Pathways to net-zero emissions by 2030 for Norway – too ambitious to be true?

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Overview

Several countries have decided to reach net-zero greenhouse gas emissions by mid-century. Norway stands out as a forerunner by having this goal already for 2030. Still, as opposed to Norway's international commitments for 2030 in the Paris Agreement and the Fit-for-55 collaboration with the EU, the net-zero ambition is not well-defined, not stated by law or international agreements nor operationalised by concrete action plans. This paper scrutinises the net-zero concept in the Norwegian setting, propose feasible and reasonable operationalisations and analyse their macroeconomic implications in a 2030 perspective and in the longer term.

Methods

The paper includes a close evaluation of Norway's net-zero options with references to expert interviews and documented policy and research assessments. Based on this insight, we simulate eight policy scenarios with the global CGE model SNOW that are compared with a benchmark reflecting economic and emission projections without novel policies. The model is calibrated with consideration to anticipated abatement potentials and costs for Norway and the EU in the coming decade. (The estimations are documented in the full paper.). Focus is particularly on the European and Norwegian economies and their Fit-for-55 collaboration.

The eight scenarios represent four policy packages introduced into two different regimes, one where Norway can swap EU ETS allowance purchases for domestic emission cuts (ETSLINK) and another where all abatement by assumption takes place domestically (NOLINK). The latter is an expressed goal of the present government but not legally binding. The policy scenarios include one that includes the NDC and Fit-for-55 commitments (COMM) and three that add different net-zero strategies (NZ-OF, NZ-AB and NZ-RE) – see Table. In NZ-OF the strategy is to balance residual domestic emissions in COMM by buying international offsets. NZ-AB assumes that domestic abatement measures still left after COMM fulfilment will added to those in COMM, while NZ-RE also adds available domestic natural and technological CO_2 removal measures.

	COMM	**NZ-OF**	**NZ-AB**	**NZ-RE**
ETSLINK	X	X	X	X
NOLINK	X	X	X	X

Results

To obtain net-zero emissions, the NZ-OF strategy is undoubtedly the cheapest. We identify three types of international offsets to be considered: EU ETS allowances, credits under the auspices of the UNFCCC's Article 6 and from the voluntary carbon markets. Our analysis concludes that purchasing EU ETS allowances as a means of approaching net-zero emissions is infeasible. Under current rules, Norwegian purchase and deletion would as a default be reported as EU, not Norwegian, achievements. Concerning Article 6 mechanisms, these are banned by the EU as a tool for meeting international commitments. This also legally binds Norway but does not apply to measures exceeding the Fit-for-55 commitments. Notwithstanding, there are specific reasons for EU's ban and these currently lag the establishment of Article 6 mechanisms: Their climate impacts are regarded uncertain and unverifiable, and there has been disagreement about the rules for avoiding 'double-counting'. Besides, since the EU still holds back, their market fundament is seriously weakened. On the other hand, accumulated experience from the ever more active trading going on in various voluntary markets is promising wrt. learning about standards, regulations and monitoring. Indeed, a plausible outcome is that the distinction between UNFCCC and voluntary credits can be wiped out. In our NZ-OF simulations we assume that Norway buys equal shares of UNFCCC and voluntary offsets.

The NZ-AB strategy will involve implementing costly and risky projects with relatively small remaining potential, particularly when introduced in the NOLINK regime, where much of the domestic potential is already used to meet Norway's international commitments. In NZ-RE, both natural and technological options are identified. Natural options largely consist of well-known technologies and practices, embracing carbon storage through changes in

forestry and other land use activities. Net CO_2-removal in forests will be affected by changes in total forest area (deforestation and afforestation) and changes in management of existing forests. The potential for domestic forest-based measures for approaching new zero is restricted, since first the LULUCF commitments in the EU agreement will have to be met. Many measures have long time horizons and will provide only minor added net removal by 2030. Relatively low-cost 2030 potential lies in reducing the high rate of land take for raising infrastructure, buildings, industry etc. We expect such measures to be controversial and seriously impeded by societal resistance. Technological carbon removal options typically involve highly science-based, immature, large-scale investments. Policies, regulations and business models are expected to develop slowly, leaving the potential in 2030 modest. Direct air capture and combining bioenergy with CCS in waste incineration are the most likely. Their costs exceed costs of most marginal abatement options in NZ-AB.

Our simulations of the COMM scenarios reveal that the Norwegian international commitments towards 2030 are most cost-effectively implemented in the ETSLINK regime. The Fit-for-55 commitments also involve net-zero LULUCF emissions compared to a specified reference period, which is assumed obtained primarily by reduced deforestation and modified forest management techniques. In the ETSLINK regime, domestic ETS emissions are found to be cut by 40%, while the remaining commitment of this sector is fulfilled by purchasing ETS allowances at 170$ each (corresponding to another 10% cut from the benchmark). Abatement of non-ETS emissions is by assumption made within Norwegian territory. Marginal abatement cost reaches 340$. The overall abatement cost measured as the percentage welfare deterioration amounts to 5%, which is considerable. In the NOLINK regime, the cost rises further, along with increased marginal cost of abating ETS emissions to 340$.

Adding the use of international offsets to balance the remaining gross emissions in NZ-OF will hardly affect welfare. The price of buying 50% UNFCCC and 50% voluntary market credits has a medium estimate of merely 10$/ton CO_2. The offset strategy becomes least costly when introduced in the ETSLINK regime.

In the NZ-AB and NZ-RE scenarios, the net-zero target is not reached because there are too few feasible domestic options. This applies particularly in the NOLINK regime, as explained above. Thus, to reach the net-zero ambition, international offsets (in the same proportions as in NZ-OF) are assumed to balance the remaining gross emissions, though without much extra cost.

Conclusions

Preliminary results indicate that the potential for eliminating net emissions by domestic measures within 2030 is not present. Thus, Norway needs to resort to carbon offsets. Using ETS allowances beyond the Fit-for-55 commitments is not an option. Cheap UNFCCC and voluntary credits with more uncertain emissions impact will likely be accessible. The results also indicate that the cost differences across the two regimes with and without exploiting the EU ETS, are considerable for the policy scenarios where not all feasible domestic abatement measures eventually will be implemented

Beyond 2030, the cost of domestic abatement and CO_2 removal can be expected to fall as new and immature technologies develop, commercialises and spread. This will also affect the prices of international offsets. However, their prices will expectedly rise towards 2050, as the number of countries with net-zero commitments increases and as their qualities improve. We expect the cost difference to shrink between prices of international offsets and domestic abatement projects.

A policy-implication of these preliminary conclusions is that the Norwegian net-zero ambition would be more constructive if formulated less in terms of short-run net emission cuts and more in terms of preparing for a competitive and sustainable economy in agreement with the temperature goal of the Paris Agreement. Norway should look for areas where it can be expected to benefit from head-starting the net-zero efforts, even if the ambition is met later than 2030. Examples for such areas are shifting to land use and forestry practices that can prepare for increased emissions uptake in the longer run, conduct research on and develop immature abatement and removal technologies, as well as work internationally for agreements on rules and accounting principles in the fields of carbon removal and of offsets markets. Transformation indicators beyond emission indicators should be operationalised that can monitor, for instance, low-carbon and carbon-removal investments and R&D expenses, new green businesses and products, land use shifts and sectoral reallocations.