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A forward looking, actor based, indicator for climate gas emissions

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Sammendrag: **Abstract:** The most commonly used Norwegian indicator for climate change displays historical emissions and compare with Norway's Kyoto target. This indicator says little about future emissions, about the ongoing Norwegian effort to reduce climate gas emissions, or about its effect on sustainability. In this paper we propose an indicator that improves on these weaknesses. We present a forward looking climate indicator that in addition to historic data includes business as usual scenarios, different proposals for future domestic emissions, and national or international commitments and agreements. This indicator presents – in one graph – a broad diversity of views on how the climate challenge should be handled from now and into the future. This indicator-graph may contribute to a more transparent discussion of available policy options.

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1 Introduction

Sustainable development indicators are commonly used to survey the development of socially important variables. Norway has 18 indicators, intended to be important tools to measure the progress in the country's strategy for sustainable development. One of the indicators gives information related to the climate challenge. It shows Norway's historical emissions and the level of emissions to be reached to comply with the Kyoto commitment.

However, as for instance is pointed out in the Stiglitz report (Stiglitz, Sen and Fitoussi, 2009), "measuring sustainability also entails prior responses to normative questions. The coexistence of different appreciations of sustainability may reflect not only different predictions of what the future can be, but also different views about what will really matter tomorrow for us or our descendants. Everybody should in principle converge on the idea that sustainability means the preservation of future well-being. But the question remains to know what well-being we wish to sustain exactly." To measure sustainability adequately, "we need projections, not only observations." The existing Norwegian climate indicator (as well as the other Norwegian indicators) does not provide information on possible future development. Nor does it take into account normative questions, such as by how much we should reduce domestic emissions to develop towards a certain desired future.

In this article we propose a climate emissions indicator and suggest ways in which the indicator can be made both forward looking and capable of explicit representation of the diversity of views on optimal climate policy in the future. We propose to include the views of various stakeholder groups on how much greenhouse gases Norway should emit by 2020 in the indicator. These groups may be scientists, politicians, NGO's, industry, lay-people, citizens, etc. In addition, the indicator may display business as usual scenarios that show the development we may expect if no specific changes to climate policies are done. The indicator, we propose, should also include historical emission data and national or international targets and commitments. In this way, the indicator sums up the essence of the climate policy debate in one figure. Our hope is that this indicator-graph will contribute to a more transparent discussion related to the different "appreciations of sustainability". Although this article focuses on an indicator of climate gas emissions, we suggest that the approach will be relevant for other areas of sustainable development.

2 Sustainable development indicators

Indicators are in use everywhere. From car speedometers, to thermometers, to Key Performance Indicators in business, to the consumer price index and to national GDP numbers. They are useful if you want to manage a certain development and get feedback on your performance. Due to the complexity of the modern society's interaction with nature, sustainable development is an area where indicators have been seen as useful. They have been seen as tools to make complex questions more accessible in order to better assess whether ongoing societal development is desirable and within sustainable limits.

2.1 Norway's current indicator for climate gas emissions

In 2005, a proposal for a Norwegian national set of indicators for a sustainable development was introduced in “*Enkle signaler i en kompleks verden*” (NOU 2005:5). This was later revised by the Ministry of Finance, and consists today of 18 indicators. They are listed in the annual Report to the Norwegian Parliament on the national budget. Statistics Norway is responsible for the update of the indicators. The latest report is called “On the right path?” (Norwegian: *På rett vei?*; Brunvoll and Smith, 2010). The 18 indicators are distributed within six different areas: International cooperation for sustainable development and combating poverty; Climate, ozone and long-range air pollution; Biodiversity and cultural heritage; Natural resources; Hazardous chemicals; Sustainable economic and social development. The climate indicator we discuss is illustrated in the figure below.

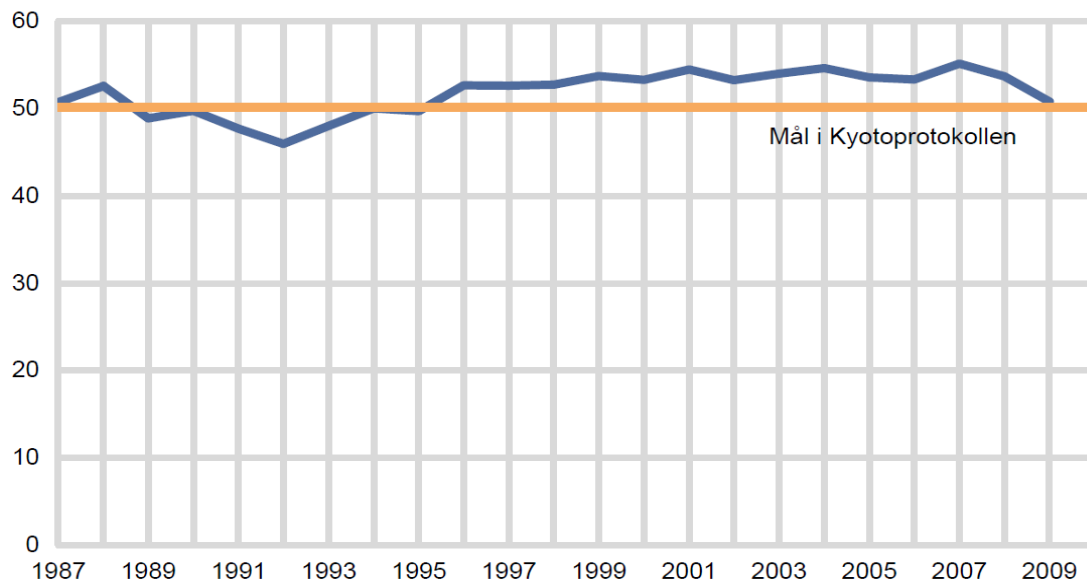


Figure 1. The most commonly used indicator of climate policy in Norway: Norwegian climate gas emissions related to the Kyoto-target (MtCO₂e/yr¹).

Although the Norwegian sustainable development indicators were intended to be an important tool for Norway's strategy for sustainable development, there seems to be a general lack of attention and use of them. According to a poll done by TNS-Gallup in 2011, only 8.6 per cent of the Norwegian population know about the Norwegian indicator set (TNS-Gallup, 2011).

¹ Million tons of CO₂-equivalents per year

3 Shortcomings of the Norwegian indicator for climate policy

According to Levett (1998), the struggle to find and use indicators of sustainable development is intimately bound up with the process of deciding what we mean by sustainable development and what we shall do about it. He maintains that in the field of sustainable development at least, indicators are intrinsically and unavoidably normative and political. In 2009, the influential Stiglitz report (Stiglitz, Sen and Fitoussi, 2009) aimed at identifying the limits of GDP as an indicator of economic performance and social progress, and to consider what additional information might be required for the production of more relevant indicators of progress. In the chapter on Sustainable development and environment in the report there are three main messages which inspire our proposal of a new indicator in Section 4:

- Message 1: Measuring sustainability differs from standard statistical practice in a fundamental way: to do it adequately, we need projections, not only observations.
- Message 2: Measuring sustainability entails prior responses to normative questions. In this respect too, it strongly differs from standard statistical activity.
- Message 3: Measuring sustainability raises an additional difficulty in an international context. The challenge is not only to assess the sustainability of each country taken separately. The problem is global, not least in its environmental dimension. In that case, what is at stake is rather the contribution of each country to global sustainability or unsustainability.

We propose that it will help to look forward, and to make explicit what different stakeholders think will be Norway's contribution to global sustainability. More useful indicators could be created through the participation of different stakeholder groups, suggesting answers and solutions. This is essentially what the indicator should aim at containing and reflecting, and hence what we see as shortcomings with current indicators.

We can see in Figure 1 that the Norwegian indicator of climate change policy does what the Stiglitz report calls "the standard statistical practice"; it shows historical data from 1987 until 2009. The indicator also shows Norway's Kyoto commitment, which may be regarded as a normative point of view on how much Norway should contribute to global sustainability. However, although displaying the Kyoto target to some extent is in line with the recommendation from Stiglitz et al, we believe the indicator would benefit from including several other recommendations of future emission targets. As it is framed now, the indicator may actually convey a misleading impression: namely that the Kyoto target is enough to judge whether Norway is sustainable with respect to climate change. The reader might mistakenly think: "Since we are not too far away from the Kyoto target, Norway must be sustainable", whereas the Kyoto target in reality was meant to serve as a starting point for stricter targets. Therefore, we suggest, supplementary views should be presented in the indicator. Furthermore the Kyoto target, related as it is to 2008-12, is too short term to be a sufficient guide for Norway towards sustainability. It is necessary to look way beyond the Kyoto period in order to assess whether current ways are sustainable. According to for instance IPCC, global emissions should be reduced by 50 to 85% within 2050 to reach the "2 degree target", which has been agreed by the EU and adopted by the signatories to the Copenhagen accord. Thus we believe it is relevant to include information in the indicator about how Norway's climate policy take into account such messages or goals pertaining to the long term future. What do politicians want? What are the recommendations from experts? What does industry or NGO's desire? And so on.

The indicator in Figure 1 does not provide any such information on what stakeholders want. Nor does it show what will be the emission path with business as usual. Therefore, it is not possible to judge from the climate change sustainable development indicator in Figure 1 whether Norway is on a sustainable path or not. That is, by looking at the figure, one can not assess the current situation and conclude whether rapid change is necessary; whether the development will be sustainable if Norway continues its current climate policy, etc. To draw

such conclusions, the user needs additional knowledge. If the indicator is to be used as an important tool to measure the progress in the country's strategy for sustainable development, as is the intention, "we need projections, not only observations". As we propose in the next section, normative recommendations on desired future emission levels could be included in a way that engage and promote involvement by the public.

4 Suggestion for a new climate indicator

We propose an improved indicator, which include and build upon both the existing climate indicator and the messages given in the Stiglitz report, including the need to look ahead and to represent the variety of views held by the different societal groups. We suggest that the indicator should display historic emission data, the business as usual scenarios (i.e. the consequences of pursuing those policies that have already been decided – as forecast by different observers), and the future paths/scenarios recommended by different stakeholders (be they political parties, special interest groups, or national or international commitments and agreements). In other words, we propose to include normative aspect in the indicator. We do this by including several opinions on how much Norway should emit in the future, and has chosen 2020 as a useful time horizon.² Next section explains how we have constructed one such indicator.

4.1 Base data

We have reviewed information that exists in Norway with respect to historical emissions, and scenarios, recommendations and goals on how much to emit in the future. We have used national reports, political parties' goals, political agreements, environmental organizations recommendations, the industry organization's recommendations, the EU goals and the IPCC recommendations (assuming that Norway take its proportional share), and the results of surveys of the opinion of Norwegian voters. All is represented in the figure 2.

Because of place constraints we have not labeled the different curves in figure 2. The main point is to show that there exist a large number of opinions. The figure shows the years until 2050 because there is a diversity with respect to the years that is used for the recommendations on the future emissions. We have linearly interpolated between the year that the recommendations have been made and the year they assess. Most of the recommendations have been made for the years 2020, 2030 or 2050. This figure also includes recommendations on how much we should emit if we include purchases of quotas. That is why some of the projections reach zero emissions already in 2020. The figure reveals the wide variety of views in Norwegian climate politics. It is difficult to get a complete overview of the different opinions.

² The question of the domestic contribution to global sustainability may be understood in different ways. Here we treat this as the question of how much Norway is willing to reduce domestically. Another way to treat this could be to look at the total of domestic and foreign reductions, i.e. including purchase of quotas. However, this raises the additional question of whether also Norwegian contribution to emission outside should be added to the historical data. It would be interesting to do both, but this is out of the scope here. Our focus is therefore domestic emission cuts.

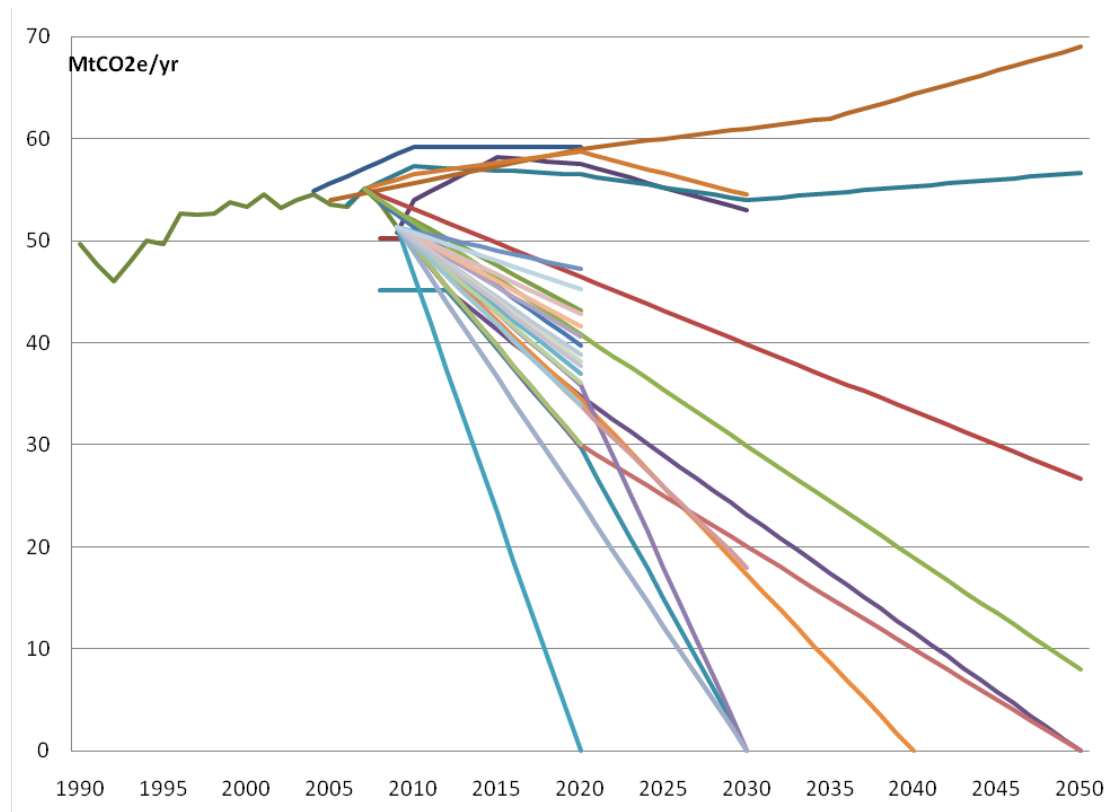


Figure 2. The graph shows all available data towards 2050 on desired or recommended emissions, the Kyoto target and business as usual scenarios.

The available data may be framed differently, for example in the simpler manner shown in Figure 3 This figure is based on the same data, but only up to 2020. Also, we have only included stakeholders who provided explicit statements about domestic emissions.

4.2 The suggested climate indicator

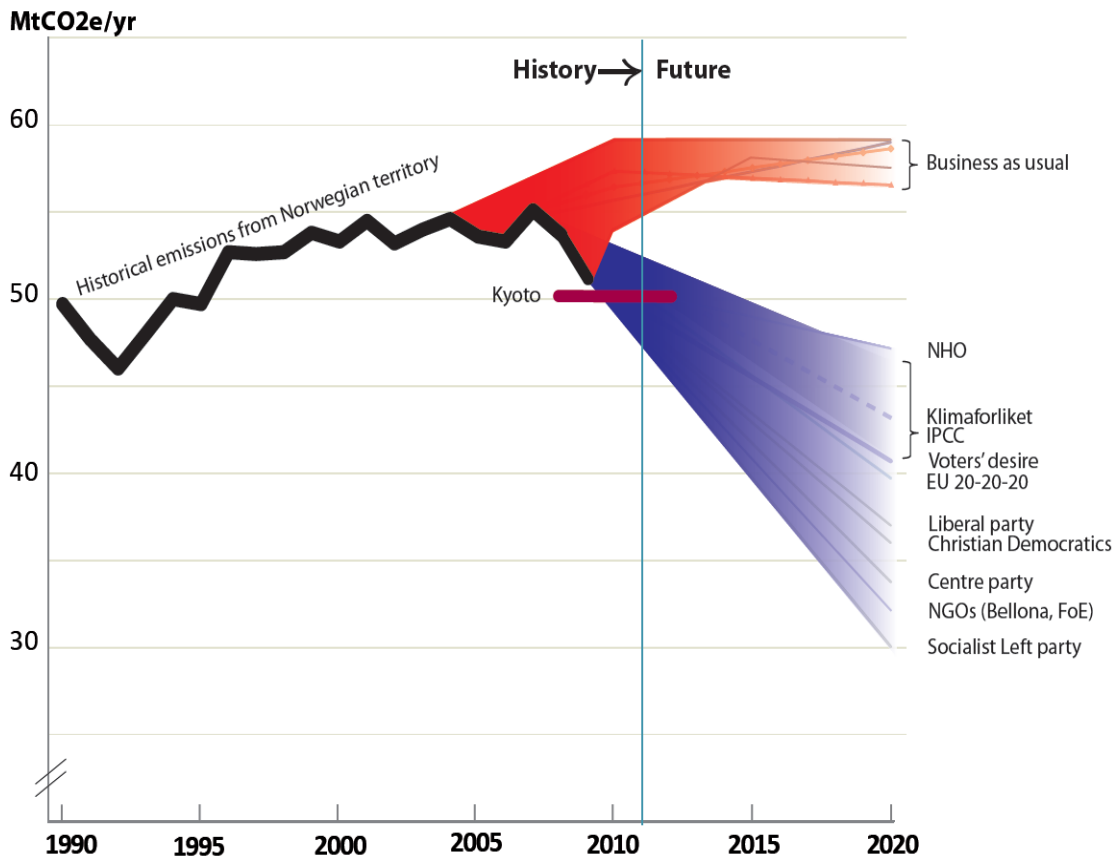


Figure 3. Our proposal for a forward looking indicator for climate gas emissions, showing the wide variety in stakeholder (political) views.

The black curve in Figure 3 is the historical emissions from Norwegian territory (SSB, 2011), the red area indicates different business as usual scenarios³ and the blue area indicates different recommendations of desired emission paths from the time of presentation to 2020. We have included goals found in the political programs of The Socialist Left Party (SV, 2009), The Centre Party (SP, 2009), The Christian Democratic Party (KrF, 2009) and The Liberal Party (V, 2009).⁴ 3 of the 7 main parties are not included (The Labour Party, The Conservative Party and The Progress Party) as they have not quantified in their political programs what fraction of the cuts they want to do inland. The line indicating “Klimaforliket” shows an agreement between 6 of the 7 main parties on Norway’s goal for 2020 (The

³ Business as usual scenarios (in the order from the top in the year 2020 in Figure 3) are taken from Nasjonalbudsjettet 2007 (St.meld. nr. 1 (2006–2007)), Lavutslippsutvalget (NOU 2006:18), Klimakur 2020 (2010), Nasjonalbudsjettet 2011 (Meld. St. 1 (2010-2011)), Perspektivmeldingen (St.meld. 9 (2008-2009)).

⁴ The Centre Party wants carbon neutrality in 2030 with 2/3 reductions domestically. We assume this is compared with the reference path in Perspektivmeldingen. The Christian Democrats want 25-30 percent reduction compared with 1990; hence we assume 27.5 percent.

Progress Party did not agree).⁵ The line indicating NGOs is an average of two environmental organizations (Bellona, 2009, Friends of the earth Norway, 2011).⁶ Included is also the NHO - Confederation of Norwegian Enterprises (NHO, 2009).⁷ The Norwegian Confederation of Trade Unions (LO) have not made a similar recommendation. The Kyoto goal shows Norway's commitment according to this agreement. EU 20-20-20 indicates what Norway would need to do in order to follow the EU's scheme of 20 percent cut in emissions by 2020, compared with 1990. The area covered by IPCC indicates the recommended 50-85% reductions necessary if applied to Norwegian domestic emissions. Citizens' opinions are taken from a poll in which respondents were asked how much they want Norway to emit in 2020. This poll was carried out in cooperation with TNS-Gallup in December 2010. The sample of 1008 respondents was representative for Norway (TNS-Gallup, 2011). The respondents were asked how much they were willing to reduce domestic emissions by 2020, and indicate this by pulling a slide along a vertical line resembling the vertical axis and the emission level for 2020 (MtCO₂e/yr) in Figure 3. They were also informed about the ambition levels of various stakeholder groups. The respondents could then use all of this information as a basis for their own recommendation concerning emissions cut by 2020. As it is difficult to show all information in one figure, Figure 4 shows the respondents' recommendations, distributed according to what political parties they voted for.

We propose that this indicator should be updated annually, like most other quantitative indicators. The older graphs should be stored, so it will be possible to follow the evolution of the graph over time. If the indicator was made available on the internet, it could be made interactive, deeper and more flexible. For example, the user could point to one of the recommendations, click and get access to all data. The indicator should be dynamic and continuously updated as new information becomes available.

⁵ In Klimaforliket there is an agreement of 15-17 MtCO₂e/yr by 2020 compared with the reference path in Nasjonalbudsjettet 2007 (St.meld. nr. 1 (2006–2007)). We assume 16 MtCO₂e/yr.

⁶ Friends of the earth want 40 percent reductions within 2020. We assume this is compared with 1990 emission levels.

⁷ NHO wants reductions by 12 MtCO₂e/yr by 2020. We assume this is compared with the reference path in Nasjonalbudsjettet 2007 (St.meld. nr. 1 (2006–2007)).

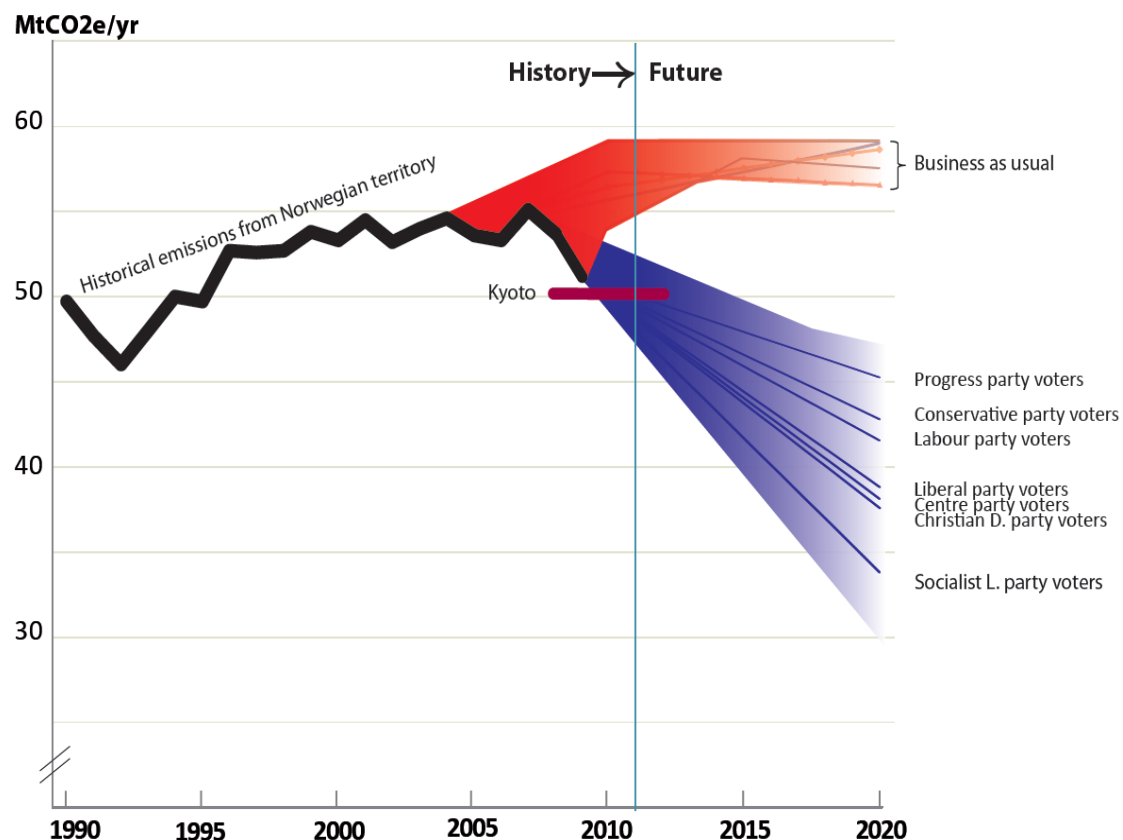


Figure 4. The forward looking greenhouse gas emission indicator, showing the desired emission levels from voters on different political parties in relation to business as usual scenarios and the recommendations made by other stakeholders' views (which is spanned with the blue area).

4.3 Forward looking indicators-advantages

The indicator uses projections, not only observations. It aims at revealing the variety of normative recommendations that exist on how much Norway should emit in the future. In that sense it works as a framework to publicize stakeholder views. The indicator provides a “microphone” to those who want to have their say on the issue. The indicator also makes it easier to evaluate whether Norway’s climate policy strategies are sufficient and leads in a direction that is desired. This can be seen if there are deviations between the recommendations and the business as usual scenarios. If the gap is too wide, this may help promoting discussions of the need for proactive action.

The indicator also exhibits information which often is difficult to find, systematize and compare. This makes it easier to orientate and get an overview, and it contributes to making the policy debate more informed and transparent. A user of the indicator, for instance a voter, can quickly see how much Norway emit today, how much will be emitted with continuation as usual, what the national or international commitments and goals are, and how much the different actors recommend or want to emit in the future. The user can compare the goals of the different political parties with what experts, NGO’s or others recommend, and get a quick and helpful overview of the positions. If a user of the indicator has little prior knowledge and sees that his/her political party has agreed to reach a certain level of emissions in 2020, it may be helpful to see what the other parties have promised at the same glance. Furthermore the

parties' ambitions can be compared with business as usual forecasts, and this will reveal something about their ambitions levels. A user may also find it valuable to see that in spite of the large disagreements between the recommendations, there may still be agreement that reductions should be carried out. In the current Norwegian case there appears to be general agreement that reductions should be taken domestically. In other words, there appears to be agreement between experts, politicians, NHO, the environmental organizations, and the population at large that the BAU path is not desired. So although there is a general disagreement on the detailed emission goals for 2020, there is more or less unanimity on the undesirability of business as usual. This is itself a clear message, and may provide more legitimacy for stricter policy decisions.

The proposed indicator can also tell which actors have not yet provided a public opinion in the topic. For instance, neither of The Labour Party, The Conservative Party, The Liberalistic Party, and The Norwegian Confederation of Trade Unions (LO) have made it clear how much they want to reduce domestically. The figure does not include their view. The proposed indicator can bear pressure on stakeholders and others to publicize their views.

Making the different recommendations visible could encourage public discussion and knowledge. It could also enhance interest in the Government's sustainability strategy. All of the above would be strengthened if the indicator was made available on the internet and updated regularly.

4.4 Shortcomings of forward looking indicators

The way we have produced the lines denoting "citizens' opinions" deserves further discussion. It is not simple to respond to a question about what will constitute a desired emission level in the future. The respondent may be uncertain about the business as usual scenario, what options exist for reductions, and what they might cost. The respondent may be uncertain about what s/he thinks is the desirable combination of reductions at home and reductions abroad (i.e. purchase of emission rights). And finally, the respondent may be uncertain about whether to include the emissions from the productions of goods that are later imported to Norway. All these uncertainties make it difficult to ask unambiguous questions, and to obtain comparable answers. Furthermore, the concept of emissions may be hard to grasp, and costs expressed in future fractions of GDP similarly meaningless. It probably would be useful to ask in terms of something that the respondents use and value in their daily life and which would possibly be jeopardized through climate change. For instance, the number of rainy days during the summer, the number of subfreezing winter days, etc. The issue of a graspable numeraire is outside the scope of this article.

More concretely, the scale used by the respondents to indicate their recommended emission level did not allow for levels below the lowest of the stakeholders and political parties (i.e. 30 MtCO₂e/yr). This probably biased the answers toward higher levels than if they had been allowed to indicate even stricter emission targets.

Although the proposed indicator might help public involvement in the policy dialogue in itself, public participation in its updating might be even more engaging. Our indicator serves as a first step towards making explicit the existence of the wide variety of values and interest that influence decision making on sustainability matters.

5 Conclusions

Sustainable development indicators are often used to survey the development of environmentally and socially important variables. Norway has 18 indicators, intended to measure the progress in the country's strategy for sustainable development. One of the indicators addresses the climate challenge. It shows Norway's historical emissions and the cuts needed to comply with Norway's Kyoto commitment. Like most common indicators, Norway's climate indicator does not provide information on how much Norway will emit into the future, and therefore says little about the sustainability of a future Norway. We have proposed a forward looking, actor based, indicator for climate gas emissions summarized in Figure 3. The proposed indicator gives a better view of the future, in the form of recommendations by various stakeholder groups. And it gives a slightly better indication of the future sustainability of Norway, by enabling comparisons of the business as usual path and the various stakeholders' views with that of expert assessments of what it will take to achieve climate sustainability. To better measure progress against sustainability, we need similar forward looking indicators for a range of sustainability dimensions.

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