What's the magic word? What we talk about when we talk about energy efficiency

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Abstract

Energy efficiency has become an integrated and common concept both in modern language and public discourse, and central for policies directed to mitigate climate change as well as competitiveness. Yet definitions and effects of energy efficiency and reduction is still an ongoing debate within academic discourse. This article investigate how industrial energy efficiency is framed and features in media narratives. Media discourses both reflect and shape public opinion and essentially the political sphere, calling for an improved understanding of how energy efficiency features in public discourse. The paper is based on a media analysis of 309 articles featuring "industrial energy efficiency" in a selection of Norwegian newspapers in the period between 2013–2017. We find numerous different framings of energy efficiency in the articles, where the authors draw on various notions of relative and absolute reduction in consumption, indicators and diffuse system and temporal boundaries. Even more common is the tendency to frame energy efficiency generically without explicit or implicit assumptions about reduction in consumption. The analysis show that energy efficiency is rarely an object of contention or controversy and often not even the topic of the articles itself. Rather it figures in arguments within narratives of climate change mitigation and economic stability and growth. The paper outlines the underlying structures of how energy efficiency serves as a legitimizing concept in these narratives, as well as ammunition on both sides of heated controversies regarding development of renewable wind or hydro-parks, transmission lines and oil & gas industry. The combination of a multitude of framings and generically use of the concept essentially allows a black-boxing of the relationship between energy efficiency and reduction. Consequently, the concept of energy efficiency features in the discourse as a magic word, where the prospects of fixing both the climate and the economy makes it suitable to legitimize almost every thinkable argument within narratives of transition.

Introduction

Energy efficiency is a magic word that seems to fix two of the greatest concerns of our time; the climate and the economy. In this article we analyse how this is articulated in Norwegian news articles, who leads what argument and what controversies they are associated with. By this we argue that it works because the concept is blackboxed, and that the magic lasts as long as its true meaning(s) is not revealed.

The prospects of linking climate change mitigation with industrial growth has made energy efficiency policies an attractive choice for policy makers. With the slogan "Putting Energy Efficiency First" the European Commission launched the revised Energy Efficiency Directive (EED) in 2016, proposing a binding EU-wide target at 30 % (European Commission 2016). While the EED is a part of the EC Energy Packages it states explicitly that the "clean energy transition is key for the current European strategy for jobs and growth" (European Commission 2016). The attractiveness for energy efficiency as a climate mitigation measure is regarded as especially important in regions where power production is based on fossil energy sources. However, even in Norway where 98 % of electricity use is based on hydro-

electric power, energy efficiency is regarded as a key governmental strategy for climate change mitigation. The EED has not been implemented in Norway, yet energy efficiency is still high on the agenda of policy makers with significant funding for industry projects and private energy efficiency measures through the Norwegian state enterprise for energy efficiency (Enova), R&D projects and energy policies and building regulations.

While the political sphere embrace energy efficiency policies, definitions and measurements of energy efficiency as well as its effects as a climate change mitigation strategy is still an ongoing debate within academic discourse (i.e. Patterson 1996, Shove 2018, Lutzenhiser 2014). A mass of different indicators and interrelated concepts have emerged such as energy intensity, exergy measurements, net energy and absolute energy reductions in order to more precisely describe and measure the effects of different facets of energy reduction efforts (Erbach 2015). Also, studies of re-bound effects (Herring 2006) as well as more fundamental critique of energy efficiency policies ability to address energy demand (Shove 2018) have raised the discussion of the appropriateness of the climate change mitigating aspects of energy efficiency moving the academic debate towards studying sufficiency (i.e. Darby & Fawcett 2018). In parallel energy efficiency has become an integrated concept in modern language and public discourse, featuring as a solution to both economic growth and climate change in government documents and media narratives. Energy efficiency functions in the discourse as a non-specified construction holding a number of different references from relative efficiency to absolute energy reduction (sufficiency). Thus, this paper aims to explore how energy efficiency and interrelated concepts feature in media narratives and ask a trite but nevertheless important question; what do we talk about when we talk about energy efficiency?

We base our arguments on an analysis of the Norwegian media discourse on industrial energy efficiency. Understanding media discourses on energy efficiency is important since they both reflect and shape public opinion as well as governmental policy. Media coverage and public opinion may influence politicians and regulatory authorities, impacting on the industry's framework conditions as conditioned by a supportive governance system (Røyrvik, Olsen, and Aasen 2012; Olsen and Osmundsen 2017). Our data set is based on 309 newspaper articles between 2013–2017 containing the main search words "industry" and "energy efficiency". While our analysis is based on a quantitative material, the main focus of this paper is a qualitative analysis. The article poses three research questions. First, how does the concept industrial energy efficiency (and/or interrelated concepts) feature in the Norwegian media discourse? Second, which narratives and controversies are they a part of? Third, how does energy efficiency function within the argumentation of these narratives and controversies? Studying the function of energy efficiency here refers to what the concept does in the text – what it achieves, triggers and performs (Bye, Rosness, and Røyrvik 2016). In other words, we are interested in investigate both how energy efficiency is *framed* as well as how it *functions* within the *frames* in which it occurs.

NORWEGIAN CONTEXT ON ENERGY EFFICIENCY

Although the findings from this media analysis are relevant for other European countries, there are some contextual factors and nation-specific conditions important for how the concept occurs in the Norwegian media discourse. Power production in Norway is largely based on hydroelectric production and 98 % of the national electricity production comes from renewable energy sources. Although carbon emissions in Norway are not directly attributed to electricity production, energy efficiency has been a prioritized strategy from the Norwegian government. Reliable access to low-cost, hydro-powered electricity has historically been one of the main competitive advantages for Norwegian industry, contributing to thriving conditions for energy intensive industries (i.e. metal and process industries, chemical, mineral and paper). In addition, since the 1970's the petroleum industry has been a leading industry in Norway contributing to a significant proportion of national CO_2 emissions. Recently, the financial crisis, disrupting markets and destabilising energy prices for electricity, have challenged the frame conditions for the industry. In 2014, the petroleum industry also experienced a decline due to the price of oil more than halving, triggering discussions of productivity in Norwegian oil and gas industry as well as debates about the need for assessing what should be the new industries after the oil reservoirs run empty. In parallel, climate change and the need for reducing emissions have increasingly been put on the political agenda. The main strategies put forward, although some of them contested, have been energy efficiency, increased transmission capacity of electricity and natural gas to other European countries, increased production of renewable energy, as well as a focus on electrification of carbon-intensive practices (i.e. offshore oil production). The Norwegian government agency for energy efficiency (Enova) has increased the funding for industry projects considerably since 2009. Substantial government funding has also been invested to R&D through the Norwegian Research Council. The greatest commitment are the research programs Centres for Environmentally Friendly Energy that seek to develop expertise and promote innovation through long-term research in selected areas of environment-friendly energy. The research activity is carried out in close cooperation between prominent research communities, industry partners and other stakeholders.

In the wake of these changing conditions and trends, several intersecting controversies have emerged including increased renewable energy production, transition of the energy system with closer connection to the European electricity markets, and the future of the Norwegian oil and gas industry. Efforts to establish new wind- or hydro parks to increase production of renewable energy have been applauded by some environmental NGO's but have been met with resistance among other actors insisting on concerns for wildlife and nature. Similarly, plans to expand the transmission capacity of electricity between Norway and the European continent and the connected discussion about Norway joining the Agency for the Cooperation of Energy Regulators (ACER) have divided NGO's, unions, industries and politicians with differing opinions on consequences for electricity prices.

ENERGY EFFICIENCY AND INTERRELATED CONCEPTS

In general, energy efficiency refers to using less energy to produce the same amount of services or input (Patterson 1996:377). A similar definition has been adopted by the European Council; 'as the ratio of output of performance, service, goods or energy, to input of energy' (European Commission 2016). In

his book "Coal and Empire: The Birth of Energy Security in Industrial America", Peter A. Shulman (2015) traces the notion of efficiency from antiquity to its modern connotation in the middle of the nineteenth century (Shulman 2015:40): Among engineers, the word evolved from meaning an action administered on a machine to a property of that machine – a number measuring the actual performance of a machine against its ideal performance. This usage was developed most significantly by W.J.M Rankine, a Scottish engineer and central figure in the development of thermodynamics. In 1858, Rankine, building on several years of earlier investigations, defined a machine's efficiency as a fraction expressing the ratio of the useful work a machine could perform in producing the effect for which the machine is designed – pumping water, driving a paddle wheel-divided by all the work the machine performed, useful work as well as work lost to friction, heat dissipation, or other impediments (Shulman 2015:40). Energy efficiency is a generic term, and there is no one unequivocal quantitative measure of 'energy efficiency' (Patterson 1996:377). Or in other words, the "ideal performance of a machine" is not always a known state, nor an appropriate unit of comparison when the system boundaries of a machine is expanded to an organization, industry sector or country. Furthermore, establishing ratios between energy input and useful work done necessitates unequivocal definitions of useful work done which makes it problematic to compare the energy efficiency of an aluminium processing plant with a light bulb, or the output of a nation. Patterson (1996:378) divides energy efficiency indicators into four main groups, indicators that rely entirely on measurements derived from the science of thermodynamics (*thermodynamic)*, hybrid indicators where the energy input is measured in thermodynamic units, but the output is measured in physical units (*physical-thermodynamic)*, hybrid indicators where the service delivery (output) of the process is measured in terms of market prices (*economic-thermodynamic*) and indicators measuring changes in energy efficiency purely in terms of market values (*economic*) (Patterson 1996:378). While such indicators provide units of measuring energy (and 'less energy') and equivalence (what counts as the 'same' or more service), Shove (2018: 781–783) shows how constituting energy efficiency also involves steps to establish how units of service are established (what it is that is efficient) in relation to other objects and entities, and over time. Shove (2018) notes that the intrinsic reliance on unequivocal indicators for energy and useful work, discriminates on the temporal dimension to post-energy-demanding practices. For example, measuring the energy efficiency of household heating relies on the unequivocal units of energy input and Celsius degrees within the system boundaries of a house or room, making it impossible to compare the efficiency of central heating with previous heating and comfort practices such as blankets and clothing. Thus, the temporal dimension is bound both by the available measurements and the practices of heating and comfort (Shove 2018).

The European Commission relies on several interrelated concepts in the refinement of the energy efficiency directive (EED). Energy savings refer to the actual reduction of energy use, without reference to output produced (Erbach 2015). A continued measurement based on this form of understanding energy efficiency is the notion of avoided energy measuring the energy that has been saved due to efficiency efforts. Thus, there exists a multitude of different understandings of energy efficiency and related concepts of energy intensity, avoided energy, energy savings and net energy.

Several scholars have criticized the one-sided framing of energy efficiency as a climate change mitigating strategy. Although contested, direct and indirect re-bound effects have been widely recognized by economists as disrupting the link between energy efficiency measures and reduced carbon footprint (i.e. Wei and Liu 2017). Recently, sociologists such as Shove (2018) and Lutzenhiser (2014) have provided a more fundamental critique of how energy efficiency policies fail to recognize energy demand and how energy is intrinsically bundled together with social practices. In a commentary response to Shove's (2018) article, Fawcett and Rosenow (2018) argue a separation between 'good' and 'bad' energy efficiency for the efforts that lead to actual total reductions in energy use. While these contributions are based on different theoretical frameworks (and not necessarily agreeing with each other), they seemingly share an underlying acceptance of the need for absolute reductions in energy demand (and consequently production) in order to be a viable climate change mitigation strategy. Thus, the discussion has moved towards energy sufficiency to address the upper and lower limits of energy services reflected in Darby & Fawcetts (2018:8) working definition on energy sufficiency as 'a state in which people's basic needs for energy services are met equitably and ecological limits are respected'. Wilhite and Norgard (2004:991) argue interestingly that policy makers at the centre of the policy discourse on energy sustainability suffer from a form for self-deception which revolves around the equation of 'efficiency' with 'reduction' and 'sustainability', i.e., the untenable contention that technological and market efficiency alone will offset continued growth in energy services to the extent that deep reductions in energy use are possible. In many ways, this paper empirically addresses this statement within the Norwegian media discourse; how energy efficiency and its interrelated concepts of reduction and sustainability is framed and to which arguments it lends support.

Data collection and descriptive results

This study is based on a media analysis of "industrial energy efficiency" in Norwegian newspapers. Initially, several search criteria were explored to grasp the framing and use of "energy efficiency" in an industry context. The final search parameters were the word *industry* in combination with one of the following words *energy efficiency*, *energy-efficiency, energy economization*, *energy efficient, energy saving* and *save energy*. In total eight different Norwegian newspapers were selected to cover different segments in the public debate including newspapers with different topical (political, technical, daily newspapers) and geographical (local, regional, national) focus. Three national papers; *Dagens Næringsliv* which focuses on business content, *Klassekampen* which has a main focus on political news and is associated with the left of Norwegian politics, and *VG* with a more popular content. Two regional newspapers *Aftenposten* (Oslo area) and *Adresseavisa* (Trøndelag region) were included. *Rana Blad* and *Varden* were selected to include local newspaper in areas with strong industry activity. In addition, *Teknisk Ukeblad* was selected to include a weekly magazine focusing on new technologies and research. The search period was from

1.1.2013–1.1.2018 which included a total of 326 articles. After cleaning non-relevant articles (articles missing content, job ads, not within search criteria due to key words being split in different articles) a complete number of 309 articles were analysed and coded in-depth.

The articles were coded with a total of 18 variables; article identification number (v1), newspaper (v2), article name (v3), date (v4), genre (v5), size (v6), theme (v7), level (v8), containing industry case (v9), actors mentioned (v10), text producer (v11), sources, primary, secondary tertiary (v12) and media event (v13). The main narrative (v14) and the associated sub-narratives (v15, v16) were ranged according to the respective variables and the position (v17) adopted in the articles (positive, negative – implied or explicit – or neutral towards the discourse) were determined. Finally, the energy efficiency description (v17) and comments (v18) were used as free-text boxes for the authors to add text explicit or implicit framings of energy efficiency. Upon re-analysis of the energy efficiency variable additional coding emerged to highlight different framings of energy efficiency, link to energy reduction and concept properties.

DISCOURSE ANALYSIS

At its core, a discourse analysis examines the conditions of knowing by questioning discourse objects (Foucault 1977), revealing power and their regimes of knowledge as expressed in public communication. As a result, a core idea within critical discourse analysis is that knowledge is always situated and that it legitimizes power. Thus, by focusing on the patterns in public communication, what is taken for granted, taken as natural, and what is seen as the natural order of things are questioned. In this article we focus on the discursive patterns in public communication that includes the term energy efficiency. It is treated first as a formal and administrative *concept*, now turned in to a word used in spoken conversation and in our case increasingly in newspaper media articles. By investigating how the concept is generically or explicitly expressed, which narratives the concept promotes, and how the concept feature and function in different argumentations we can achieve a nuanced answer to the question "what do we talk about when we talk about energy efficiency?".

While Foucault (1977) refers to discourse as "ways of constituting knowledge" which governs the way that a topic can be meaningfully talked about and reasoned about, Bourdieu (1977) treats it as a "structuring, structured, structure". This is a kind of power that is non-personal in the way that it is a structuring of the thinking that is already structured by what was possible to think and express - a continuing reification of thought, structure and power. In our corpus of text – this reification is expressed by the generic description or adjective quality statement where the link between "energy efficiency", "reduction" and "sustainability" is essentially *black-boxed*. To be used in such a way, social phenomena must be objectified, separated from other phenomena and related as either cause or effect in the discourse of explanations (Røyrvik, Olsen, and Aasen 2012:203; Bye, Rosness, and Røyrvik 2016). In this case, we can identify the objectification process of 'energy efficiency' by how it is delimited (in different ways) and used (differently) to form arguments within narratives. The multitude of accentuations of energy efficiency, interrelated concepts, indicators and effects are contributing to black boxing energy efficiency in the media discourse. Rather than being an expression of the relationship between energy input and useful out or the reduced energy consumption within set boundaries of a system, energy efficiency has been *entified as a general concept or "thing"*. Thus, instead of only understanding energy efficiency by looking at the expressed (or lack of) meaning, we must investigate how the concept features in narratives and provide legitimization to arguments. The concept/word thus functions to legitimize and front strategies, policies, trends, business opportunities and solutions. Such an analysis examines energy efficiency as a representation of a discourse object and how the object (and the actors wielding it) conveys and constitutes power. Hence, the analysis of the meaning, use and function of energy efficiency in media narratives must investigate the discourse, power and hegemonic understanding it is a part of.

As we specifically focus on the production of news in newspapers, the 1) material, 2) form, 3) function and 4) agents (mirroring the Aristotle-Heideggerian typology of causes: 1. Causa Materialis, 2 Causa Formalis, 3 Causa Finalis, 4 Causa Efficiens (Heidegger 1977)) constitutes and structures knowledge differently than other public communication. The material from which news are produced can encompass both the paper – and to an increasing/dominating degree digital technology – on which news is produced, represented and distributed. Control is inscribed in different types of material just as mobility and justification of truth is dependent on type of material in question. These dimensions often stand in contrast to each other, when comparing paper and digital newspapers, it is evident that the expected tempo of news production is higher in digital news while the trustworthiness is lower as control and uniqueness in editorial position (hegemony) is weakened. The emergence of memes like "fake news" belongs to the realm of digital news production (Røyrvik, Olsen, and Aasen 2012). All news adheres to certain forms which makes them *news-like* (Røyrvik, Olsen, and Aasen 2012), both in how they are written with a beginning and end, and more importantly that they include both some kind of controversy and are connected to narratives that already gives sources a role/position legitimating their presence in the *news stories* (Rapport and Overing 2000). The function of news articles – or the production of news – is also distinctly different from that of other forms of public communication. At one level it is a way of spreading information about the world (and how it works) in an asymmetrical way (the few informing the many) (Carrol & Ratner 1999) – thus both producing consensus and ordering limits of dissent. On another level the function of news is to raise attention – to put issues on the agenda – and by that gain power in terms of market position and definition power (i.e. symbolic power, Bourdieu 1977).

DESCRIPTIVE DATA, NARRATIVES AND CONTROVERSIES

The final dataset consisted of 309 articles in 8 different newspapers. The figure below illustrate the articles distributed by political level, article type and author affiliation. The journalists used industry actors and political commentators as their main source, while researcher used themselves and their own research or other researchers as their main source of information.

Interestingly; energy efficiency is seldom the main topic of the articles. This is at first sight somewhat surprising since the concept is the main search word. In the initial analysis of the

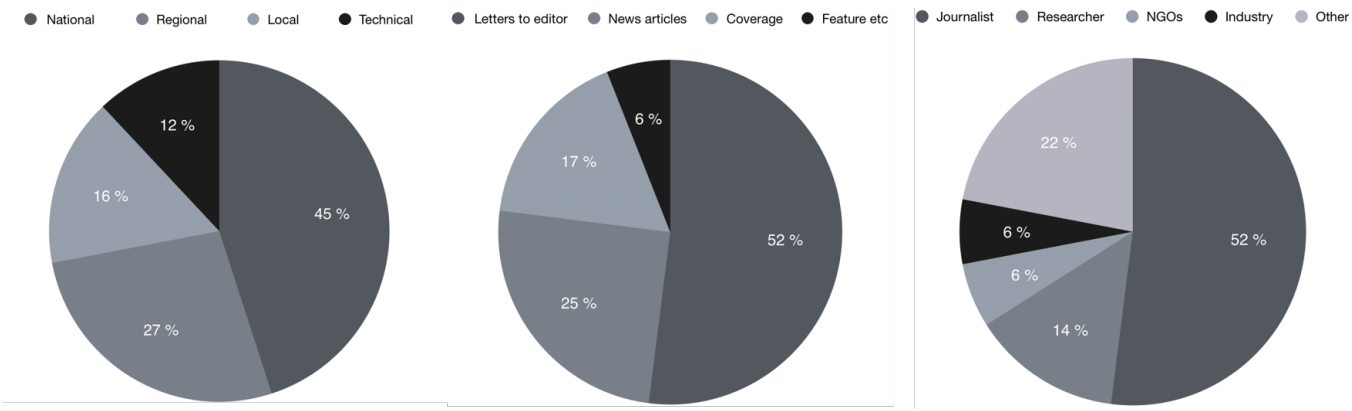

Figure 1. Distribution of articles based on political level, article type and author affiliation.

data we found a clear common denominator permeating all the articles, namely narratives of change. All articles relate to some form of wanted or unwanted societal *transition* (we don't separate between transitions and more profound transformations). Further, we coded the articles in terms of what type of transitions in which the articles where framed. We here found four prominent, although somewhat overlapping sub-narratives encompassing related framings. The first narrative, we labelled "climate/environment narrative" (40 %), includes articles placing the arguments within a climate change context. The second narrative, we labelled "economic stability and growth" (16 %), contains articles where the argumentation is placed within an economic growth, industrial stability context. The third sub-narrative we labelled "green growth" (16 %), arguing the interlinking between climate change and industrial growth. The fourth sub-narrative we labelled "energy security" (7 %) is less prominent, but contains articles for energy reliability and self-sufficiency of energy production due to geopolitical security (where the *self* varies between the articles meaning Norway or Europe). The "energy security" narrative is not central for this article.

The elements of transition "what", "from where", "to where" and "why" differs within the media narratives as well as the agents who get access to them and the different societal levels they focus on (regional, national, global). Thus, there is no evident "energy efficiency narrative", rather the concept is a part of narratives of climate/environment, economic stability and growth and the interlinked narrative of green growth. Even more prominent, energy efficiency is in itself seldom the object of contention and the energy sufficiency debate (Wilhite and Norgard 2004) seems to be missing from the Norwegian discourse on energy efficiency.

Within the transition narratives, there are numerous ongoing controversies where energy efficiency also has a function within arguments on both sides of contention. Most prominently are articles with opposing positions debating development of new wind-, solar- or hydro-parks, transmission lines, integration with European electricity markets and oil and gas industry. The most visible in this analysis is especially that of development of on-shore wind-parks, hydro-parks and transmission lines which splits politicians and NGO's arguing for nature exploitation and local democracy one the one hand, and climate change mitigation and energy security on the other ("Nature/Climate"). A second prominent controversy is the debate regarding increase of transmission capacity to Europe ("Green battery for Europe/Green industry in Norway"). Here, the main topic of contention is the impact on energy prices for the Norwegian industry. A third controversy is the future of the Norwegian oil and gas industry, where specific controversy is found regarding possible expansion of Norwegian oil and gas fields in the Arctic region or whether this industry should be phased out ("Sustainable oil and gas/Phase out").

Analysis

As mentioned above: energy efficiency in itself is rarely the object of contention or controversy in our material. The difference is striking when comparing with the media discourse on other climate-mitigation technologies such as carbon capture and storage (CCS) where controversy and contention of the technology is at the centre of the discourse (Røyrvik, Olsen, and Aasen 2012). The analysis shows that the concept of energy efficiency is seldom the topic of the articles itself, but rather figures in arguments within narratives of climate change mitigation, and economic stability and growth. While the topics of energy efficiency goals, incentive systems, effects- or pre-conditions sometimes are prominent and discussed it is always in connection to these narratives. However, the concept of energy efficiency is seldom the object of controversy, but rather is used to legitimize and strengthen arguments within narratives, and/or legitimize once own position in a controversy by drawing a connection between energy efficiency and a narrative. In order to explain how the notion of energy efficiency serves to both converge opposing narratives and positions, as well as support divergent arguments in the same controversy we will first show how energy efficiency is framed within these narratives.

FRAMING ENERGY EFFICIENCY: MULTITUDE OF MEANINGS ON DIFFERENT SCALES

In contrast to Rankine's machines (the steam turbine systems based on an idealized thermodynamic cycle, Shulman 2015), the property of energy efficiency is rarely specified by a number or indicator referring to the ideal state of a machine. Tracing the usage of the concept in newspaper articles, it is evident that the concept holds both different *referents and references,* sometimes within one article but especially *between* articles. As shown in Bye et al. (2016), discussions and arguments tend to include self-referencing and tautologies when a concept en-

compasses both different referents and references; and in our case this means that it is the total argumentations related to the use of the concept which together includes invalid inferences such as tautologies.

These framings vary in the specification of the concept from **generic framings** where energy efficiency features as an undefined entity, to explicit or implicit **expressed framings** of the concepts as a "more for less" relationship, reduction in energy consumption and/or avoided energy. Here, the framing of energy efficiency also diverges in their expressed connection between relative or absolute energy input and output parameters. While this relationship often remains undefined, notions of both absolute or relative energy reductions are present and sometimes in conflict. Furthermore, the central elements of constituting energy efficiency (i.e. Shove 2018) such as specification of concept, the comparative referents, temporal and spatial system boundaries differ. In addition, the framing of energy efficiency sometimes includes carbon intensity, blurring the association and connection between energy and carbon emissions as fractional parameter even further.

Generic framings

In the majority of articles (179), energy efficiency and interrelated concepts are used in a generic fashion, without any implied or explicit notion of framing. When used without definitions or explanations, the terms tend to feature as a self-explanatory entity, causally related to other entities such as the example below:

> Renewable energy and energy efficiency are important strategies in order to increase energy security in Europe, but also to decrease climate gas emissions and create new jobs (ID:56)

It is in this causal relationship (as either a cause or an effect), that the function of the entities is revealed; connections are made between the concept and assumed effects; energy security, emission reduction and job creation. In this kind of argument, the one uncharacterized entity can cause all these effects. Similarly, energy efficiency is generically framed as other entities such as goals, targets, commitments, business opportunities, products or as a societal trend where the understanding of the concept remains unaddressed producing different kinds of causally related entities. Energy-efficiency-as-goal is caused by research/industry synergy, energy-efficiency-as-product causes commitment fulfilment, energy-efficiency-as-trend cause surplus energy, etc. This overwhelming tendency; to not specify energy efficiency and the things it is either caused by or is the cause of, extends to the notion of assuming effects in terms of relative or absolute energy reductions which often unclear.

Another common generic framing, formulates the concept of energy efficiency as an adjective or property/quality statement. The purpose of the quality statements within the argument, as the one below, is to underline the efficiency of "something".

> The main competitive advantage of Norwegian industry is that it is very energy efficient and utilize clean renewable hydroelectric power as energy source ID:297

The object that "is" energy efficient varies in the articles from a product, organization, industry sector or country along with the object of comparison (i.e. other companies, industry in other countries) and the temporal and spatial system boundaries as well as comparisons varies (the world, previous practices). Although explicitly unaddressed, meaning is given to the entity by its attributed properties (which is the way Latour argues that objects are defined, e.g. 1999). These quality labels are common in the articles where some goes into depth in describing the technical components or processes validating their energy efficiency, while others keep to the generic quality statement.

Expressed framings

While the most common expressions of energy efficiency are generic, several articles (82) explicitly or implicitly indicate an *expressed framing* of energy efficiency. Among these, energy efficiency as doing *more for less* are the most common;

> Energy efficiency – to do more with less energy – is one of the instruments (ID:224)

In the quote above, the relative dimension of energy efficiency – *the relationship between energy input and useful work* – is clearly expressed. There is a large variance on the specification of the fractional parameters (the more and the less) ranging from purely generic to explicit indicators as in the example of Power Usage Effectiveness in server parks below:

> That contributes to a Power Usage Effectiveness (PUE) of below 1.2. That implies that of 1.2 W electricity, 1 W is utilized for IT performance. The rest of the energy goes to run the facility, particularly cooling. This PUE places the [data] center in the top coat (ID:280)

Similar specifications of energy input and useful output definitions are evident in other sectors referring to output parameters such as ton of aluminium, heating equivalents or generic products. Different from the "more for less" framing, are expressions of energy efficiency as reduction in energy consumption:

> If there is still concerns regarding energy supply through the winter and will contribute to lower need for transmission […] the solution is to reduce the winter consumption of electricity through energy efficiency and heating methods requiring low or none electricity (ID:272)

Instead of relative statements of energy input and output relationships, energy efficiency and/or its effects are framed as reduction in energy consumption within generic or defined system boundaries. This framing is connected to the conceptualization of "avoided energy", where the non-used energy is measured, often followed by an assumed energy efficiency potential that can be released. Avoided energy is often mentioned as a percental decrease in energy use (from a defined or undefined state) or an absolute number of TWh compared to a defined or undefined object of comparison in the past or the future; "Energy efficiency will reduce the electricity demand heavily, up to 15 TWh" (ID:73). Several articles indicate this expression in more generic terms, where a common statement is that "the most climate-friendly kilowatt there is, is the one that will never be used" (ID:110). This framing often contains clear assumptions about the relationship between energy efficiency and energy demand in a larger system where the released energy can be used to displace other energy sources (i.e. electrification), increase energy security or not be used at all.

Finally, a few articles, frame the boundaries of energy efficiency to involve entropy in society itself:

> The more a district heating company succeeds in utilizing surplus energy, the more district heating contributes to reduced energy loss in society itself and reduced use of primary energy resources (ID:250)

This framing is close to the notion of "net energy" directing the attention to the total performance of the system, in this case the society. While there are a multitude of expressed framings of energy efficiency along with generic use of the concept, another dimension to these articles is the mixture between energy intensity and carbon intensity which is used hand-in-hand. Even in the articles expressing clearly the implications of absolute energy reductions, these are still contingent upon different spatial and temporal boundaries, that being industry processes, companies, industry sectors, or national and global boundaries. They are also dependent on different modes of comparisons, some comparing the absolute energy reductions with projected energy use at a given point in the future (i.e. EU). Thus, within the media narratives it is seldom explicit whether the concept of energy efficiency address reductions in energy consumption.

While the different interrelated concepts of 1) energy efficiency, 2) energy reduction, 3) avoided energy and 4) net energy (Erbach 2015) are present in the articles (and even used precisely within the context of the article), within the media discourse as a whole they add to the multitude of meanings of energy efficiency and the associative equations between them. It is apparent that several of the actors do not address the same phenomena nor its effects when drawing on the familiar concept of energy efficiency. This multitude of meaning content combined with the overwhelming tendency to utilize energy efficiency as a 1) generic description, 2) quality statement or 3) an entity, contributes to black-boxing what energy efficiency is and what it can do. While this equivocality of the concept is evident, a further investigation of how the function of the concept is framed in the arguments and narratives they are a part of provides another approach of answering *what we talk about when we talk about energy efficiency*.

FRAMES OF ENERGY EFFICIENCY

While we identified four transition narratives of 1) *climate/environment*, 2) *economic stability and growth*, 3) *green growth* and 4) *reliable energy supply* in our data material, there is a multitude of actors promoting them. By analysing how the concept of energy efficiency features in these narratives we find that the concept is both contributing to converging narratives as well as cementing opposing positions within controversies. As mentioned, while the authors of the articles represent opposing positions fronting conflicting positions between narratives or within a more specific controversy, the concept of energy efficiency is almost never an object of contention. Rather we suggest that the concept features as a *magic word* capable of both converging narratives and providing legitimation to arguments on opposing sides of controversies.

Converging narratives

Within narratives, energy efficiency is usually *framed as a solution*, establishing a connection between the concept and the narrative. The solution framing is especially visible in 'green rhymes', often fronted by politicians although with different variations such as:

> A new course in climate politics would require more full-scale CCS, renewable energy, energy efficiency, funding for adjusting industries and more electrical cars on the road (ID:216)

While the concept of energy efficiency and an electric car is something completely different they are made the same, commodified through associative connections within the transition narratives. These types of associative connection equate energy efficiency with other forms of climate strategies:

> We [in Norway] have so much knowledge on energy efficiency in buildings and industry. Here lies an enormous potential for global emission reductions (ID:78)

Again, equations are placed between "knowledge about energy efficiency in buildings and industry" and "global emission reductions". This framing legitimizes both the climate change narrative in itself, energy efficiency as part of the solution and the author as responsible. Energy efficiency is also framed as a part of a solution within the narrative of economic growth, job creation and standards of living. Energy efficiency is here for example listed as a pre-condition or area of competitiveness to make Norwegian industry competitive: "more resource and energy efficient production" (ID:82).

While the concept is used within the single transition narratives, the most prominent use is in the interlinking between the two as "green growth". In an article titled "Good climate policy will be good industry policy" the author uses a generic framing of energy efficiency to state that "Manufacturing has always been energy efficient and environmental friendly for its time. Norway must utilize that" ID:55. In another example article the authors are criticizing a previous article from the Green Party in Norway pushing for a lower growth rate: "In Norway the emissions from industry have been reduced with almost 40 % since 1990, while the production has increased a lot; growth and emissions are uncoupled" (ID:118). Energy efficiency contributes to cement the link between climate change mitigation and economic stability and growth arguments.

Legitimize positions in controversies

While drawing on transition narratives for explanation or legitimization, there are several specific controversies within our data set which are the main topic of the article. Development of wind-parks, hydro-parks, solar energy, transmission lines in Norway and to Europe as well as the future of oil and gas industry are important controversies in the Norwegian media discourse with divergent positions drawing on energy efficiency for legitimization of arguments. Here, the contention is not directed towards the transition narratives themselves. Rather, the arguments connect to these narratives by establishing logical pathways including or excluding the object of contention. Energy efficiency is also here connected to the transition narratives as a solution, but even more prominent is the concept's distinguished function as an *alternative* or *addition* within the argument:

> The proposed wind-park build-out is ruthless, massive in scale and does not holistically view the consequences and nature impact in Trøndelag. We have to oppose it. As an

> alternative we would pursue energy economization and reduced consumption, upgrade of existing hydro-power and transmission networks as well as other renewable energy sources such as solar, geothermal energy and offshore wind (ID:43)

While the argument establishes a clear connection between *energy economization* and a climate/environment narrative, it features as a more favourable pathway within the controversy of establishing wind-parks in the Trøndelag region. Similarly, the establishment of power transmission lines for electricity triggers parallel argumentation in a local newspaper, where energy efficiency features as a preferred option:

> The best would off course be to not construct the [transmission] line. Instead the billions could have been used on families and industry in Trøndelag so they could upgrade buildings, install heat-pumps and pursue energy efficiency (ID:46)

The function of energy efficiency is here still grounded within a narrative of climate change mitigation, energy supply and industry policy, but it features in the argument as an alternative to legitimize the resistance towards constructing transmission lines. While the argumentation still connects energy efficiency to the societal goals within the transition narratives, the purpose is to front an alternative to possible futures. The alternative solution framing is evident within the three controversies of actors opposing the development of onshore wind parks, power transmission cables to Europe often framed through the metaphor of Norway as a "green battery for Europe" and the expansion of Norwegian oil fields in the Arctic.

Interestingly, energy efficiency can serve as rhetorical ammunition for diverging positions, for example by highlighting energy efficiency as an essential additional part of the solution in addition to the proposed developments. "Energy efficiency is important, but not sufficient alone" (ID:213) is a common framing. While some of the "green rhymes" fronted by politicians are quite static, similar green rhymes within controversies include different variations for example by including oil and gas production and CCS:

> Energy efficiency, oil- and gas deliveries with low emissions, focus on carbon capture- and storage, technology development and renewable energy are important parts of the answer for Statoil and Norway (ID:57)

Drawing on the concept of energy efficiency in itself provides legitimacy, and forgetting it in arguments can trigger counter-arguments as the quote below from an against-wind-power actor suggests:

> The article only focus on development of more renewable energy. It doesn't mention with a single word energy efficiency, which internationally is recognized as the decidedly most important climate measure. At the same time is Norway's eventual contribution to a common European energy supply highly overestimated (ID:223)

While generic expressions of energy efficiency are commonly used within controversies, there are also examples of drawing on more explicit expressions of the relativity of energy efficiency to front the argument. Within the discussion of sustainable oil and gas pro-development actors:

> Technology [subsea installations] will make it possible to extract far more oil and gas from both new and existing wells in a more energy efficiency way (ID:322)

> We are dependent on new production with lower emissions to avoid alternative production with higher emission (ID:54)

In these cases, the contention is not about energy efficiency nor the transition narratives. Rather, the concept of energy efficiency is used to draw legitimization to conflicting arguments in an ongoing controversy. Thus, within controversies energy efficiency is framed to legitimize an argument, by connecting the argument to a transition narrative through energy efficiency as an alternative or additional solution.

Energy efficiency in opposing explanations

Another way energy efficiency features in controversies is effect relations between the object of contention and energy efficiency. A good example of drawing on explanation where energy efficiency is a pre-condition or effect is the debate of electricity prices within the controversies of transmission cables to Europe, increased renewable energy and national targets for energy efficiency.

> The price of electricity is so low that it is not profitable to isolate houses or for the industry to be energy efficient (ID:110)

> For the industry predictability is crucial. No one will invest billions if they are uncertain that the frame conditions are the same in the future (ID:248)

The first author argue that high electricity prices is a pre-condition for energy efficiency, the second argue that low electricity prices is a key frame work condition for investing in energy efficiency measures. Both opposing positions on high/low energy prices uses the effects on energy efficiency to legitimize the argument. Similarly, the profitability of increased renewable production versus energy saving is essential for the argument:

> Saving energy will lower the prices and profitability of renewable power. On the contrary an increase in renewable power production will lead to cheaper electricity and make energy saving less profitable (ID:223)

The argument establishes a negative causal relationship between the object of contention (renewable energy) and the preferred outcome (energy saving) to argue against the former. Within these arguments the connection to transition narratives are implicit and the concept of energy saving becomes the purpose. Thus, energy efficiency is frequently used on opposing sides of controversies both by highlighting the connection between the concept and the transition narratives as an alternative or necessary addition, and consequently by establishing cause-effect relationship between the object of contention and the concept of energy efficiency in itself.

Discussion: Concept boundaries and magic disrupted

In media discourse in Norway, the concept of energy efficiency has been disentangled from machine performances, technical equivalences and energy-output ratios. Following Patterson's (1996:377) statement that there is no unequivocal quantitative

measure of energy efficiency, our analysis show that there is no unequivocal qualitative framing of energy efficiency either. The numerous and differing notions, parameters, indicators, system boundaries, scales and temporal dimensions in combination with the tendency to frame energy efficiency as a generically scalable concept, contributes to black box the relationship between energy- efficiency and reductions and ultimately with the societal goals it is argued to address. A key explanation to why energy efficiency is not more contested is that the flexibility of meaning content and ability to black-box connections to societal goals serve several important functions. The concept of energy efficiency enters the public discourse as a solution to a number of societal issues mainly: climate change, economic growth and reliable energy supply. Narratives exist that both legitimize and are legitimized by energy efficiency. There are two main argumentations at play where energy efficiency serves a distinct function within the argument:

1. Energy efficiency can reduce national energy consumption enabling electrification of carbon intensive practices and/or displacement of fossil fueled energy production in Europe.
2. Energy efficiency, more useful work for less energy costs, can improve the productivity and competitiveness of companies and the economy.

While academic definitions of energy efficiency points to "more for less" framings of efficiency, we find that in the media discourse it also points to absolute energy reduction – either as it is the meaning of the concept itself, or through its effects. The lack of explicitly stating the connection between relative efficiency and absolute reduction essentially means that the concept is allowed to mean both at the same time. Within the media discourse both argumentations are black-boxed within the scalable generic concept of energy efficiency. The framing of relative energy efficiency and absolute energy reduction are blurred together, essentially leading to a black-boxing of what energy efficiency is and what it does. Through this black-boxing, the concept of energy efficiency (within the discourse) has the ability to merge opposing positions. The associative equation between "energy efficiency", "reduction" and "climate change", contributes to establish energy efficiency as a *magic word*, suitable to legitimize almost every thinkable argument within the transition narratives.

While the relationship between the two argumentations are rarely addressed in the articles investigated in this study, there are a few examples where it surfaces as a conflict elucidating the opposing positions of the actors. During a national conference for energy efficiency and the environment (Enova conference) the former oil and energy minister, Ola Morten More, stated that;

> […] the Norwegian government will not put a cap on energy use, and is not against increased used of energy. We are at the same time engaged with energy efficiency, and wish to produce more for less, said Borten Moe (ID:184)

The quote was met with a surge of articles criticizing the minister by addressing the conflict between increasing energy use, energy efficiency and the narrative of climate change mitigation.

> Yesterday the responsible cabinet minister for Enova contributed to confusion regarding the governments ambition for climate change mitigation. Several of the 700 listeners at the Enova conference was puzzled when Ola Borten Moe emphasized that the government will not set a cap on energy use and emissions. "From my point of view it is good if we can both increase energy efficiency and at the same time increase the total energy consumption. That means we have succeeded, that we increase the value creation and employment in Norway" he said. It is nice that cabinet member thinks aloud outside the red-green box. But what is challenging, is that this statement about increasing the energy consumption makes it even more unclear what the government will achieve with climate efforts and Enova as an instrument. "Oil-Ola" must beware so he doesn't become "Waste-Ola" (ID:50)

Now, perhaps the most interesting with this debate is not the particular reactions from journalists and NGO's to the minister comment since the diverging positions are known. However, it highlights how and why energy efficiency can be utilized without contention as long as the boundaries of the concept are not made explicit. By explicitly disrupting the link between "less for more" and "reduction in energy consumption", contention towards the effects and goals of energy efficiency surfaced. The boundaries of energy efficiency were here made explicit as "more for less and not reduction in energy use" the diverging positions on the connection between energy efficiency and the narrative on climate change mitigation was questioned. This is not to say that an effect of energy efficiency measures can't also be absolute energy reductions. Rather, that when contention is directed towards the concept itself it is because an actor has made the boundaries of the concept and its intentions explicit. In this example the revealed position of the author was explicitly not sufficiency. However, revealing a position of sufficiency (total energy reduction) produces similar controversies. In these glimpses (or glitches), the actual positions, disagreements and priorities of the intended effects of energy efficiency becomes visible and the magic is broken.

However, such glitches are rare in the media discourse, and also quickly forgotten. The taken-for-granted conception of energy efficiency as a good for both climate and the economy has granted the concept legitimating power also in other controversies. A variety of actors utilize the connection between energy efficiency and societal goals to legitimize arguments within other controversies. Within the media discourse the purpose of energy efficiency is not only a tool reserved for designers and engineers, nor for policy makers constructing programs for facilitating adoption of technologies. It has also become a tool for local actors to resist wind-parks and transmission lines, for politicians to win elections and for researchers to attract funding. Energy efficiency contains the flexibility to converge opposing positions and narratives, as well as diverging them. Thus, the function of energy efficiency in the media discourse is not to measure something, but to legitimize something.

Conclusion

Energy efficiency is a magic word that seems to fix two of the greatest concerns of our time: the climate and the economy. In this article we have analyzed how this is articulated in Norwegian news articles, who leads what argument and what contro-

versies they are associated with. By this we argue that it works because the concept is blackboxed, and that the magic lasts as long as the boundaries of the concept is not revealed. Media narratives are inherently characterized by noise, controversies and actors legitimizing different positions, and we are cautious in claiming that a coherent use of the concept between articles, or even revealing of intentions, will ever be realised. We neither claim that energy efficiency policies and programs are incapable of contributing to achieve the societal goals argued by the actors. Producing goods and services useful for society more energy efficiently can be a valuable contribution to reduction of carbon emissions, as well as contribute to cost-reductions and competitiveness. However, this two-fold benefit is only viable to the extent that it is coupled with absolute reductions and/or de-carbonization of energy production and use. These considerations are rarely addressed in the media discourse, and sometimes are not even the intention of the participating actors. While energy sufficiency can be a valuable concept in this regard, it is not included (nor appropriately translated) in a Norwegian news media discourse dominated by energy efficiency. However, aspects of energy sufficiency, (i.e. upper limits of energy services) are visible through various framings of energy efficiency although rarely explicitly articulated nor contested by opposing positions. Thus, it is important to direct attention to the implications of the non-controversy surrounding energy efficiency in media discourses. First, this contributes to legitimize energy efficiency in itself, promoting the prospects of continued funding of policy programs, research and technology implementation in industries. A second implication, which calls for further investigation is how the media discourse on energy efficiency contributes to legitimize other practices and a business-as-usual paradigm.

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