Wind Power Policy Implementation: The Beliefs of Sovereigns, Policy Outputs and Policy Impacts

David Newell
Luleå University of Technology
Division of Social Science
971 87 Luleå
Sweden
E-mail to corresponding author: david.newell@ltu.se

Abstract
As energy security, climate change and other environmental concerns remain prominent on the global agenda, international organizations and states have created policies intended to foster the development of renewable energy. With wind power projected to make the largest contribution to Europe's renewable energy mix, the EU and EU member-states have created an institutional framework designed to that favor the development of wind power. While some states have been successful in reaching their renewable energy goals, others have been less so. This article seeks to understand the reasons why states are successful in achieving their intended policy outcomes despite the inherent difficulties in implementing policy. Using the Advocacy Coalition Framework as a point-of-departure, this article will explore the relationship between the beliefs of national lawmakers, policy outputs and policy impacts, as well as how these relationships can help explain wind power policy implementation.

Keywords: energy policy; renewable energy; wind power; advocacy coalition framework.

1. Introduction

1.1. Background

When what policymakers intend to do, i.e. their *policy intentions*, do not match with the results of policy implementation, i.e. *policy outcomes*, the temptation is to ask why things didn't turn out as envisioned. In taking account of the myriad obstacles to realizing intended policy outcomes, policy implementation research (c.f. Wildavsky 2007) flips this question on its head. Instead of asking, "what went wrong?" Pressman and Wildavsky (1973) formulated the problem of policy implementation in terms of, "why it's amazing that federal programs work at all." Therefore, the better question to ask regarding policy implementation is, "why do things *ever* work as envisioned?" In other words, studying successful cases of policy implementation and asking, "what went right?" has the potential to reveal more about policy implementation than simply studying cases of unsucessful policy implementation and asking, "what went wrong?"

In efforts to address energy security, climate change and sustainability more generally, governments the world over have created public policies intended to encourage the development of renewable sources of energy. An increase in the consumption of renewable energy has been identified by the European Union as an important objective in the EU 2020 targets, which stipulate a minimum 20% share of energy consumption from renewables, and, more recently, the EU 2030 framework, which stipulates that the minimum share of renewables be increased to 27% of consumption (European Union 2014a, 2014b, 2013). In order to reach these EU-wide targets, EU member-states have set national targets based on their individual energy consumption, production capabilities, and existing energy mix. However, efforts to increase the consumption of renewable energy have met with varying levels of success, with some states surpassing their 2020 targets, but at least five countries failing to meet them so far (European Union 2013). This illustrates the difficulty of translating policy from *policy intentions* to successful *policy outcomes* (c.f. Wildavsky 2007).

Among renewable energy resources, *wind power* is expected to contribute the most to Europe's renewable energy consumption through 2030. Determining how to successfully implement wind power policies will therefore be critical to realizing European Union targets. However, as with renewable energy policy generally, the implementation of wind power policy is problematic. Despite international goals and national policies intended to support the development of wind power, efforts to develop wind power have met with varying success (Clement 2010, Ek et al. 2013, Nadai 2007, 2009, Söderholm et al. 2007, Szarka 2007) despite general popular support for wind power (Jobert et al. 2007, Nadai 2007, Todt 2011). But because there *are* cases of successful wind power development among EU states, it is therefore relevant to ask what these states have done *right* in implementing their renewable energy objectives.

1.2. Previous Research

Since the seminal *Implementation* (Pressman and Wildavsky 1973), the literature on policy implementation has grown significantly, covering a diversity of policy areas (cf. Smith 1973, Montjoy and O'Toole 1979, Matland 1995, O'Toole 2000). In later years, while not always termed as such, implementation research has continued broadly and unabatedly (Saetren 2005). Regarding wind power policy implementation specifically, several frameworks and theories have been used, comprising a significant body of research. One such approach is *historical institutionalism* (Breukers and Wolsink 2007, Toke et al. 2008, Agterbosch and Breukers 2008, Ferguson-Martin and Hill 2011). The historical institutionalist approach has illuminated the institutional frameworks for wind power policy that result from national-level processes. *Path dependency* dictates a resistance to change in wind power policy unless either a) current institutions are configured in such a way as to allow wind power development without much conflict, or b) there is a shock external to the institutions that could result in changes to the institutions that govern wind power development. Because historical institutionalism treats policy change-inducing shocks to institutions as exogenous, however, it struggles to explain or predict the *drivers* of wind power policy change.

The *policy subsystem* approach has also been used to analyze wind power policy implementation (Jegen and Audet 2011, Szarka 2004, 2006, 2010, Wiener and Koontz 2010). Policy subsystem frameworks have shed light on the wind power policy process by focusing on *coalition behavior* and explaining wind power policy outcomes in terms of *beliefs* and *policy learning*, which are the conceived of as the drivers of policy change. However, while *beliefs* and *learning* are helpful in terms of understanding *why* wind power policy changes, the *mechanisms* by which this happens, e.g. the relationship of beliefs to policy outputs (such as legislation) and policy outcomes (i.e. changes in wind power production) has not been explored in-depth.

1.3. Aim

The aim of this article is to understand why--in states where wind power has been successfully developed--states are successful in implementing wind power policy. This will be done by analyzing the relationship of policy beliefs to policy outputs and policy impacts and outcomes in order to understand the mechanisms by which policy implementation occurs within the context of policy beliefs and policy learning. In order to do this, a model of how policy beliefs, policy outputs and policy outcomes relate to each other will be developed, based on policy subsystem theory. This model will then be used to analyze a case of successful wind power policy implementation.

2. Theory

2.1. Policy Subsystems and the Advocacy Coalition Framework

According to Baumgartner and Jones (1993), and Sabatier and Jenkins-Smith (1993),

policy can be understood in terms of *policy subsystems* and *beliefs*. Collections of beliefs about policy in a given area compete within a subsystem for dominance. Those beliefs or "images" that become dominant among actors in a subsystem are reflected in the policy outcomes of the subsystem (Sabatier and Jenkins-Smith 1993:26).

Among policy subsystem theories, the *Advocacy Coalition Framework* (ACF) brings together several elements of actor- and policy subsystem-based frameworks of the policy process and integrates them into a single, theoretically coherent, empirically testable model with specific causal mechanisms and falsifiable hypotheses. The ACF envisions policy change occurring over periods often lasting ten years or more (Sabatier and Jenkins-Smith 1993:16), with policy subsystems defined as substantive, territorially defined, policy-domains (Sabatier and Jenkins-Smith 2007)), which incorporate actors from across governmental entities as well as private and civil-society actors (Sabatier and Jenkins-Smith 1993:16). Within subsystems, public policies are conceived of as belief systems which are shaped by different, competing *advocacy coalitions*, comprising actors who share normative and empirical beliefs about a given policy area (Sabatier and Jenkins-Smith 1993:18). Advocacy coalitions and actors' beliefs are not static, but dynamic, shifting and changing through processes of *policy learning*. In the absence of policy learning, policy remains relatively stable over time (Sabatier and Jenkins-Smith 2007). In the ACF, actors are goal-oriented, but the preferences of advocacy coalitions play a more important role than in utilitarian models (Sabatier and Jenkins-Smith 2007:30), i.e. actors are "boundedly rational." Finally, beliefs play a central role in the ACF because they mitigate actors' preferences by shaping how actors view causal relations and to what degree actors value certain policy preferences within a given subsystem.

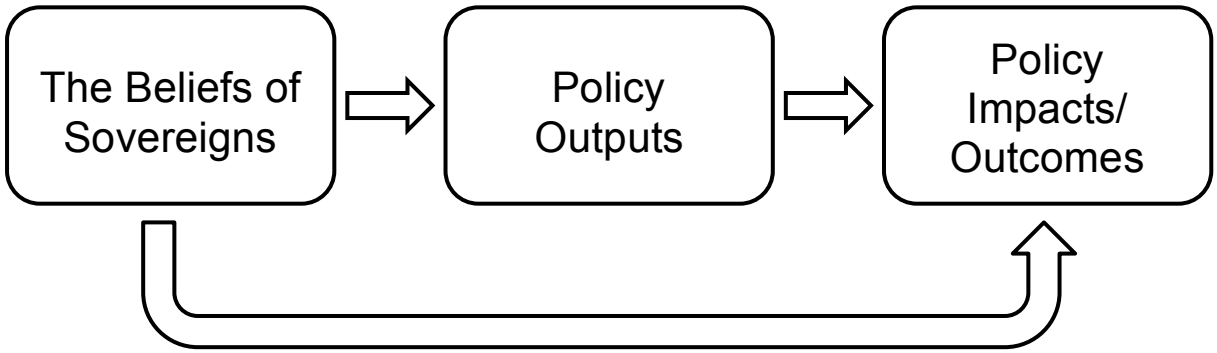
2.2. Sovereigns, Policy Outputs and Policy Outcomes

According to the ACF, "decisions by sovereigns" (subject to agency resources and general policy orientations) result in policy outputs (Sabatier and Jenkins-Smith 1993:18). "Sovereigns" in a given subsystem include anyone who has decision-making authority for a given policy question and could include bureaucrats, politicians or judges. While ACF research has typically focused on the beliefs of *coalitions* (Weible et al 2011), doing so has minimized the question of whether some actors' (e.g. sovereigns') beliefs matter more or in different ways than others in determining policy outcomes. Because sovereigns' decisions lead to policy outputs, which lead to policy impacts/outcomes, there is reason to believe that sovereigns' beliefs related to policy outputs and policy impacts/outcomes--i.e. their beliefs related to policy implementation--deserve special attention. By explaining policy impacts/outcomes in terms of policy outputs and policy beliefs, the relationship between *policy intentions* and *policy outcomes*, as well as *policy implementation*, can be better understood.

Based on the ACF, a theoretical model has been developed here that outlines one of the mechanisms by which policy implementation occurs in policy subsystems, including the concepts: sovereigns' beliefs, policy outputs and policy impacts/outcomes. A visual representation of this model is presented in Figure 1. The model suggests that, by understanding the *beliefs of sovereigns*, one can understand the decisions made by sovereigns

in the form of *policy outputs*, which, in turn, affect the *policy impacts/outcomes* within a given policy subsystem. The model also suggests that the *beliefs of sovereigns* affect *policy impacts/outcomes* directly. This is because the ACF views policy as the product or representation of beliefs generally. Hence, it is possible that the *beliefs of sovereigns* affect *policy impacts/outcomes* through mechanisms besides *policy outputs*. This could be due to the influence actors' beliefs have over the policy process through, for example, public communications by sovereign politicians.

Figure 1.



2.3. Research Question and Hypotheses

Based on the aim of this article, the following research question is posed to guide the empirical data collection and analysis of this study:

Why are states who have reached their renewable energy targets successful in implementing wind power policy?

As outlined above, the ACF asserts that beliefs are the drivers of policy change. According to the ACF, the mechanism by which policy is implemented includes the decisions of sovereigns, which lead to policy outputs, which lead to policy impacts and, thereby, policy outcomes. By analyzing the relationships of these elements to each other, the ACF has the potential to provide answers to the research question posed, as well as a better understanding of wind power policy implementation. These relationships have been formulated in terms of three hypotheses that will be tested:

H1: *The institution of specific wind power policy outputs will be preceded by policy learning by sovereigns.*

This hypothesis is based on the general notion within the ACF that beliefs and policy learning (i.e. changes in beliefs) are the drivers of policy change. In the ACF, policy outputs are the result of decisions by sovereigns and should therefore be expected to reflect the beliefs of sovereigns to some extent. New policy outputs represent changes in policy and one would therefore expect that such changes would be preceded by policy learning by

sovereigns.

H2: *Increases in wind power production will be preceded by the institution of specific wind power policy outputs.*

According to the ACF; policy impacts (and outcomes) are the result of policy outputs. One would therefore expect that the institution of new wind power policy outputs would affect wind power production in one way or another. Increases in wind power production (i.e. in states that have successfully implemented wind power policy) should therefore be expected to be preceded by the institution of new policy outputs.

H3: *Increases in wind power production will be preceded by policy learning by sovereigns.*

This hypothesis derives from the notion in the ACF that policy, in a general sense, is a reflection of the dominant beliefs within a policy subsystem. It can therefore be expected that there will be a relationship between policy learning by sovereigns and wind power policy outcomes.

3. Research Design

3.1. Case

An ideal case to test the hypotheses proposed would include the following factors: 1) be a state that has had recent, significant increases in wind power production compared to previous time periods; and 2) be a case where institutional factors and potentially conflicting interests are not necessarily inherently favorable to wind power, i.e. where one would not expect an easy path to implementing wind power policy. The first factor is important because it is necessary to test a case of successful wind power policy implementation. The second factor is important because in cases where there are few obstacles to wind power development, it would require little, if any, policy change to induce an increase in wind power.

Given these factors, Sweden was selected as the case for analysis. Sweden is an appropriate and interesting case for several reasons. First, Sweden is among the world's foremost renewable energy producers, and has experienced a massive increase in wind power production in recent years. Sweden has gone from producing 13 gigawatt hours (GWh) of wind energy in 1991 to producing 987 GWh in 2006 and over 6000 GWh in 2011 (IEA 2015). During this period, Swedish parliament has also passed a number of pieces of legislation that affect wind power.

Sweden is also an appropriate case because the expansion of wind power legislation and production has occurred within a regulatory and legal framework that is not necessarily conducive to wind power development. The Swedish Environmental Code, passed in 1999, places local and regional planning for wind power on the same footing as, and in competition with, all other environmental and land use concerns. The result is that wind power

development has often been prioritized lower than other planning priorities (Khan 2003). This is in contrast to Denmark, for example, which has a dedicated, streamlined and clearer legal framework for developing wind power not subject to the same planning-phase obstacles as Sweden.

In order to employ the ACF as a theoretical point-of-departure, it is important to delineate the relevant policy subsystem. In the case of wind power policy in Sweden, the relevant subsystem for analysis is the *energy system policy subsystem*. This is because wind power policy is not made in a vacuum, but in relation to other actual and potential energy resources--such as oil, gas, coal, hydropower, solar power, etc.--as well as the concerns and issues related to developing and using, or replacing, each of these resources. The policy subsystem also comprises the competing coalitions and beliefs related to these policy issues. According to the ACF, the policy produced by the subsystem will represent the beliefs, and changes in the beliefs, of the dominant coalitions and actors within the energy system subsystem. Among the actors of interest within energy system policy subsystems, this article will focus on *sovereign decision makers* because of their critical role in the policy implementation process. The sovereign decision makers of relevance for the case of the energy system policy subsystem in Sweden are the members of the Swedish parliament (or *riksdagen*). These lawmakers are responsible for formulating the laws and, thereby, the institutional framework (i.e. the *policy outputs*) within which wind power can be developed in Sweden. Analyzing the beliefs of these sovereigns, the laws passed by them, and the changes in wind power production (i.e. the *policy impact/outcomes*) in relation to each other will therefore be the basis for testing the hypotheses proposed in this article.

3.2. Data and Methods

In order to conduct the analysis of the three relevant variables--*the belief of sovereigns*, *policy outputs* and *policy impacts/outcomes*--various types of data were collected and a number of methods were employed to analyze the data. These data were collected for the period 1991-2011, given the availability of the data sets and the length of time necessary to observe significant policy change (10 years or more) according to the ACF.

Two types of data on the beliefs of sovereigns were collected. The first type of data on the beliefs of sovereigns included the text of wind power-related policies deemed "significant" by the International Energy Agency (IEA) (2015), as well as parliamentary documents related to the policies. The three policies identified include: 1) "Energy, Carbon Dioxide and Sulphur Taxation," 2) "The Electricity Certificate System," and 3) "An integrated climate and energy policy framework: A sustainable energy and climate policy for the environment, competitiveness and long-term stability." The second type of data on the beliefs of sovereigns include all of the 2893 public documents produced by the parliament related to wind power, including the bills, motions, minutes, debates, reports, evaluations, opinions, statements, etc. from both the general body, as well as the separate committees, of parliament. These documents were found using the advanced document-text search techniques available in the Swedish parliament's online archive (Riksdag 2016).

Research on the belief systems present in Swedish energy policymaking has previously been conducted by Måns Nilsson, in the article "Learning, frames, and

environmental policy integration: the case of Swedish energy policy" (2005). Nilsson's work examines the role of policy learning and the evolution of *policy frames* (coherent sets or systems of beliefs) in environmental policy integration in the Swedish energy sector over time. This was done by examining the shifts in prominence of various policy frames over time. In order to determine what the different groups of beliefs that sovereigns have, as well as how these can be related to each other and examined, this article used the policy frames identified by Nilsson (2005) as the basis for understanding the sets of beliefs held by sovereign decision makers in the energy system policy subsystem in Sweden. The policy frames/belief systems were used to interpret, code and measure the different beliefs of members of parliament, including the relative prominence of those belief systems over time (i.e. policy learning). The three main policy frames in energy policy in Sweden that Nilsson (2005) identifies include the following:

1. **Energy as Infrastructure**. Energy is conceived of in terms of physical infrastructure that serves the purpose of social welfare. Security of supply is paramount and government planning and intervention are necessary to ensure this.
2. **Energy as Risk**. Energy is conceived of in terms of the risks of its production to (primarily) the environment. Environmental targets, conservation, sustainability and averting the risk of climate change are central concerns.
3. **Energy as Market**. Energy is conceived of in terms of its market value and potential inefficiencies in energy markets. Market competition, consumer choice and economic efficiency are key.

The analysis of the "significant" wind power policy outputs included using the three policy frames as a guide for qualitatively interpreting the text of the policy documents in terms of the belief systems held by sovereigns and measuring the relative prominence of the belief systems within the texts. This method also served as means of validating the conception of the separate policy frames used in this study. The coding and analysis of the entire set of parliamentary documents related to wind power was done using quantitative content analysis, specifically the "dictionary method" (Grimmer and Stewart 2013), which identified key search words and phrases within documents related to the policy frames being measured. For measuring the policy frames, this article identified terms that pertain (and are ideally exclusive to) Nilsson's policy frames (2005). For the *energy as infrastructure* frame, "security of supply," "planning," "infrastructure" and closely related phrases and terms were used. For the *energy as risk* frame, "environment," "sustainability," "climate" and closely related phrases and terms were used. For the *energy as markets* frame, the terms "competition," "markets" and "consumer," as well as closely related terms and phrases were used. All of these phrases and terms were searched for in conjunction with the term "wind power" in order to provide the correct substantive context. In order to benchmark the relative prominence of the policy frames to all parliamentary documents dealing with wind power (in order to establish a baseline for the *general discussion* on wind power), a search was also conducted on the term"wind power," and related terms, without reference to the specific policy frames. Table 1 specifies the search terms and phrases used (in Swedish). In searching for specific terms, the Swedish language has the benefit of employing compound words that

include the noun with the adjective, making searches for related words significantly simpler and more accurate than languages where such words are discrete from each other.

Table 1.

Policy Frames	**Search Logics**
Wind Power (relevance term)	"vindkraft*"
Energy as Infrastructure	vindkraft* (leveranssäkerhet OR planering* OR *planering OR infrastruktur* OR *infrastruktur)
Energy as Market	vindkraft* (*konkurrens OR konkurrens* OR *marknad OR marknad* OR konsument* OR *konsument)
Energy as Risk	vindkraft* (klimat* OR *klimat OR miljö* OR *miljö OR hållbar* OR *hållbar)

The search method was employed using the Swedish Parliament's Archive website, which has advanced Boolean search-logic functions. This method produces counts of the number of documents that contain at least one of the phrases or terms. Using this approach, each document where a phrase or term occurred at least once was treated a single occurrence of the given policy frame. While multiple policy frames might coexist within the same document, the frames should nonetheless be separate and distinct. As a precaution against "false positives," potentially problematic compound terms (such as "environmental planning," indicative of both the *energy as risk* and *energy as infrastructure* frames) were reviewed in a random selection of documents. The results indicated that there were a negligible amount of such problematic occurrences overall and, of that negligible amount, almost all can be attributed to the presence of multiple policy frames instead of "true" false positives.

The data on the dates and descriptions all of the policy outputs from the Swedish Parliament from 1991-2011 was collected from the IEAs database on countries' renewable energy policies (IEA 2015). For that same time period, data on annual increase in gigawatt-hours (GWh) of wind power produced in Sweden was retrieved from the IEAs database on renewable energy statistics (IEA 2016). Data on renewable energy production in Sweden are only available since 1991, but 1991-2011 should provide a sufficiently lengthy time period, according to the ACF, to measure significant policy change. Taken together, the data on the *beliefs of sovereigns*, *policy outputs* and *policy impacts/outcomes* will allow comparisons of the variables across time and between the variables within given years.

4. Results

This section will proceed as follows: first, the analysis of the policy frames in the

texts related to the specific, "significant" policies will be presented. This will be followed by a presentation of the policy frames found in *all* parliamentary documents related to wind power, as well as the increases in wind power generation, over the 1991-2011 time period. This will be followed by a table of all wind power policies during the given time period. The analysis of the relationships between the policy frames, policy outputs (policies) and policy impacts/outcomes (increases in wind power) will then be presented.

4.1. Significant Policies

In the 1991-2011 period, the IEA (2015) identified Sweden's Energy, *Carbon Dioxide and Sulphur Taxation* policy (1991), *Electricity Certificate System* policy (2003), and *An integrated climate and energy policy framework: A sustainable energy and climate policy for the environment, competitiveness and long-term stability* (2009) as "significant" or landmark policies related to wind power. The text of parliamentary documents related to these policies were analyzed for the presence and relative prominence of the policy frames identified. Quotes from these texts are translations by the author from the original Swedish.

As reflected in the quantitative analysis of policy frames later in this article, all three policy frames were evident in the policy documents related to the three significant policies. However, in these three significant policies, it was also evident that certain aspects varied. In the texts related to the *Energy, Carbon Dioxide and Sulphur Taxation* policy (1991), it was evident that, "The aims of energy policy are, in the short and long term, secure access to electricity and other energy on internationally competitive terms. In this way, good economic and social development are promoted in Sweden. Energy policy should be based on what nature and the environment can bear" (Swedish Parliament 1990). Here, the emphasis is on the *energy as infrastructure* (secure access) and *energy as market* (competitive terms, good development). These frames are further evident where it is stated that, "The transformation of the energy system must, in addition to meeting safety standards, be done with consideration to the need for electrical power in maintaining employment and welfare" (Swedish Parliament 1990).

Despite this, the *energy as risk* frame is considered, and can even be considered as one of the bases of a law designed, after all, to tax emissions. Yet, it is apparent that the *energy as risk* policy frame is subservient to the other frames: "A *credible* policy for the transition and development of the energy system requires concrete measures that combine a stable and sufficient supply of energy with other energy policy goals. Stringent environmental standards should apply to all electricity and heat production" (Swedish Parliament 1990, emphasis added). So, while the environment is definitely considered, policies that do not ensure the energy supply (*energy as infrastructure*) are not considered "credible." The assumption is that it is possible to "have your cake and eat it too," i.e. that it is possible to promote energy supply (*energy as infrastructure*) and markets while also addressing environmental concerns, with no trade-offs. In other words, *energy as risk* is viewed as something that can simply be tacked on as an additional energy goal.

In the *Electricity Certificate System* policy (2003), all three frames are also present, albeit the focus is somewhat different from the *Energy, Carbon Dioxide and Sulphur Taxation* policy (1991). The policy is viewed as, "Further steps forward in the efforts for an

energy supply that is secure, effective and environmentally friendly" (Swedish Parliament 2002a) and as a means "To achieve economic growth together with social welfare, without negative environmental impacts" (Swedish Parliament 2002b). However, the point-of-departure is more the *energy as market* frame, i.e., "The system thus comprises incentives for producers of renewable electricity to make *rational choices*, which will eventually strengthen the *competitiveness* of renewable electricity *on the market*" (Swedish Parliament 2002c, emphasis added). This is also evident in the statement, "The energy policy decision entails a large *investment* in renewable electricity production... The energy policy decision will also entail further *gains in efficiency for the energy market*" (Swedish Parliament 2002b, emphasis added). The goal is, apparently, to improve energy markets at least as much as to address any potential, unspecified, environmental risks.

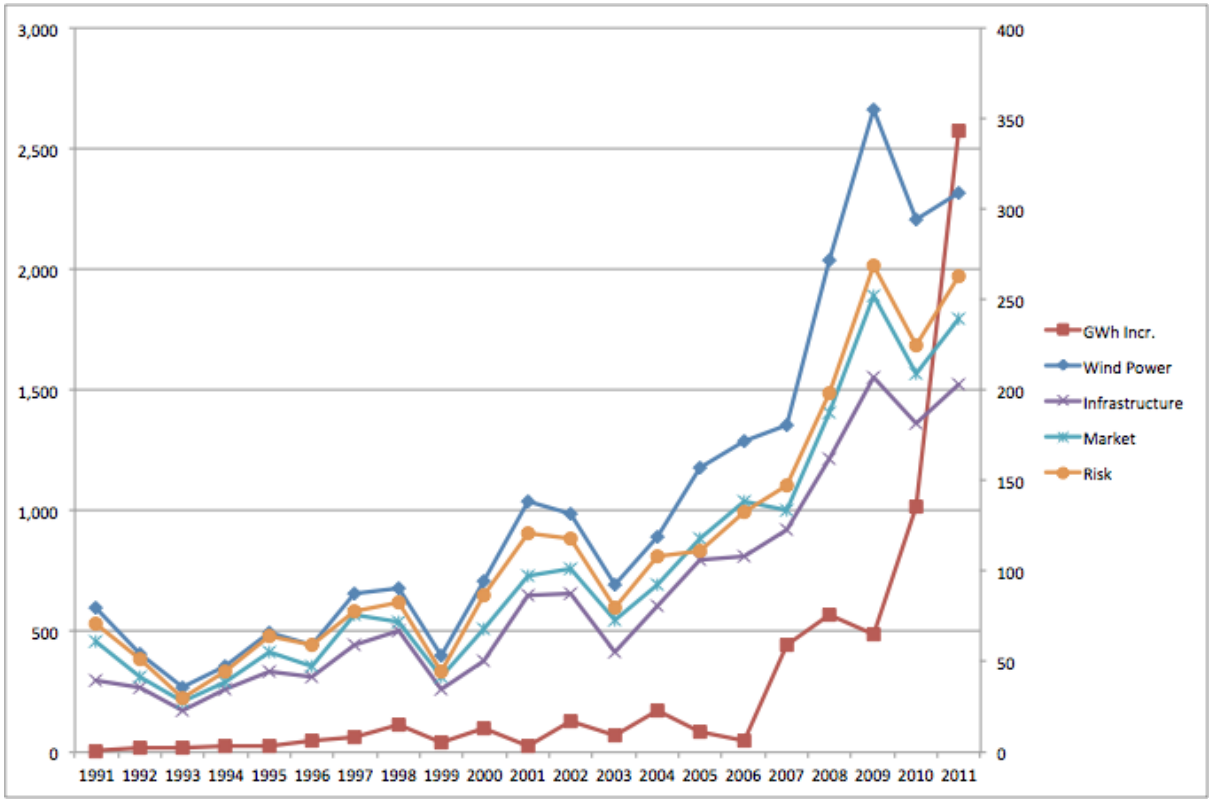
In *An integrated climate and energy policy framework: A sustainable energy and climate policy for the environment, competitiveness and long-term stability* (2009), however, a shift takes place in how the *energy as risk* policy frame is used and perceived in relation to the other frames. In the introduction of the government's proposal it is stated that, "Climate change is one of the great challenges of our times" (Swedish Government 2009), something that was not addressed in the previous policies. Here the *energy as risk* frame no longer references abstract environmental problems, but refers to something concrete: *climate change*. The *energy as infrastructure* and *energy as market* frames are still prominent, "The investment in renewable energy and more efficient energy-use will strengthen Swedish energy security and competitiveness" (Swedish Government 2009), yet, the point-of-departure is the linking of energy and climate policies: "The proposals are submitted in the form of two bills, which should be seen as two parts of one policy: An integrated climate and energy policy" (Swedish Government 2009). The policy documents state that, "The Swedish energy policy--and thereby also the foundation for climate policy--must be based on the same three pillars as EU energy cooperation…: Ecological Sustainability, Competitiveness, and Energy Security" (Swedish Government 2009), yet, "The basis for climate policy is the two-degree target that EU heads-of-state and government leaders have established" (Swedish Government 2009). By connecting energy policy to climate policy, which is then connected to a *specific climate goal* (limiting climate change to two degrees celsius), the *energy as risk* frame is no longer one frame among equals, but becomes the point-of-departure, or the policy frame by which the other policy frames are framed. While these three significant policies contain all three frames, as will be discussed later, the variations in how these frames are used over time--from taking *energy as infrastructure* and *energy as markets* to taking *energy as risk* as the primary point-of-departure--potentially has consequences for policy outputs generally, as well as policy impacts/outcomes.

4.1. Policy Frames, Policy Outputs, and Policy Impacts/Outcomes Over Time

In order to display the results of the policy frames in *all* parliamentary documents, as well as for wind power production over time, Figure 2 was created. The graph charts the document counts per policy frame overall, as well as GWh wind power production, by year. The document counts are labelled according to the three policy frames, i.e. *energy as*

infrastructure (labelled "Infrastructure"), *energy as risk* (labelled "Risk"), and *energy as market* (labelled "Market"). The document counts for wind power overall, i.e. the *general discussion*, are also plotted (and labelled "Wind Power"). The left-side Y-axis displays the amount of increased GWh wind power production over the previous year and the right-side Y-axis displays the document counts for the policy frames and wind power generally. The X-axis displays the years from 1991-2011.

Figure 2.



In order to display the wind power policies (i.e. policy outputs) instituted during the 1991-2011 period, Table 2 was created. It indicates the name of the policy, the year it was created, its current status, and the type of policy instruments the policy included. The grey-shaded cells represent "significant" or landmark policies, according to the IEA.

Table 2.

TITLE	YEAR	STATUS	TYPE
National Renewable Energy Action Plan (NREAP)	2010	In Force	strategic planning
Environmental Bonus for Wind Power	2009	Ended	tax relief
An integrated climate and energy policy framework: "A sustainable energy and climate policy for the environment, competitiveness and long-term stability"	2009	In Force	strategic planning
Network for wind power (Nätverket för vindbruk)	2008	In Force	policy support
Grant for local authority land use planning for wind power	2007	Ended	grants and subsidies

Commercial Loans to Startup Energy Companies	2006	In Force	loans, fiscal/financial incentives
The Electricity Certificate System	2003 (last updated 2013)	In Force	green certificates
Market introduction of Wind Power/Funding for Wind Power Pilot Projects	2003	Ended	fiscal/financial incentives
Measures to Support Wind Farms in Difficult Locations	2003	Ended	demonstration projects, grants and subsidies
Climate Investment Programmes (Klimp)	2003	Ended	grants and subsidies, funds to subnational governments
Economic Support to Regional Energy Offices	2002	In Force	economic instruments, policy support, institutional creation
Tax Reduction for Wind Power - Prolongation	2002	Ended	tax relief
Sustainable Municipalities Programme	2001	In Force	strategic planning, advice/aid in implementation, grants and subsidies
Support for Small Scale Electricity Production	2000	Superseded	fiscal/financial incentives
The Environmental Code	1999	In Force	codes and standards, regulatory instruments
Local Investment Programmes (LIP)	1998 (revised in 2003)	Ended	grants and subsidies, funds to subnational governments
Technology Procurement Programme - Renewables	1998	Ended	procurement rules, technology development
Guaranteed Power Purchase Contracts	1997	Superseded	mandatory requirements
Renewable Energy Investment Support Programme	1997	Ended	grants and subsidies
Renewables Tax Exemption: Act 1776	1994	Ended	tax relief
Energy, Carbon Dioxide and Sulphur Taxation	1991	In Force	taxes
Source: IEA http://www.iea.org/policiesandmeasures/renewableenergy/?country=Sweden			

In regard to Figure 2, it is evident that the three policy frames follow the basic trend of *wind power*, i.e. the *general discussion* on wind power, with few divergences between the *general discussion* and the individual policy frames. As the general discussion of wind power increases in parliament, all three policy frames increase as well. However, there are some smaller differences between the policy frames. *Energy as infrastructure* is clearly less prominent than either the *energy as risk* or *energy as market* frames. This phenomenon seems to have become more pronounced in the later years. This finding is also, incidentally,

congruent with Nilsson's (2005) findings regarding the relative prominence of the *energy as infrastructure* frame in the discourse on the energy system in Sweden.

The *energy as risk* and *energy as market* policy frames track each other and the *general discussion* quite closely, both more prominent than the *energy as infrastructure* policy frame, a result that also correlates with Nilsson's findings (2005). The *energy as market* policy frame seems to have a slightly closer relationship to the *general discussion* on wind power than the *energy as risk* frame, as seen in the years 2003-2007, when the *energy as risk* frame increased less and thereby diverged from the more marked increases in the *energy as market* frame, as well as the *general discussion* on wind power.

Concerning the relationship between the policy frames, the general discussion about wind power, and the policies instituted, a number of observations can be made. After 1991, when the policy on carbon taxes was created and the policy frames and general discussion were relatively higher, there was a lull in both the general discussion and policy creation until the 1996-1999 period, when there was an increase in all policy frames and the general discussion, which coincided with the creation of several less significant policies. From 1999 to 2003, there was an increase in all three policy frames and the general discussion, which coincided with the institution of the Environmental Code in 1999 and several policies created in 2002 and 2003, including the Electricity Certificate System. The period after 2003 also saw a sustained increase in the general discussion on wind power and all three policy frames. However, there is no readily distinguishable change in the prominence of any given policy frame compared to the others during this period. The 2009 Climate and Energy Policy Framework was preceded by a sharp uptick in the general discussion about wind and all three frames which, as was the case after the 2003 passage of the Electricity Certificate System, was followed by a downturn in both the general discussion and policy frames, perhaps indicative of members of parliament feeling they had done enough to address the renewable energy issue for the time being. And in both cases, the drop in the general discussion and policy frames post-policy creation was temporary. As was also the case during the 1999-2003 period, the run-up to 2009 saw no major shifts in the relative prominence of the three policy frames.

Looking at the relationship of the policies created (i.e. policy outputs) to wind power production (i.e. policy impacts/outcomes), there are a number of interesting observations. Since there is no production data prior to the 1991 Energy and Carbon Taxes, it is difficult to establish a baseline for evaluating whether these had a significant impact, but there was, in any event, little increase in wind power production following the creation of the policy. The 1999-2003 period, starting with the Environmental Code and other policies, culminating in the Electricity Certificate System in 2003 coincided with a subsequent, delayed bump in wind power production between 2006-2009. The 2008-2009 period--characterized by the Swedish Climate and Energy Policy Framework and the Wind Power Tax Bonus--coincided with the beginning of the most significant increases in yearly wind power production in Swedish history.

The most obvious observation about the data on the policy frames--including the general discussion on wind power--and wind power production, is that there seems to be a clear correlation between the increased production of wind power and all three policy frames--as well as the general discussion on wind power--both generally and across all three frames.

As the frames and general discussion concerning wind power increase, as reflected in the increasing number of documents concerning wind power and the policy frames, wind power production increases. This could indicate that an increase in the discussion of wind power is linked to an increase in wind power production itself. Furthermore, there is some evidence that the discussion on wind power affects wind power production, as opposed to the other way around. This is observed in the "lag" of increasing wind power production behind previous increases in discussion of wind power. This is observed in the "bump" in wind power discussion from 1999-2003 and the subsequent escalation from 2003 to 2009. This corresponds to a similar trend occurring in wind power production increases approximately six years later. The wind power production graph appears to "mirror" the general discussion to some extent, delayed by a few years. This makes logical sense considering that if wind power developers take cues on when to develop more wind power from parliamentarians' discussions, debates, etc., as well as the policy outputs produced by parliament, there will be a practical delay before new wind turbines can be planned for, financed, built and brought online. If one were to extrapolate this relationship into the future, based on the graph, one might predict a coming decrease in increased wind power production followed by another increase, as indicated by the peak, trough and subsequent increase in the general discussion on wind power.

While there does not appear to be a strong relationship between any given policy frame and wind power production, the *energy as market* frame appears to have a slightly closer relationship to increased wind power production than the *energy as risk* frame, evidenced in the years 2003-2007, when the *energy as risk* frame increased less, and thereby diverged from the more marked increases in the general discussion on wind power, than the *energy as market* frame, and the (delayed, but mirroring) increase in wind power production.

5. Discussion

To evaluate the results presented above, the hypotheses formulated earlier will be discussed.

H1: *The institution of specific wind power policy outputs will be preceded by policy learning by sovereigns.*

The longitudinal data on the prominence of the three policy frames in relation to each other provides little support that policy learning (i.e. a change in the prominence of one or more frames over another) occurred prior to the institution of specific policy outputs. All three frames more or less tracked the *general discussion* on wind power, with *energy as infrastructure* being less prominent and with *energy as risk* being slightly more prominent over the period of time measured. In the analysis of the specific, "significant" policy documents, all three frames were also present. However, there appeared to be shifts in how the frames were perceived as relating to each other, with the 1991 and 2003 policies espousing the *energy as infrastructure* and *energy as market* frames as more fundamental, whereas the *energy as risk* frame was more fundamental in the 2009 policy. This change in

how the frames are viewed in relation to each other provides some support for the notion of policy learning preceding the institution of specific policy outputs.

H2: *Increases in wind power production will be preceded by the institution of specific wind power policy outputs.*

There is fairly strong support for this hypothesis, with periods of new-policy-institution (and especially "significant"-policy-institution) preceding significant increases in wind power production, usually with a lag, which could be accounted for by the time it takes to bring new production capabilities online. This is particularly apparent in the most recent round of policies, from 2003-2009, which was followed by a historically massive increase in wind power production.

H3: *Increases in wind power production will be preceded by policy learning by sovereigns.*

Regarding the longitudinal data, while there is clearly a correlation between the *general discussion* on wind power in the Swedish parliament and the increased production of wind power, there is only weak support for the notion that this is the result of policy learning evidenced by changes in the prominence of the three policy frames to each other. The *energy as market* frame mirrors the (subsequent) increases in wind power production better than the other two frames, but only marginally. In regard to the analysis of policy frames in the specific, "significant" policy documents, there is more evidence of policy learning, with the *energy as risk* frame becoming more prominent in the 2009 policy that preceded the largest increases in wind power production in Swedish history.

The research question posed by this article was *why are states who have reached their renewable energy targets successful in implementing wind power policy?* Three hypotheses regarding the relationship between the belief of sovereigns, policy outputs and policy impacts/outcomes were derived, based on the ACF. There is some support for the idea that the beliefs of sovereigns matter for successful implementation, although the evidence is somewhat ambiguous, with some evidence of policy learning in relation to the most significant policies, but less evidence that such learning is occurring generally and across time. Therefore there is some evidence that the beliefs of sovereigns can explain why states who achieve their renewable energy targets are successful in implementing wind power policy.

6. Conclusions

While the data in this study prevent strong conclusions on the relationship of the policy frames of sovereigns to policy outputs and policy impacts/outcomes, this ambiguity points to several interesting, future research areas. Because there was some evidence of policy learning in relationship to the "significant" policies, but less so in the case of policies in general, it is possible that studying policy implementation requires focusing on a more narrow set of significant, or landmark, policies rather than simply focusing on policy outputs

in general. Another interesting possibility is that, in studying beliefs or frames, actors may hold multiple, potentially conflicting beliefs or frames, but some beliefs and frames have a different qualitative status than others, even if all are equally present.

Yet another area that would prove interesting to research would be the relationship of the beliefs and policy learning of sovereigns in relation to the beliefs and policy learning of advocacy coalitions. Comparing these beliefs, and their respective influence on policy outputs, as well a policy impacts and outcomes, would also open up a new and potentially fruitful line of inquiry within ACF research, as would investigating to what degree and how the beliefs of sovereigns and the beliefs of coalitions overlap and influence each other or not. Sovereigns need not, after all, be representative of the influence of coalitions in a given policy subsystem, yet sovereigns play a critical role in policy implementation by determining policy outputs and, thereby, policy impacts and outcomes.

On a final note, this study offers quite clear evidence that the *general discussion* of wind power among sovereigns precedes both policy outputs (instituted policies/laws) and policy impacts/outcomes (increased production of wind power). It is therefore possible that the *amount of general discussion* about wind power might offer a more compelling explanation for policy outputs and policy impacts/outcomes than the *content* of that discussion, i.e. the policy frames. This is perhaps the most interesting, and unexpected, finding of this study and raises new and interesting questions. In this vein, the literature concerning *policy attention* (cf. Engström et al 2008, Lowery et al 2008) could prove illuminating.

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