important for Norway's overachievement.

[13] As of April 2020

4. Explaining implementation in Norway

How to explain why Norway overachieved the RED, after opposing it? We view the rise of wind power as the major change regarding renewable energy in Norway.

EU adaptation pressure: Setting the stage

Wind power has traditionally played a minor role in Norway's energy policies and mix. From 1998, windpower investment and operational support were offered for achieving the 3 TWh annual production target by 2010. This target failed considerably – production increased to only some 1 TWh by 2010 (of nearly 150 TWh). Windpower policies and targets emerged in response to demand from energy producers and green NGOs focusing on climate change (Hager 2014). From the outset, organizations representing nature and biodiversity concerns have been opposed or sceptical to on-land windpower installations (Hager 2014), noting that optimal wind resources are found in untouched nature areas mainly along the coast.[14]

In 2007, the windpower support system based on Enova, the state-owned fund for energy transition, was strengthened, making selected windpower projects commercially more attractive. Pressure from nature interests contributed to new guidelines for realization of the least controversial projects, and more holistic planning based on optional regional windpower plans was adopted, to minimize conflicts between windpower interests and other concerns (Fauchald 2018). These policies were shaped mainly by domestic drivers.

Before the adoption of the RED in 2009, Norway had some unrealized windpower ambitions, and nearly 100% hydropower in electricity production on land. Hydropower had provided the basis for Norwegian industrialization in the late 19th century; Statkraft has become Europe's largest hydropower producer. In years with normal weather conditions, Norway experiences a power surplus, expected to increase towards 2030 and 2040. Successive energy-policy White Papers have concluded that this surplus is likely to continue despite new subsea cables to Germany and the UK, and electrification of other sectors like transport, new 'green' energy-intensive industries and petroleum production (NOU 2012, White Papers 2016, 2020, 2021). Given the government's opposition to binding national renewable targets, all this indicates generally low Norwegian alignment with the RED aims of reducing GHG emissions, promoting security of energy supply and strengthening technological innovation. Norway's electricity certificate system is technology-neutral, designed to support well-established wind- and hydro-technology (White Paper 2016).

In 2016, the government decided to abolish the green certificate system from 2021 (in contrast to Sweden). Norway's position paper on the 2018 revised Renewable Energy Directive (REDII) for 2030 showed continued opposition to EU binding renewables targets (Norwegian Government 2015). However, Norway did transpose and apply the RED, even meeting the targets with a good margin – clearly not in line with expectations based on low alignment between EU requirements and the national situation in governmental preferences,

[14] Modern wind turbines are nearly 200 m. tall: they change the landscape visually and necessitate major construction work for infrastructure such as road development.

interests, and policies. From an EU adaptation perspective, the main reason was the flexible certificate market with Sweden. This eased the initial pressure to change from the status quo and may help to explain the smooth transposition and application – an observation basically in line with the alternative expectation to adaptation pressure that EU legislation becomes 'customized' to fit the national context. The main RED design element here was the optional cooperative trading instrument under the Norwegian/Swedish certificate system.

The Norwegian NREAP on implementation assumed that half of the investments would take place in Norway, and half of this would be in wind power. The intention behind the certificate system was not that Norwegian customers should pay for renewable energy in Sweden – but that was the case initially. Pressure mounted in Norway for 'getting its fair share' and ensuring that part of this share was wind power. As a result, the NVE accelerated the processing of windpower licences. The RED and the certificate system became important drivers here, as the NVE approved more licenses to ensure that enough projects would be realized in Norway (Riksrevisjonen 2014; Bjerkestrand *et al.* 2020). This necessitated greater administrative capacity – new staff were recruited to the NVE for processing licences.[15]

Thus, low alignment between EU requirements and Norway's status quo and overachievement of targets runs contrary to our 'EU adaptation pressure' expectation. The pressure was initially eased by Norway's flexible certificate market with Sweden, which is more in line with the alternative view: that EU legislation was 'customized' to fit the national context by the RED's optional cooperative trading instrument. Still, EU adaptation pressure proved important for Norway's increase in windpower licences.

Domestic politics: Changing the rules

Norway's certificate market was not funded through state resources and has therefore proven politically resilient. Change in the depreciation rules was a major domestic political factor that affected RED implementation and windpower development. This change occurred after the RED encouraged domestic actors to favour greater windpower development, with developers and municipalities seeking to strengthen the local economy (Gulbrandsen et al. 2021, Saglie et al. 2020, Vasstrøm and Lysgård 2021). Power- and certificate prices were similar in Norway and Sweden, but the tax-based depreciation rules were more favourable in Sweden. The Norwegian windpower industry saw this difference as the main reason for the uneven development of wind power in Norway and Sweden (NORWEA, 2015). When the issue was debated in the Parliament in 2015, nearly all political parties agreed on the need for new depreciation rules (Stortinget 2015). The certificate system was adopted under the Red/Green government, headed by the Norwegian Labour Party 2005–2013, which was followed by a Conservative-led government from 2013. Both Labour and the Conservatives agreed on the new depreciation rules – and agreed to end the certificate market after 2021 (White Paper 2016).

The new depreciation rules were initiated in response to societal demands by power producers and windpower interests. These actors had been strengthened by the new EU renewables policies – as could be expected from the domestic-politics perspective. The wind industry gained clout that could be used to challenge the status quo. The RED has been seen

[15] The NVE is responsible for granting hydro- and windpower licenses in Norway.

as an important factor for the professionalization and development of the windpower sector, which has established itself a strong interest groupings in Europe and Norway. The uneven realization of renewables and wind power in Sweden and Norway within the certificate system triggered internal political pressures for levelling the playing field. The challenge for Norwegian windpower interests was that costs were considerably higher than the market price for electricity certificates. Very few windpower investments had been undertaken solely based on the certificate market (Ministry of Finance 2016).[16]

Norwegian power producers and windpower interests fronted a campaign to persuade the government to change the depreciation rules, so as to stimulate new investments in wind power. A proposal for new rules was sent for public consultation in February 2015. Twenty organizations responded, including eight that represented energy- and wind-production interests (Ministry of Finance 2015). They all supported the proposal but had some remarks on specific design features. One climate-focused NGO supported the new rules, whereas two nature conservation NGOs opposed them. The organization representing small hydropower opposed the new rules, as these would make wind power relatively more attractive. The new rules also had local-level backing: the organization representing windpower municipalities supported the new rules, also arguing for a nature-resource tax that could increase local tax revenues.

In 2016, new depreciation rules were approved by the EFTA Surveillance Authority according to EU state-aid rules (ESA 2016). The new rules allowed most assets in Norwegian windpower plants acquired between 2015 and the end of 2021 to be depreciated according to more favourable rules for investors. Impact assessment and experiences of these new rules indicated that they would incentivize windpower investment … moderately (Ministry of Finance 2016, White Paper 2020). The Fosen project in central Norway – Europe's largest on-land windpower plant – may serve as an example. The original project was terminated due to lack of profitability but was re-activated after the change in depreciation rules that would bring in fresh investment *(Adresseavisen* 2015, Otte *et al.* 2018). Further, investments in two windpower projects in northern Norway were announced shortly after the change in rules.

Reduced wind-power technology costs – nearly 40% between 2012 and 2019; 30% since 2016 – is an alternative explanation indirectly related to the RED (White Papers 2020, 2021). In addition to stimulating windpower innovation and deployment throughout Europe led by Denmark and Germany *(Energiewende)*, the rapid increase in Swedish wind power within the certificate market propelled innovation and cost reductions in cold climate and forest areas particularly relevant to Norway (IEA 2017, Möllerstöm 2019). On-land wind power has also been prioritized in EU research and innovation policies, stimulating an innovation push/demand-pull effect together with the RED (Eikeland and Skjærseth 2019). However, the decreasing cost of wind technology is an insufficient explanation. Investment decisions in several large windpower plants (including Fosen) were taken before the steep fall in the certificate price from 2018. Moreover, a power-market study conducted by the NVE concluded that wind power would become profitable only from 2020 based on the power price alone (without electricity certificates) in areas with the best wind resources (NVE, 2018).

[16] From 2012 until the end of 2015, the certificate market had triggered investments totalling only 108 MW of wind power in Norway, with average annual production of 337 GWh. Total installed wind capacity in Norway was 873 MW at the end of 2015.

Concerning changes in economic development, jobs, and ownership the picture is mixed. On the one hand, Norway's municipalities are central providers of welfare services, and are thus motivated by local economic development and jobs from windpower (Saglie et al. 2020). Windpower services have increased significantly as share of the value creation in the Norwegian renewable-energy industry (NOU 2012, White Paper 2021). However, 58% of Norwegian wind power is owned by foreign interests (White Paper 2020); and a study of the benefits from wind power for economic development in Norway concluded that local benefits were limited, related mainly to tax revenues and jobs (Berg 2019). Moreover, there are now few 'pro-windpower' municipalities left – the moderate benefits have apparently not outweighed the costs (see below).

Thus, we conclude that change in domestic politics challenged the status quo and affected Norwegian implementation of the RED concerning wind power. New depreciation rules were supported by most political parties and were adopted in response to internal pressure fronted by windpower interests that had been strengthened by the RED. This levelled the playing field with Sweden within the certificate market for wind-energy investors and coincided with a drastic cost reduction in windpower technology indirectly related to the RED and the certificate system.

Policy feedback: Local protests and reform

The next policy development was a national framework for localization of on-land wind power, designating 13 areas in Norway for such development. The framework was intended as a tool for the authorities to gain better control over where new licences would be sought, depending on wind resources and grid access (White Paper 2016). The framework was directly linked to the electricity certificate system, the emerging boom in new windpower licences – and a rise in local conflicts (NVE 2019a).

After the Planning and Building Act was amended in 2008, Norwegian municipalities lost influence through their local planning process and the NVE gained full control over windpower licensing within the electricity certificate system (Inderberg *et al.* 2019, Saglie *et al.* 2020). In practice, however, the host municipality has almost veto-power over windpower applications – generally initiated by developers (Inderberg *et al.* 2019, Bjerkestrand *et al.* 2020).

In 2019, however, the national framework was withdrawn, following massive protests from affected municipalities and other interests. In the public consultation, most of the 5000 responses were negative to the framework – 62 of the 69 municipalities – and most of them were also negative to more on-land wind power (MPE 2019). The NVE halted the issuance of new windpower licences pending new licencing procedures (NVE 2019b). In 2020, the government proposed various changes in the licencing process, including measures to improve local and regional acceptance, and greater attention to conflicting concerns related to nature conservation, biodiversity, and landscape, acknowledging that the most serious nature conservation conflicts concern windpower development in pristine nature areas (White Paper 2020). Several of the proposed changes were adopted by the Parliament.

The withdrawal of the national framework and the reform in licensing procedures are related to Norwegian implementation of the RED by the certificate system, changes in domestic politics leading to more favourable depreciation rules, and other factors such as falling technology costs. Not only were feasible small-scale hydropower projects becoming scarce (White Paper 2020): wind power was also becoming profitable much faster than foreseen. All this stimulated realization of windpower licences previously accorded by the NVE – leading to more rapid windpower development more quickly than expected – in turn fuelling mobilization, opposition, and conflicts.

New windpower development took place mainly in untouched nature areas along the coast. This and other factors, like the significant increase in the size of the wind turbines from the time when licences were granted to their actual construction, spurred local protests, culminating with the opposition expressed in the public consultation (White Paper 2020). This indicates that negative policy feedback from implementation experiences affected the decision to withdraw the national framework for windpower localization and the licencing reform. Municipal opposition effectively blocked the national framework.

Local responses to the national framework for wind power indicate a change in municipal preferences in recent years (MPE 2019).[17] Of the twelve responding municipalities belonging to the 'pro-windpower' organization (LNVK) that had previously supported more favourable depreciation rules,[18] seven were now opposed. Altogether 62 of the municipalities opposed the new framework, and 48 opposed further on-land windpower development. Only six of the 69 responding municipalities were unconditionally in favour of more wind power. Of the municipalities negative to the framework and/or wind power, 60 mentioned the environment and nature among their concerns, with 50 ranking environmental and nature concerns as 'most important'. The finding that a high environmental impact reduces the likelihood of obtaining a licence (see Inderberg et al. 2020) indicates that municipal responses may also have been affected by additional factors such as the 'top–down' nature of the national framework, and the desire to increase local tax revenues from windpower projects (LNVK 2019). Opposition from local authorities follows a more general trend. In September 2019, several locally-based protest organizations joined forces and established a nationwide organization – HEADWIND – to oppose on-land windpower development.[19]

Thus, negative policy feedback from implementation experiences affected policy reform together with other factors – the cancellation of the framework for wind power and the proposed reform of licensing procedures. The windpower boom coincided with the growing opposition from municipalities, many arguing that insufficient attention had been paid to nature and other concerns in the licensing process.

5. Conclusions

How to explain Norway's 'successful' implementation of the 2009 EU Renewable Energy Directive (RED) under conditions of low alignment? What are the consequences of Norway's overachievement for the development and reform of renewable energy policy? Here we have examined these questions with specific focus on Norwegian wind power, complementing the

[17] The summary is based our examination of 69 municipalities' hearing responses.
[18] The National Association of Norwegian Windpower Municipalities.
[19] https://motvind.org/

literature that has showed little interest in examining the role of the EU, the related electricity certificate system, and the politics of depreciation rules.

We note poor alignment between the RED's binding national target and governmental preferences, existing policies and energy interests, as described in successive Norwegian White Papers. This included a surplus of renewable energy in normal years based mainly on hydroelectric power, expected to continue also with new subsea cables and electrification of other sectors than power production. This did not align well with EU renewables ambitions in terms of GHG mitigation, energy security and technological innovation. Accordingly, the Norwegian government opposed the EU renewable energy target for 2020 – yet Norway managed to overachieve the RED and the related electricity-system target.

Norway implemented the RED through a technology-neutral, flexible electricity certificate system with Sweden that initially eased the problem of low alignment. Viewed from an EU adaptation-pressure perspective, the 'customization' of EU legislation resulting from the RED's optional cooperative trading article partly explains implementation. From 2012 to 2016, the electricity certificate system brought significantly more renewable energy investments in Sweden than Norway, maintaining the status quo. However, some new hydropower was added; moreover, the NVE accelerated the approval of windpower licences to ensure that Norway would realize enough projects within the system by 2021.

From 2017, Norway experienced a windpower boom, becoming the number one European country in establishing new, on-land wind turbines. Domestic politics became important – the new, more favourable, depreciation rules resulting from demands from pro-windpower societal actors were adopted in order to make wind power more profitable compared to Sweden. After the RED was adopted, changes in government did not affect Norwegian implementation to any great extent. The new depreciation rules within the certificate system coincided with an alternative explanation – a dramatic fall in technology costs, which increased the profitability of wind power compared to Sweden and hydropower. This drop in costs was indirectly related to RED implementation in other EU countries; it stimulated actors favouring greater windpower development, including developers, and municipalities seeking local economic development. Although local economic benefits from wind power have been relatively small and foreign ownership dominates, the value creation of windpower has increased.

What of the consequences of implementation and overachievement for policy reform? Policy feedback from implementation experiences can contribute, at least partially, to explaining why Norway's new national windpower framework was withdrawn and windpower policies ground to a halt – followed by a proposed reform of the licensing system. Important here was the negative policy feedback from almost all affected municipalities, some of which changed their preferences. This was related, inter alia, to the rapid boom in wind power and the fact that municipalities' stated concerns, especially those concerning nature, had not been taken sufficiently into account in licensing.

Two more general lessons can be drawn from our study. First, the dynamic approach to implementation and its consequences has shown how renewables/ windpower policies have developed through the policy cycle of EU adaptation pressure, implementation, and policy reform. This speaks to the acceptance and energy democracy literature, as EU adaptation pressure appears to have 'backfired' due to local opposition based on trade-offs between nature preservation and renewable energy production. While this may be related to the fact that Norway is an EEA country with no formal say in Brussels decision-making, such insights have relevance for most democratic countries struggling to replace fossil fuels with renewable energy while addressing sustainable management of nature. More broadly, increasing land-use pressures and related nature-conservation challenges need to be addressed to prevent opposition that may impede achievement of long-term climate targets. Second, our study shows how the interaction between policies and technology can lead to declining technology costs that accelerate implementation and contribute to overachievement under conditions of low alignment between EU outcomes and national status quo. The EU implementation literature has been largely insensitive to technological change.

There remains room for analytical improvement to our study. Various EU policies interact in ways that may affect local-level implementation. Norwegian implementation of the RED differs from that in EU member states because the EEA Agreement does not apply to nature management. Thus, Norwegian wind power is not directly affected by the comparatively stricter (Dörpo, 2020) framework of Natura 2000, the EU Habitat and Birds Directives, or the accompanying European Commission guidelines on windpower development and Natura 2000 (Commission 2011, 2020). Further examination is warranted of how EU policies apply and interact differently in various national contexts.

Norwegian energy policies have fluctuated in recent years, due to the more ambitious EU climate-policy agenda – to which Norway is fully aligned – expressed in the European Green Deal, and the proposed 'Fit for 55' package aiming for a GHG-reduction target of at least net-55% (compared to 1990) and 40% renewable energy consumption by 2030 based on yet another reform of the RED (Skjærseth 2021). Responding to this more ambitious climate/energy policy agenda, the political drive for more renewable energy production for electrification in Norway came largely after the boom in on-land wind power. However, as also expressed in the European Green Deal, it is increasingly realized that climate and nature challenges require solutions that might weaken the pace of future on-land windpower development.

Interviews:

NVE (December 2019)
Anton Jayanand Eliston
Mari Hegg Gundersen
Arne Olsen
NORWEA (November 2021)
Øystein Schmidt Galaaen
Energy Norway (November 2021)
Eivind Heløe
Solgunn Furnes
TrønderEnergi (December 2021)
Ståle Gjersvold
Statkraft (December 2021)

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