Steered or Guided by Numbers? How Climate and Energy Policymakers Domesticate Quantitative Information

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Abstract

Concepts like 'the metric society' and 'the tyranny of metrics' suggest that quantitative information increasingly shapes and steers policy and governance. This paper engages critically with such assumptions by using domestication theory to analyse how Norwegian climate and energy policy actors make sense of, assemble, and employ numeric information. Through analysis of interviews with politicians and public employees working with climate and energy policies in the Norwegian government administration, we identified three main categories of narratives of domesticating quantitative information: (1) Numeric engagements, (2) Uncertainty, and (3) Pragmatic information management. Employees in the administration articulated either of the two first categories, while politicians and political advisors performed the third. All interviewees highlighted the need for cautious and reflexive approaches to numeric information rather than enthusiastically embracing such information. In their decision-making, the policymakers appeared to be guided by numbers rather than steered by them.

Keywords: Energy, Climate, Policymaking, Quantification, Numeric information, Domestication

Introduction: Numeric governance

Numbers may be employed in governance and policymaking for many purposes, such as identifying directions of preferred social development, benchmarking such developments, and articulating specific targets. Policy documents often provide extensive quantitative information as a basis for decisions. For example, the latest Norwegian White Paper on climate mitigation (Ministry of

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Climate and Environment, 2021) contains 583 figures, on average, about 3 per page of text. The document uses descriptive statistics, modeling, and scenario work to describe the present situation regarding climate gas emissions and energy production and consumption and to present targets for reducing emissions, enhancing energy efficiency, and increasing the provision of renewable energy. Based on interviews, this paper analyses how Norwegian policymakers working with energy and climate issues account for their appropriation and use of such numeric information.

Many scholars have argued that numeric information dominates policymaking and shapes the conception of politics. For example, Blastland and Dilnot (2008: 1) claim that "Numbers saturate the news, politics, life. For good or ill, they are today's pre-eminent public language – and those who speak it rule". A widespread argument is that quantification practices have become too dominant and should be critically examined (e.g., Porter, 1995; Power, 1997; Muller, 2018; Mau, 2019; Rose, 1991; Strathern, 2000; Sætnan et al., 2011). Implicit in such claims is the belief that numbers have epistemic authority that may lead to uncritical employment in policymaking.

Asdal (2008, 2011) argues that statistics has been a central political technology in Norwegian debates about pollution because policymakers believe statistics provide relatively unbiased information. Thus, Norwegian politicians deciding on pollution regulations have relied mainly on quantification as an instrument of governance because, as Asdal concludes, numbers are associated with authority. Many other scholars observe how quantified information is often used to substantiate political choices when policymakers claim that they base decisions on information they consider as objective as possible due to assumptions about how quantified information is made (Porter, 1995; Power, 1997; 2003; Strathern, 2000). Experts are expected to produce numeric information in standardised ways, adhering to rules that are believed to constrain the influence of personal and subjective views. Porter refers to this practice as the pursuit of mechanical objectivity, noticing how such quantification efforts replace trust in people with trust in numbers. Desrosières (1998) also highlights the importance of numeric targets and the pervasive role of calculative practices in modern political culture. In his words, "they [the numbers] are inscribed in routinised practices that, by providing a stable and widely accepted language to give voice to the debate, help to establish the reality of the picture described" (Desrosières, 1998: 1).

Grek and Rinne (2011: 19) exemplify the claimed importance of numbers when they observe that the EU's "rapid change of policy discourses and practices" has moved from constructing a "European culture to a Europe governed by numbers". Other scholars have argued that the domain of governance has become numerically constituted and delineated and that counting is a way to define a problem and make it amendable to governmental action (Baele et al., 2017; Rose, 1991). Thus, from this perspective, governance is co-produced with numerical, policy-relevant information. The outcome is what Power (1997) calls 'the audit society', where public administration must convert 'everything' into numbers that they may use as a basis for policy decisions to make them auditable.

Thus, this line of research considers numeric measurements and estimates to be used to assess social developments and compare practices and situations. Several scholars argue that the consequences are problematic. Power (1997) and Muller (2018) claim that auditing tends to have unintended, dysfunctional effects on audited practices. Muller argues, "Unfortunately, the issue is not one of metrics versus judgment, but metrics as informing judgment, which includes knowing how much weight to give to metrics, recognising their characteristic distortions, and appreciating what can't be measured" (Muller, 2018: 183).

However, we cannot assess the effects of auditing and using quantitative information in policymaking primarily from the calculative practices involved. Instead, the features of such effects are an empirical issue. Moreover, we consider policymaking as a process rather than a particular decision. By investigating policymakers' use of quantitative information when dealing with energy and climate issues, we aim to contribute to understanding the complex processes of developing transition policies related to climate and energy. Köhler et al. (2019) and Sovacool

et al. (2020) have identified such knowledge as a pertinent need in sustainability transition research. The importance of investigating the use of numbers in sustainability transition policies is further indicated in the Norwegian context by the apparent inconsistency between the abovementioned White paper on climate mitigation and the Parliament's Standing Committee on Energy and the Environment's recommendations to the Parliament regarding the White paper (Innst. 325 S (2020-2021), Ch. 4). While the first, as we have seen, abounds with numeric information, the latter are nearly without any numbers. It mentions only three numeric goals among 148 recommendations. Why this striking difference?

Understanding the quantitative practices of policymaking

The increasing amount of quantitative information provided in policy contexts reflects the rise of the profession of economists as policy advisors and policymakers, although their role varies considerably across nations (Fourcade, 2009) and may even be mediated by local circumstances (Hirschman and Berman, 2914). In Norway, economists exercise strong discursive and practical influence on climate and energy policy (Sørensen, 2015). A simple measure of their impact in this policy area is the observation that the Ministry of Oil and Energy employs more economists than the Ministry of Finance. Cost-benefit analysis prevails, and concepts from economics are considered essential as a kind of pidgin used to communicate across professional assessments (Jomisko, 2015; Øvstebø Tvedten, 2022).

During the 1980s, many OECD countries moved towards the practice of so-called New Public Management (NPM), a reform where public management practices shifted towards 'accountingisation' (Power and Laughlin, 1992: 133). This reform meant the introduction of ever-more detailed cost categories into areas where cost previously was aggregated, pooled, or undefined (Hood, 1995). Another essential aspect of NPM is the emphasis on rankings and change indicators. This practice requires quantification of relevant governance features.

Often, numbers are granted a greater authority than more qualitative forms of knowledge (Espeland and Yung, 2019). Espeland and Stevens (2008: 414) describe numbers as "a key mechanism for the simplifying, classifying, comparing, and evaluating that is at the heart of disciplinary power". Numbers are often perceived as transparent, secure, well-funded, and credible (Demortain, 2019). When something is quantified, it appears to create trust, be easy to relate to, and provide a clear basis for action, although this may result from the considerable work of the involved actors (Daston and Galison, 1992; Desrosières, 1998; Porter, 1995; Power, 1997).

Furthermore, quantification is often presented as apolitical and persuasive (Bruno et al., 2016). Supiot (2015) claims that numbers have replaced law as the leading government technology. Rottenburg and Merry (2015: 7) argue that numeric representation in governance, first of all, consists of methodologies to achieve two primary political purposes: (1) to simplify complexity in order to come to a conclusion and be able to collaborate or act in the name of a collective, and, in doing so, (2) to demonstrate adherence to public responsibility and absence of personal or group bias. These attributes may make numbers attractive and enchanting to governance despite widespread academic critique that current quantification practices involve questionable gathering, interpretation, and use of quantitative information (Sætnan et al., 2011; Bruno et al., 2016; Mennicken and Espeland, 2019; Berman and Hirschman, 2018).

The reliance on numbers may shape governance practices. Baele et al. (2017) observe three distinct shaping features: persuasion, (de)politicisation, and standardisation. Such effects presume trust in, and authority of, quantitative information. Similarly, Muller (2018: 17-18) introduces the 'metric fixation' concept, which describes the increasing demand for performance measurements and output documentation. On the other hand, politicians may be accused of numeric incompetence (Blastland and Dilnot, 2008).

Moreover, policymakers may exercise considerable discretion in their use of numeric information. Mügge (2020: 14) argues that "Politicians are no hostages to economic data". Some previous

research supports this. In the Norwegian context, Næsje (2002) found that when the Parliament decided on a system for heat pump subsidies, the politicians dismissed economic calculations in favour of moral arguments. Deringer (2018), on the other hand, describes the authority of numbers as coming from the turmoil of politics and not from efforts to find objective truths that transcend politics.

Thus, there are diverging views about the actual impact of numeric information on policymaking. Some see numeric competence and the strategic interests of policymakers playing a role. Still, much previous research on quantification is influenced by post-Foucauldian approaches that emphasise the performativity or the discursive strength of numbers. We wanted to study practices and sensemaking of quantification in climate and energy policymaking without prior assumptions regarding the performativity of numbers. Thus, we wanted a theoretical approach that gave policymakers agency in their relationship with numeric information. These considerations led us to employ domestication theory (Berker et al., 2006; Hartman, 2023). This approach replaces linear thinking about effects and perceives users of scientific knowledge and information as actively making choices in their appropriation processes (Sørensen, Aune and Hatling, 2000). Domestication theory has been used to analyse the use of a wide variety of knowledge and technologies, including policymaking but, to a lesser degree, the employment of quantitative information (Ask and Sørensen, 2019; Haddon, 2011; Hartmann, 2023; Lagesen 2021; Sørensen et al., 2000; Sørensen, 2006). We see domestication theory as an appropriate tool of analysis since it invites us to study the impact of quantitative information on policymaking in a manner that highlights the agency of policymakers without making assumptions about the decisive forcefulness of numbers.

Instead, with domestication theory, we assume the processes of applying numeric information to policymaking to be situated, meaning that the issues at hand shape its application and interpretation. Further, the availability of alternative sources of information and the interaction between policymakers must be considered. Thus, emphasising situatedness invites observations of contingent outcomes and provides a generative framework to explore accounts of the extent to which and how quantification shapes and is entangled in climate and energy policy.

Drawing on actor-network theory (Latour, 2005), domestication may be described as the assembling of human and non-human elements, resulting in heterogeneous assemblages of practices, sensemaking, and cognitive aspects. This process entails making links to, for example, other artefacts, other practices, alternative sources of information, and other people, as well as engaging in interpretative and organisational efforts (Sørensen, 2006). Thus, when we apply domestication theory in our analysis, we implicitly inspired by actor-network theory.

Consequently, in this paper, we ask how policymakers in the climate and energy area describe (1) their use of numeric information, (2) the meaning they attribute to numbers assumed to be relevant for policymaking, (3) how they access numeric and non-numeric sources of information, and (4) their understanding and assessment of such information. We also consider the possibility that domestication is unsuccessful because numeric information is misunderstood or discarded. The paper's primary concern is to explore what place numeric information has in assembling climate and energy policy decisions.

Method

To study how policymakers addressing climate and energy issues domesticate numeric information, we chose a qualitative approach mainly based on interviews but supplemented with analysis of a few reports produced in the policymaking processes. (We refer to them when they are used). The interviews provided data about how policymakers reasoned around their engagement with quantified input, assessed quantitative information compared to qualitative alternatives, received and gathered information, and how issues and context might influence policymaking. We did not ask them about specific cases, but often, the interviewees would exemplify their practices by referring to particular decisions. A few mentioned the Norwegian White Paper on climate mitigation (Ministry of Climate and Environment,

2021), but the examples varied greatly. Thus, we could not focus on a single policy issue. We used documents, mainly reports made by the Standing Committee on Energy and the Environment to the Parliament, as a backdrop to the analysis of the interviews.

We define policymakers to be politicians and their advisors, but we have also included employees in ministries and directorates in this category. The latter group may not make the final decisions, but they provide suggestions for policies, background information, and assessments of the effects of policy measures. The first author conducted 20 semi-structured, in-depth interviews with these groups of policymakers. She interviewed six politicians. One was a former Minister of Oil and Energy, and five were Members of Parliament (MP) with a seat in the Standing Committee of Energy and the Environment. These five constituted almost 1/3 of the committee. Three political advisors to MPs were also interviewed. The remaining 11 interviewees worked in the Ministries of Oil and Energy, Climate and Environment, and their subordinate directorates. The interviewed politicians represented The Green Party, The Progress Party, The Conservative Party, The Christian Democratic Party, The Socialist Left Party, The Labour Party, and The Liberal Party, thus covering the whole spectrum of Norwegian politics.

The context of the study is Norway, which is often described as an 'energy nation' by policymakers due to the great economic importance of energy production. Norway is a significant oil exporter and the world's third-largest exporter of natural gas. Hydroelectric power is the backbone of the country's energy-intensive industry (Ryghaug and Skjølsvold, 2013). Hence, energy issues and climate mitigation get much political attention.

The first author undertook the interviews between June 2016 and February 2018. Fourteen interviews were done in person, lasting 45-90 minutes, while the remaining six were conducted by telephone, with calls lasting between 25 and 45 minutes. Interviewing policymakers raises challenges with access, mainly because they are busy and usually must be reached through a secretary (Undheim, 2003). Occasionally, this made interviewing by telephone the only option. Telephone interviews have been considered as not providing 'sufficiently rich' data. Other well-known concerns are the lack of non-verbal communication and the possibility of capturing diversity (Tjora, 2021). Still, we found that the telephone interviews provided informative and expressive conversations, in line with Christmann (2009).

The interviews followed a flexible interview guide. We asked the interviewees what kind of knowledge they considered to have the most impact and was most persuasive, including how they considered, understood, assessed, and used numeric information. Further, we inquired about their sources of information and to what extent they trusted the sources. All interviews were recorded and later transcribed verbatim by the first author. The authors have translated the quotes used in the paper into English. All interviewees have been anonymised and are referred to by abbreviations. We call the politicians P1-P6, the political advisors PA1-PA3, the employees in ministries M1-M3, and those working in directorates D1-D8.

Given the pervasive use of numbers in policy documents addressing these issues and the relative transparency of governance in Norway, we expected the interviewees to be able and willing to reflect on the role of quantification in their policymaking. This expectation was met. The interviewees were quite open about their practices related to policymaking, including how they appropriated and assessed both quantitative and qualitative information. They described to us the formal system of provision of information and the supplementary informal ones.

When analysing the interviews, we found considerable diversity among the interviewees in their accounts of practices, forms of sensemaking, and learning strategies of numeric information. However, after closer examination, similarities appeared. We used thematic narrative analysis, where content is the exclusive focus, and the primary attention is directed at *what* is said rather than how and to whom (Riessman, 2008). We concentrated on what was said about quantification and the domestication of numeric information, sorting this by categorising statements into the three domestication aspects: practice, sense-

making, and cognitive issues. We identified three main narratives regarding the domestication of quantitative information. In the next section, we briefly introduce the three narrative categories. We then explain each of them in some detail before making some concluding remarks on how policymakers in the energy and climate field domesticate numeric information when crafting energy transition policies.

This article presents a case study of how quantitative information is domesticated in the context of climate and energy policymaking in Norway. This context is specific, so may there be broader implications? First, the numeric information provided in the relevant Norwegian policy documents appears to fall within the same categories we find with the IEA and many other countries; thus, it is not specific to Norway. Moreover, the interviewees repeatedly mentioned the IEA and the EU as essential sources of information, and some also said they were closely following developments in other countries. Second, several of the interviewed politicians had experience from other policymaking areas. The only area they described as different from climate and energy concerning the role of numeric information was financial policy, which they considered much more quantified. Still, any generalisation of our findings must be done carefully, but we assume the processes may also be observed in other contexts.

Narratives about the domestication of numeric information in climate and energy policymaking

The interviewees described climate and energy policymaking as situated in a comprehensive and complex information ecology characterised by rich formal and informal input flows. They had to navigate these flows, but there were few complaints besides mentions of time constraints. Numeric information appeared in writing or orally. The interviewees did not emphasise such differences in material form, but written sources were the most frequently mentioned. They also commonly referred to qualitative forms of information. When we asked about their assessment of the information quality, a striking feature was a high level of trust in both numbers and narratives. This observation reflects that trust is an inherent quality of Norwegian governance and politics.

The exchange of information between the groups of actors we interviewed was shaped by the formal structure of their information ecology, with the Standing Committee of Energy and the Environment (SCEE) as the central climate and energy policymaking arena. The committee was the endpoint of the formal information flow. Its task is to provide recommendations to the Parliament for final policy decisions regarding energy and the environment, which includes climate issues. Some recommendations may be unanimous, while others are supported by a majority or a minority of the committee.

The committee has two primary sources of formal input to its deliberations. One is proposals from Members of Parliament. The other and the most prominent is the Government, chiefly the Ministry of Climate and Environment and the Ministry of Oil and Gas. They supply Green papers, White papers, legal propositions, and other printed material. In addition, the committee members said they collected information independent of the administration, for example, through visits to relevant companies, research institutes, and universities.

The main tasks of the interviewed ministry employees were to collect and review information, contribute to White papers and reports to politicians, and communicate with politicians and the public. They collected information from many sources. They received or asked for input from the subordinate directorates while commissioning consulting companies and acquiring information from other external actors, such as Statistics Norway, the Research Council of Norway, IEA, research institutes, and environmental non-governmental organisations (ENGOs).

The interviewees from the directorates also collected and reviewed information, but many also engaged in calculations, often using economic or techno-economic models. Thus, they worked intimately with numeric material, more than the ministry employees. However, their primary sources of input were more limited. Statistics Norway was the leading supplier, but they also collaborated with research institutes and commissioned consulting companies. Occasionally, they

collected data themselves. The directorates served the two ministries mainly with quantitative information.

As previously noticed, research about the role of numbers in the governance of modern societies suggests that a vital aim is to invoke trust (e.g., Porter, 1995; Daston and Galison, 1992) but also that there are good reasons to approach the role of quantification in government critically. Further, this research emphasises how processes of quantification have increasingly become pervasive. The quantification of climate and energy issues in the Norwegian context is striking, easily verified from any White or Green paper addressing such concerns. The pervasiveness of quantification was also evident from the interviewees' accounts. They mentioned a variety of numeric climate and energy policymaking inputs. These inputs included descriptions of the present situation or historical developments in energy production and CO_2 emissions, model-based predictions of future changes, output from climate and weather models, cost assessments of policy instruments such as incentives, and calculations of the impacts of policy measures. Targets could also be numeric (Jørgensen and Sørensen, 2022).

In particular, the interviewees from the directorates accentuated quantification, which they considered vital. For example, D1 explained the importance of being exact.

> When we advise the cabinet minister and the Ministry, numbers and facts are essential because they [the Ministry] must have clear documentation when discussing with other ministries and balancing the concerns regarding oil and energy policy, financial policy, or other stuff.

Still, numbers did not reign supreme. The directorates and ministries interviewees said that politicians often needed stories when explaining policies. In addition, their understanding of how policy instruments worked required other forms of knowledge.

> Numbers are interesting in themselves … but much of what we collect is knowledge about how companies' decisions look, how they affect the diverse ways of organising policy instruments, how this influences the incentives (…). [I]t is as much that 'how question' we are interested in.

Similarly, M3 reflected that:

> [O]f course, we are concerned with numbers … the whole building is engaged with describing the effects of various forms of policy, and that does not have to be only numbers. It may be numbers but also descriptions of mechanisms and relationships, which may be pretty complex within climate politics.

In addition, the interviewees from the ministries and directorates explained that politicians might ask for stories they could use for more effective communication. D6 added that:

> [W]hen you move upwards [in the decision-making system], it is – like, what did I want to say – more general views than numbers that determine the decisions.

While they spent much time and energy dealing with quantitative information and appreciated the quantification of climate and energy issues, these interviewees had a level-headed relationship with the numbers they provided. They also valued qualitative knowledge and were careful not to reduce its importance. This moderation was expressed in two categories of narratives. Narrative 1, which we call *Numerical engagements*, was a mundane report about quantitative practices and the meaning given to numbers. Narrative 2 we call *Uncertainty*. It was an account of risks concerning the accuracy of numbers, how their sensemaking led to concerns about uncertainties, and their practices in dealing with this. Interviewees from the directorates offered Narrative 1, while the interviewees from the two ministries and some from the directorates articulated Narrative 2. The two narratives were not mutually exclusive, meaning that some interviewees offered both.

The interviewed politicians and political advisors articulated a third narrative, *Pragmatic information management*. This narrative described a practical domestication of information, emphasising the context of decision-making practices, the relevance of the available information, and the need to employ sources beyond the formal input

from the two ministries and the three directorates. When inquired about the impact of numbers and statistics on policymaking, P2 plainly stated, "I've yet to experience that it is [such facts] that tilt a case [political decisions]."

Moreover, the recommendations from the SCEE and the subsequent decisions that the Parliament makes are usually verbal and non-numeric. If we return to the previously mentioned Climate mitigation plan (Ministry of Climate and the Environment 2021), typical decisions were 'The Parliament asks the government to determine that increased taxation of Norwegian production of meat should not be implemented as a part of the climate policy' (Decision 791) and 'The Parliament asks the government to ensure the development of a general infrastructure for zero- and low-emission vehicles' (Decision 792).[1]

This writing of recommendations does not imply that the politicians considered quantitative information unimportant. However, we found the impact of numeric information challenging to trace through the series of official documents. When we compare the White paper presenting the Climate mitigation plan, the report about the plan made by the Standing Committee, and the recommendations in the report (Innst. 325 S (2020-2021), Ch. 4), we see a radical decline in the use of quantitative information from a lot to a little to nothing. This reduction could mean that numbers have been transformed into qualitative statements, but the interviewees were unclear to what extent this happened. However, the decline resonates well with the pervasive pragmatism of Narrative 3. Also, Narratives 1 and 2 had, as we shall see, a pragmatic flavour but less pervasive and prominent than Narrative 3.

In the following, we describe the three narratives in greater detail. We begin with Numerical engagements.

Presenting the narratives

Narrative 1: Numerical engagements

The accounts of the domestication of quantitative information that constituted Narrative 1 were shaped by the prevailing calculative practices that reflected the profound quantification of the climate and energy area. This quantification reflected an audit culture where targets tended to be formulated quantitatively, and achievements were measured through indicators and statistics (cf. Jørgensen and Sørensen, 2022). The calculation practices varied but could include the use of models, the collection and reviewing of data, and the communication of results. D4 described his and colleagues' work as 'knowledge refinement', involving synthesis, assessment of the knowledge status, and policy advice.

All the interviewees from the directorates had higher education, mainly with degrees in economics and engineering. Thus, they were trained in the use of numbers. Their task was to provide relevant and reliable information about climate and energy issues to the policymaking process, such as statistical overviews of CO_2 emissions and the production of energy, projections of future energy demand, and assessments of relevant policy instruments, for example, through cost-benefit analysis. Their role could also be to inform about the ongoing work of and recommendations from The Intergovernmental Panel on Climate Change (IPCC). A primary task was the quantitative assessment of target attainment.

The processes of sensemaking reflected the pervasive engagement with numeric information. Most interviewees contributing to Narrative 1 described their sensemaking as mundane and focused on the interpretation and trustworthiness of the information. D3 referred to her directorate's communication strategy. "If you get an enquiry from the news media, you need to be very certain before saying anything. So, a culture of caution has developed." D7 related that what is good data, "ultimately, that is a discretionary assessment." D8 was one of the few who made a general statement describing numbers as necessary and valuable.

When saying this, D8 referred to his and his colleagues' practices related to developing and managing programmes to support the development of new renewable energy and energy efficiency, as well as assessing and reporting the achievements of the programmes. The Ministry "owning" the directorate preferred to set numeric targets. D8 attributed this to their assumed disciplining effect for achieving results. "Politicians and the Ministry would like us to produce results.

And it happens to be like this in the bureaucracy. Results that can be measured can be presented as facts". Thus, he meant that politicians preferred figures over more qualitative information due to the assumed precision, order, and stability of the former. This preference shaped the directorate's domestication of numeric information, making quantification and calculation central practices. For example, numeric targets required the production of adequate indicators of efforts and outcomes to allow auditing, helping them to observe how close they were to reaching their targets. As D8 put it, "Numbers are important; they give us a sense of speed".

D7 also emphasised the importance of quantifying targets as much as possible but assessed by a combination of qualitative and quantitative indicators. This auditing practice was the basis of negotiations with the Ministry and embedded in the current energy policy. He concluded that this situation exemplified that numeric information "if not steering policy, so at least it's considered in the policy development". Further, D7 observed the directorate's obligation to perform parts of the energy policy. One aim was to make the present use of subsidies superfluous. Such qualitative goals tended to result in quantitative targets. "In reality, we are supposed to reduce market barriers. And that is a qualitative goal, but to have control and the proper focus, one tends to make related quantitative targets."

Thus, qualitative goals were pursued through metrification. Metrification describes the process where qualitative judgement is replaced by numbers (Lorenz, 2014; Saltelli, 2020). However, D8 pointed to a counteracting tendency. "There is a development [in the directorate] where we try to understand the world with other kinds of data than just quantitative data (…). Those who are the target groups of our programmes are actors in some context, in a market, and then you want to try to understand, not just counting but understanding what drives these actors."

He added that much of their policymaking was far more complicated than could be described using numeric information only. "Even if you've got numeric information and you make forecasts when you've access to time series that point in a specific direction and predict a future, things will happen and change these forecasts very often. If there's one thing economists need to understand, or at least should understand, it's that history shows that predicting the future is very difficult." Thus, the sensemaking resulted in some caution regarding the quality and accuracy of numeric information. For example, several interviewees complained about surveys with poor data selection, small samples, and too fragmented presentation.

An instrumental relationship to numeric information was widespread. The interviewees described numbers as an essential ingredient of their work, but the cautious domestication with a critical view of trustworthiness displayed little affective engagement. Only a few interviewees provided affective responses. For example, D5 emphasised that ambitious targets made him, and his colleagues work hard: "Then you work in a way to achieve it [the target], and sometimes we don't make it, but if you set a significantly lower target that's easier to reach, you only slow down the pace".

Affect was also evident from D5's comment that one should not "underestimate the importance of captivating numbers". Ambitious targets were considered appealing and to inspire people to keep up the work pace, trying to drive them. Thus, to some, numeric targets could be effective motivators. They articulated both an instrumental and affective relationship to numbers but no strong affection.

Regarding the cognitive aspect of domestication, in Narrative 1, there was little mention of the learning processes related to numeric information beyond the information gathering. However, the widespread critical acknowledgement of inaccuracies indicated that this aspect of domestication also included reservations regarding its importance and trustworthiness. Narrative 1 included statements suggesting a nuanced understanding of numbers' limited generalisability and uncertainty. Numeric targets were decided top-down, and the narrative reflected a felt need to identify with them despite statements suggesting a more cautious sensemaking, emphasising the uncertainties of some of the estimated quantitative measures.

The information collection was essential in cognitive domestication, as articulated in Narrative 1. The directorates used many sources. Statistics Norway appeared as an essential supplier, but research institutes and consulting companies were frequently approached. When inquired about quality criteria, the interviewees tended to be vague, but some sources were considered more trustworthy and relevant than others. The Norwegian research scene was described as small and surveyable. "We regularly use pretty much all of them" (D4). According to D5, "So you want to employ recognised institutions, I would say. You don't shop completely random numbers, no."

Narrative 2: Uncertainty

The Uncertainty narrative was partly present in the Numerical engagement narrative in the mention of inaccuracies. Still, it is worthy of a separate analysis since it articulates a distinct domestication of quantitative information. The primary practices described in this narrative were reliability assessments and communication with politicians and the public. These practices were closely related to the reviewing and assembling of numeric information. The Uncertainty narrative were articulated by interviewees from the two ministries and the directorates, often in tandem with Numerical engagement narratives.

The emphasis on uncertainty was sometimes related to an uneasiness about the persuasive quality of numbers and the simplifications that often occurred when such information moved upwards in the system. D2 explained that "no matter how much we write about the uncertainty of [our analysis], one risks that it disappears a bit when it is filtered upwards, and one shall render the short version." Similarly, M1 worried that numbers would be taken at face value and used uncritically. She said quantitative information was often employed without reading the reservations and understanding the calculations' underlying assumptions:

> "(I)t's very attractive to be able to quantify stuff. So then …. we have a number, but it is uncertain (…). So that is the challenge with numbers, that they quickly live their own lives. I guess it is a human trait – that we love numbers. So, regardless of how much you say about how uncertain it is, it does not quite go all the way in."

D6 added to the Uncertainty narrative by reflecting on the dangers of thinking that some people believed they could find exact answers:

> "[I]n any case, when one engages in looking forward, there is a considerable uncertainty, so it is just knowing that it is uncertain, and how uncertain it is, that is vital (…). You may readily use the exact number, but one should, like, be at least as concerned about how large that uncertainty is (…). But many are looking for the one correct answer, and then you start shopping by the numbers and underestimate the uncertainty on the way because you are looking for the one correct answer and the arguments supporting it. And this is a general problem".

He also introduced another element, the costs related to obtaining high-quality data, and complained that too little time was spent on data collection:

> "Well, we certainly say that there is no problem. There are a lot of model calculations both regarding energy and climate, a lot of models, a lot of people who sit and calculate stuff, but all from the same poor data, which doesn't make it any better (…). But instrumentation, reporting, and validation of numbers cost a lot of money. Thus, it is often renounced."

Like D3, he was worried that uncertainties tended to be overlooked in the subsequent stages of policy development. Such ignoring resonated with M1's account. She invoked the Uncertainty narrative when she talked about providing input to politicians while striving to be precise without complicating the communication. She considered this challenging because of the complexity of the current climate and energy policy. M1 used IPCC reports as an example to emphasise that "uncertainty is one of the complexities, and it is very challenging when you are going to describe it in three sentences".

Thus, M1 made sense of numeric information as a necessary input to policymaking and a communication tool. She saw quantitative information as essential and persuasive numbers as an asset in

internal policy processes but was more hesitant regarding external audiences. "Well, numbers are valuable information, but the downside to numbers is that they often are perceived as much more correct than more qualitative information when this is not necessarily correct (…). So, it is, like, always a challenge to communicate the uncertainty around the figures". In this manner, M1 articulated an essential feature of Narrative 2, the understanding that numbers should be carefully interpreted by considering the assumption underlying calculations and the uncertainties involved.

M3 gave this emphasis on careful interpretation a particular twist, explaining that there could be disagreements about what kind of information could be considered facts. "Sometimes, we doubt the quality of the foundation of what is presented (…). It may happen that the Ministry disagrees with this or that factual basis, that we think that it doesn't maintain quality or that it in other ways is not good enough". Consequently, the ministries and the directorates could negotiate the interpretation of information.

In such ways, the Uncertainty narrative articulated an ambivalent view of numbers. Numeric information was vital but also uncertain. The quality of measurements and calculations could be challenged, and their implications negotiated. Moreover, the interviewees considered numbers persuasive, sometimes overly, which could lead to too much trust when such information moved upwards in the policymaking chain.

Regarding the cognitive aspect of domestication, there was much similarity between the Uncertainty narrative and the narrative of Numerical engagement. Information was collected from an impressively wide variety of sources, but not without differentiation. M1 said with an ironic twist, "Like I said, the IEA is always a useful source. If it is an occasional news service, it ranks much lower. Of course, environmental organisations, for example, also produce some quantitative information, and that is also something we read and relate to, but in a way, we would rather quote the IEA than Greenpeace".

Narrative 3: Pragmatic management of information

This narrative is based on the accounts of the politicians and the political advisors of how they domesticated numeric information or information more broadly. Their numeric practices were different from the other interviewees. They did not engage in calculations but reviewed quantitative and qualitative information to decide on policies and to explain them. The latter meant that communication was essential, above all in meetings with diverse groups of actors.

M3 mentioned several examples of policy practices, often related to the assessment of existing or planned policy instruments. One case was network tariffs, with which he had engaged on his initiative. "In my home county, this is a matter of great importance to very, very many. Here, I have needed to spend quite a lot of time to learn how the transmission network is connected to the distribution network, what lies behind existing efficiency measurements, and similar stuff". In this instance, he was working with hybrid information, some numeric, some more qualitative such as descriptions of technical and topographic matters or issues related to fairness. In another case, numbers were the predominant input. "Right now, we are engaged with the climate strategy for the sector that is not subject to [CO_2] quotas (…). In reality, it is a kind of budget, a climate budget for our country and how we shall reach the targets compared to the EU (…). Here, there are a lot of numbers. We use them."

The Standing Committee's prime activity was responding to documents from the Government. PA1 talked about the previously mentioned White paper on climate strategies (Ministry of Climate and the Environment 2021) as a current concern and observed that "this is a valuable document reference-wise for us because it describes a lot of facts about the status of the climate efforts (…). It already contains a lot of knowledge, but then we shall continue to work to bring our politics into this". He mentioned the party programme as essential, but it was also necessary to collect views externally by consulting with trade unions and ENGOs. The White paper provided numeric information, which they complemented with qualitative input. In Narrative 3, the domestication

of numbers was entangled in a comprehensive domestication of many categories of information, which was shaped by an understanding of what it meant to be a politician. As P2 explained, "To be a politician isn't about being a professional. It isn't a prerequisite to be into the details when you're a politician. What is important is to see the whole picture."

PA3 related that most of the information they collected was qualitative because "Numbers and statistics are often explained in White papers and such. They come with a lot of factual information, so then one has to supplement with the knowledge that one feels the White paper does not illuminate." He added that he preferred text over tables; he felt that text made it easier to see the more significant connections.

The cognitive aspect of domesticating information through collecting input through meetings was an essential and time-consuming practice. P1 said representatives of diverse interest groups frequently approached them to lobby the politicians. He did not see this as a problem. On the contrary, P1 exclaimed, "I love lobbyists! They are extremely useful, very rarely they come with tricks, very seldom they are bought and have sleek suits and such. Most of them are experts themselves from some interest group, and they are completely open about their interests". A vital quality of the lobbyists, according to P1, was that they knew that politicians needed solutions. P4 also appreciated how affected actors were open about their opinions and standpoints.

Similarly, P3 pointed to the impact of concrete case studies regularly provided by companies or associations. Often, they offered numeric information about the economic consequences of policy proposals. P3 mentioned as an example an ongoing discussion about a change in the CO_2 tax regime. In this case, he and others had received calculations that showed how the proposed change might make replacing oil with natural gas much less attractive. He perceived this potential effect as a weakness. In general, P3 found statistical information particularly influential, more so than most of the other interviewed politicians and political advisors. For example, P4 emphasised that the effect of numerical information depended on the issue. "It's very case dependent!"

P3 described the political advisors as an essential source of knowledge: "My acquisition of knowledge is intricately linked to their knowledge and their contacts. They [the political advisors] are employed because they are professionally solid in one area". However, he also emphasised that ENGOs, industrial associations, and companies regularly offered him information. This situation made him "become a recipient or the one who does not access [information] but the one who is accessed". The Standing Committee occasionally went on field trips to meet with industry or research communities to be informed and get a more hands-on feeling of the situation. P3 and all the other politicians described such field trips and meetings with relevant actors and organisations as providing essential input.

Thus, the politicians and political advisors' domestication of both quantitative and qualitative information was based on rhizomic learning, a non-linear, non-hierarchical engagement (Unander and Sørensen, 2020). They used a wide range of sources without clearly ranking them in terms of relevance or reliability. The rhizomic learning was a defining feature of the Pragmatic management of information. This approach owed to the nature of their tasks. Bluntly stated; they needed information to make policy. The politicians gathered information by combining sources, and they described helpful information in generic terms, such as short, relevant, and correct.

This practice reflected the time pressure to which the politicians often referred. For example, P3 mentioned previous White papers and the state budget as valuable sources of information. However, when asked if he had time to read such documents, he quickly responded, "No, no, no, very, very, very little. It's like surplus work if I get restless on the weekends".

To sum up, the Pragmatic management of information narrative describes the domestication of information as shaped by assessing its usefulness in a given context of political concerns and available alternative sources of knowledge. The quantification of the climate and energy policy area was appreciated, but all the interviewees articulating Narrative 3 also emphasised the need to acquire qualitative information. The ensuing sensemaking would result in use or non-use of the

information in policymaking. Cognitive domestication was characterised by rhizomic learning, which is consonant with the pragmatism they conveyed.

Conclusion: Cautious domestication of numbers in an audit-oriented policy culture

As we saw in the introduction, many scholars are concerned about the growing impact of numeric information in policymaking. Porter (1995) formulates this belief succinctly when he argues that trust in people has been replaced by trust in numbers. From this point of view, we would expect that the comprehensive quantification of climate and energy issues evident from White papers and other government documents would steer policymaking. The domestication of information should reflect a strong confidence in the provided numbers. Our study provides a more nuanced and complex picture.

The three narratives, Numerical engagement, Uncertainty, and Pragmatic management of information, describe a fascinating and complex ecology of numeric information in climate and energy policymaking. The interviewees explained the Standing Committee of Energy and the Environment as the centrepiece of the ecology since this committee would assemble, synthesise, and assess the flows of information supplied by the efforts of the ministries and the directorates. In addition, the interviewed politicians also acquired information from other actors and sources. Thus, when we look at the accounts of how information flowed, the ecology appears quite open and penetrable as it feeds pragmatically on diverse categories of input from a comprehensive range of sources. The pragmatic assessments and choices made by the politicians reflected their purpose: climate and energy policymaking.

Buck (2021, 55) criticises "the contemporary obsession with metrification, accounting, and modelling" in the climate field, which she claims may lead to misguided policymaking. None of our interviewees even hinted at such problems. In all three narratives, the quantification and metrification of climate and energy issues appeared pervasive but also accepted as a matter of fact without explicit criticism. This lack of critique fits the observation that the interviewees' accounts did not reflect any tyranny of metrics in the sense of Muller (2018) and no articulated experience of pressure to base policymaking strictly on numbers. Instead, they related a cautious domestication of numeric information, where qualitative input was sometimes more important. Even the interviewees who worked with calculations, articulating Narrative 1, Numeric engagement, emphasised that qualitative knowledge could be required, for example, when explaining behaviour or the effects of policies on companies' decision-making.

The interviewees described their domestication of the provided numeric information in ways that reflected trust. However, this trust came with modifications. Narrative 2, Uncertainty, expressed the qualifications most clearly as the need to be concerned with errors of measurements and the assumptions and the simplifications underlying model calculations. The interviewees emphasised the uncertainties of performance measurements and the incidental emergence of many numeric targets. Moreover, some interviewees expressed worries that politicians and the public did not take the uncertainties sufficiently seriously. Several complained that there was too much trust in numbers, and they said that they made considerable efforts to emphasise the contingencies of the policy-related numbers that they shared with politicians.

Moreover, both Narratives 1 and 2 showed that trust in numbers was related to trust in people and institutions. These interviewees were not indifferent to the origin of the numeric information, and trust had to be achieved. Thus, we do not see unreflexive assumptions about mechanical objectivity (Porter, 1995) in the information ecology of climate and energy policymaking.

The issue of trust was also present in Narrative 3, Pragmatic management of information, but without modifications related to uncertainties and errors of measurement. The politicians and political advisors accepted the numeric information the ministries and directorates provided. However, they said they put equal trust in actors from industry and interest organisations such as ENGOs. These interviewees explained that they assessed information based on its relevance

to their policymaking. The pragmatism of their domestication implied a right to balance the diverse categories of information while claiming to be concerned with appreciating "the larger picture", including party politics. The outcome depended on the issues at hand. Numeric information could be considered essential and decisive, for example, when engaging with the number of accidents in offshore oil and gas explorations, but not in discussions about opening new oil fields. In the latter case, value-based arguments had a greater impact.

The application of domestication theory proved helpful in developing the three narratives, as it asks for a focus that combines an emphasis on practice, sensemaking, and learning. A primary assumption is that actors have the agency to engage in a contingent manner with artefacts or knowledge, in our case, numeric information. This belief fitted our observation of the varied practices of working with numeric information, from reviewing and calculating targets and policy measures to assessing uncertainties in the available knowledge to deciding policies based on pragmatic management of many sources of information. Narrative 1 emphasised the existence of an audit culture where most targets were formulated numerically, and their attainment was evaluated based on metrification, resulting in indicators and measurement. However, this audit culture was not articulated in the two other narratives and was not mentioned by all the interviewees who offered Narrative 1.

Further, the sensemaking of quantitative information was also diverse. Narratives 1 and 2 highlighted positive aspects of quantification while acknowledging uncertainties and the need to include qualitative information. However, some interviewees emphasised uncertainties and possible errors of measurement. A few displayed an affective relation with numbers, while others considered quantification trivial. In Narrative 3, sensemaking was more ambiguous. The politicians appreciated the widespread quantification of climate and energy issues as valuable but in a contingent manner that often rendered the effects of numbers opaque. For example, we saw that policy recommendations tended to be articulated without using numbers. Overall, the sensemaking accounts in Narrative 3 displayed caution. None of these interviewees related to numeric information as singularly authoritative or in an unequivocally enthusiastic manner. However, on the other hand, nobody dismissed such information as untrustworthy or problematic.

We linked learning, the cognitive aspect of domestication, to information gathering since the interviews did not bring forward other forms of learning. We heard only a few complaints that numbers were difficult to understand. A striking feature of all three narratives was the many sources that could be used. Narrative 3 described the most intriguing and complex gathering process, which we described as rhizomic learning (Unander and Sørensen, 2020). This process was characterised by a lack of ranking of the sources and pragmatic use of information. The transfer of numeric information from the government administration to politicians, supposedly their dominant source of such information, was not linear but involved interpretation, negotiation, juxtaposition of numbers from other sources, and the inclusion of qualitative input that could be decisive (see, e.g., Næsje, 2002 for an illuminating case where moral arguments led to a disregard of numeric information in the Parliaments' decision-making).

As mentioned, we chose domestication theory to guide our analysis because it allows a critical assessment of the frequently assumed performativity of numbers by emphasising the agency of users (in our case, policymakers) and focusing on the details of policymaking. Our findings demonstrate that the performativity is limited. Thus, we should not overestimate the discursive strength of numbers as input to climate and energy policymaking. This claim is supported by observations of scientists and other experts saying that they need to engage in numeric work to persuade policymakers to engage with the quantitative information they supply. Numeric work means explaining the basis and relevance of such information (Jørgensen and Sørensen, 2023). Definitively, the interviewees considered quantification essential, but their engagement with numbers was more reflexive than suggested in much previous research. The predominant strategy of domestication of numeric information was careful and

pensive, acknowledging the diversity and possible inconsistency of sources and the potential importance of qualitative input. Thus, policymaking concerning climate and energy issues in Norway is guided but not always decided by numbers.

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