



To: EFTA Surveillance Authority

Date: 2 April 2025

From: The Norwegian Ministry of Energy

Copy: The Norwegian Ministry of Trade, Industry and
Fisheries

Background

The Norwegian Ministry of Energy (the “Ministry”) has conducted a public consultation concerning a support scheme for floating offshore wind in the two areas Vestavind B and Vestavind F. The purpose of the consultation, which ended 6 September 2024, was *inter alia* to consult publicly on competition impacts and proportionality of the support scheme. The consultation was conducted following the Commission’s Guidelines on State aid for climate, environmental protection, and energy 2022 (“CEEAG”), which require that a response summarizing and addressing the input received during the consultation is published. This memo constitutes the Ministry’s response to the input received during the public consultation.

The consultation

CEEAG requires that EEA/EU Member States consult publicly the competition impacts and proportionality of measures to be notified. For measures where the estimated average annual aid to be granted is at least EUR 150 million per year, the consultation must have a duration of minimum six weeks and cover the following topics:

- (i) Eligibility
- (ii) Method and estimate of subsidy per tonne of CO₂e emissions avoided (per project or reference project)
- (iii) Proposed use and scope of competitive bidding processes and any proposed exceptions
- (iv) Main parameters for the aid allocation process including for enabling competition between different types of beneficiary
- (v) Main assumptions informing the quantification used to demonstrate the incentive effect, necessity and proportionality

In a memo outlining the scheme, the Ministry requested feedback from the hearing bodies on 16 questions covering the topics (i) – (v) listed above.¹² The questions are enclosed below as appendix 1. The consultation period was ten weeks, from 28 June to 6 September 2024.

The Ministry has previously conducted a public consultation concerning the allocation model, qualitative criteria and support scheme for Utsira Nord. The consultation was conducted back in December 2020. The current measure to be notified comprise Utsira Nord, however the public consultation also included the remaining part of Vestavind F and Vestavind B.

All answers received concerning the questions in annex 1, with the Ministry's response to each answer, are listed in annex 2. A brief summary is provided in the following section.

Summary of answers received and the Ministry's response

Concerning *eligibility*, the measure to be notified is limited to floating offshore wind, which means all projects offshore that harness / utilize wind energy for electricity generation. The majority of the respondents agreed with the Ministry's assumption that floating offshore wind is the only eligible technology within Vestavind F and B that is able to generate electricity in the required scale and within the desired timeframe.

As for the *method and estimate of subsidy per tonne of CO₂e emissions avoided*, the hearing bodies agree with the Ministry's proposal of using the Innovation Fund's method. The respondents also proposed specific changes to how the calculations should be performed. The Ministry will estimate subsidies per tCO₂e emissions avoided using the proposed budget of 35 bNOK and the IF methodology. Furthermore, the Ministry will calculate the CO₂ emission avoidance over 30 years. Life-cycle emissions for the reference project will be set according to the estimates from the Sørilige Nordsjø II applications and Brussa et. al (2023). Finally, EU's reference scenario in year 2035 is proposed as a reference scenario.

Regarding *the proposed use and scope of competitive bidding processes*, the Ministry requested input on the proposed two-step model. The Ministry also requested input on whether the respondents preferred one single auction for state aid comprising all the awarded project areas, or two separate auctions split between the project areas within Utsira Nord and the remaining project areas. The majority of the respondents were in favour of having two separate auctions for state aid and argued that the Ministry should proceed with Utsira Nord first, as it is already opened for activity pursuant to the Offshore Energy Act and thus differs from Vestavind B and F (not counting Utsira Nord) in terms of maturation.

¹ Note that point (vi) *Where new investments in natural gas based generation or industrial production may be supported, proposed safeguards to ensure compatibility with the Union's climate targets*, was not included since the measure pertains to floating offshore wind.

² The questions are listed in Appendix 1.

As for the *main parameters for the aid allocation process, incl. for enabling competition between different types of beneficiaries*, the Ministry included a short description of the suggested project area allocation procedure, including the five main criteria on which the applications will be assessed. The Ministry requested input on whether the state aid should be distributed in the form of a two-sided contract for difference or as investment aid. The majority of the respondents preferred contract for difference and underlined the importance of an uncapped contract with indexation. Some respondents preferred investment aid.

Regarding the *main assumptions informing the quantification used to demonstrate the incentive effect, necessity and proportionality*, the Ministry considers that the proportionality of the measure will be ensured by the competitive bidding process which is to take place. Consequently, it is in principle unnecessary to undertake a funding gap analysis to determine that the aid corresponds to the net extra costs necessary to meet the objective of the measure in question, compared to the counterfactual scenario in the absence of aid. Nevertheless, the Ministry has analysed the costs and net present value of developing floating offshore wind in Vestavind B and F through a reference project. The Ministry requested feedback from the respondents on the assumptions and estimates on which the reference project was based. The majority of the respondents referred to the assumptions and estimates as less representative of the actual costs of a 500 MW floating offshore wind facility. The Ministry interprets the input as an indication that its estimates are at the lower end, underlining the necessity and incentive effect of the aid.

In line with the requirements of CEAAG point 101 the Ministry has considered whether possible negative impacts on competition can be minimized through the scope or eligibility of the proposed measure. The Ministry is of the view that since aid under the measure will be awarded based on a competitive bidding procedure in the form of a monetary auction, effects on competition will be limited. The competitive procedure is designed to limit the aid to the absolute minimum necessary. The measure reflects the physical properties of Utsira Nord, as well as large parts of the Norwegian sea areas. Most of the Norwegian sea areas are only suitable for floating offshore wind, and too deep for bottom-fixed technology. The physical characteristics of Utsira Nord make floating offshore wind the only relevant technology, as alternative technologies for offshore energy production, such as wave power, are not sufficiently mature to ensure production capacity on the same scale.³

³ See also consultation responses to question 2 below.

Appendix 1: Consultation questionnaire

The following questions were raised by the Ministry in the public consultation:

1. Gitt at energiproduksjonen skal foregå til havs i Vestavind F og Vestavind B, med disse områdenes tekniske og geografiske forutsetninger, har høringsinstansene synspunkter på departementets begrensning av støtteordningen til flytende havvindteknologi?

Given that energy production is to take place offshore in Vestavind F and Vestavind B, with the technical and geographical conditions of these areas, do the consultation bodies have any views on the Ministry's limitation of the support scheme to floating offshore wind technology?

2. Har høringsinstansene synspunkter på om andre teknologier enn flytende havvind kunne gitt fornybar kraftproduksjon i samme skala i Vestavind F eller Vestavind B?

Do the consultation bodies have any views on whether other technologies, besides floating offshore wind, could generate renewable power on the same scale in Vestavind F or Vestavind B.

3. Departementet ber om høringsinstansenes syn på hvilken tildelingsmodell som er best egnet for flytende havvind: 1) den skisserte tostegsmodellen, eller 2) tildeling av prosjektområde og støtte i én felles auksjon etter prekvalifisering. Høringsinstansene bes om å begrunne sitt prefererte alternativ, inkl. vurdere hvilke av de to modellene som i størst grad legger til rette for realisering av flytende havvind, lavest mulig støttenivå, samt effektiv konkurranse om prosjektområder og statsstøtte.

The Ministry is requesting the views of consultation bodies on which allocation model is best suited for floating offshore wind: 1) the proposed two-step model, or 2) allocation of project area and state aid in one joint auction after a prequalification process. The consultation bodies are asked to justify their preferred alternative, including assessing which of the two models best facilitates the realization of floating offshore wind, the lowest possible level of support, as well as effective competition for project areas and state support.

4. Departementet ber om eventuelle ytterligere innspill til hvordan bruken eller omfanget av konkurranse i tildelingsmodellen kan innrettes for å oppnå effektiv konkurranse om statsstøtte.

The Ministry requests any further input on how the use or scope of competition in the allocation model can be adjusted to achieve effective competition for state aid.

5. Departementet ber om eventuelle innspill til tilnærmingen for å tildele prosjektområder i tostegsmodellen, herunder foreslåtte hovedkategorier for kvalitative kriterier.

The Ministry asks for any input on the approach for allocation of project areas in the two-stage model, including proposed main categories for qualitative criteria.

6. Departementet ber om innspill til de ulike skisserte alternativene for selve støttekonkurransen, se pkt. 5.3. Departementet ber også om eventuelle ytterligere innspill til hvordan støttekonkurransen bør innrettes for å oppnå høyest mulig konkurranse om statsstøtten.

The Ministry asks for input on the various alternatives outlined for the state aid competition itself, see section 5.3. The Ministry is also asking for any further input on how the grant competition should be structured in order to achieve the highest possible level of competition for state aid.

7. Departementet ber om innspill på om støtte bør tildeles i form av en tosidig differansekontrakt eller som investeringsstøtte. Det bes om at innspillene begrunnes og at det også forklares hvilket av alternativene som antas å gi lavest støttebehov.

The Ministry is requesting input on whether support should be provided in the form of a two-way Contract for Difference (CfD) or as investment aid. The input should include a rationale, and an explanation of which option is expected to require the least amount of support.

8. Departementet ber om høringsinstansenes tilbakemelding på departementets vurdering av at flytende havvind i de aktuelle områdene ikke vil bli realisert uten støtte.

The Ministry requests feedback from consultation bodies on the Ministry's assessment that floating offshore wind in the relevant areas will not be realized without support.

9. Departementet ber om innspill på om anslagene som er presentert er i tråd med høringsinstansenes forventninger til kostnader, inntekter og netto nåverdi, gitt forutsetningene som ligger til grunn for anslagene.

The Ministry requests input on whether the estimates presented are in line with the consultation bodies' expectations regarding costs, revenues, and net present value, given the assumptions underlying the estimates.

10. Departementet ber om innspill på om noen av forutsetningene som ligger til grunn for anslagene bør justeres. Høringsinstanser som foreslår justeringer bes om å begrunne justeringene og beskrive hvordan endrede forutsetninger eventuelt vil påvirke anslagene.

The Ministry requests input on whether any of the assumptions underlying the estimates should be adjusted. Consultation bodies proposing adjustments are asked

to justify the changes and describe how altered assumptions would affect the estimates.

11. Departementet ber om innspill på om det er andre inntekter enn kraftinntekter som vil kunne påvirke nettonåverdi, og eventuelt anslag på størrelsen på slike inntekter.

The Ministry requests input on whether there are other sources of revenue, besides electricity revenues, that could affect net present value, and if possible, provide estimates of the size of such revenues.

12. Departementet ber om innspill på om det er andre kostnader enn de oppgitte investerings- og driftskostnadene som kan påvirke netto nåverdi og eventuelt størrelsen på disse kostnadene.

The Ministry requests input on whether there are other costs, in addition to the specified investment and operating costs, that could affect net present value and, if applicable, the size of these costs.

13. Departementet ber om innspill til foreslått metode for å beregne subsidier per tonn CO₂-ekvivalenter unngåtte utslipp. Høringsinstanser som foreslår eventuelle alternative metoder eller justeringer av den foreslåtte metoden bes om å både beskrive og begrunne preferanse for alternativ metode.

The Ministry requests feedback on the proposed method for calculating subsidies per ton of CO₂-equivalent emissions avoided. Stakeholders proposing alternative methods or adjustments to the proposed method are asked to both describe and justify their preference for an alternative method.

14. Departementet ber om eventuelle innspill til estimatene for subsidier per tonn CO₂e. Høringsinstanser som foreslår justeringer bes om å beskrive forutsetningene og framgangsmåten som ligger til grunn for estimatet.

The Ministry requests feedback on the subsidy estimates per ton of CO₂-equivalents. Stakeholders proposing adjustments are asked to describe the assumptions and approach underlying the estimate.

15. Departementet ber om eventuelle innspill til vurderingen av hvordan støtten virker sammen med andre virkemidler.

The Ministry asks for any input to the assessment of how the state aid will work with other instruments.

16. Departementet ber om eventuelle innspill til estimatet for klimagassutslipp fra flytende havvind. Eventuelle høringsinstanser som foreslår justeringer bes om å både beskrive og begrunne justeringsforslaget.

The Ministry asks for any input on the estimate of GHG emissions from floating offshore wind. Consultation bodies that propose adjustments are asked to both describe and justify the proposed adjustment.

Appendix 2: Input received during the public consultation and the Ministry's response

Input received	Response by the Ministry
Question 1	
<p><i>Input 1:</i> The majority of the respondents agree on limiting the support scheme to floating offshore wind.</p> <p><i>Input 2:</i> One respondent noted that including other renewable technologies would increase the complexity of the support scheme. ⁴</p> <p><i>Input 3:</i> One respondent pointed out that the proposed support scheme for floating wind deviates from CEEAGs principle of a technology neutral approach and is generally arguing that nuclear power is a viable alternative to floating wind.⁵</p>	<p><i>Response 1-2:</i> The Ministry notes that the majority of the respondents agree with the Ministry's assessment in limiting the support scheme to floating offshore wind technology in the Vestavind F and B areas.</p> <p><i>Response 3:</i> The Ministry notes that nuclear power is not a viable option within Vestavind F and B, and therefore falls outside the scope of this consultation.</p>

⁴ See EnBW

⁵ See Norsk Kjernekraft

Question 2

Input 1:

The majority of feedbacks from the consultation is that no other offshore renewable technology can provide reliable, large-scale renewable power within the given timeframe comparable to floating offshore wind in the Vestavind F or Vestavind B areas. Some argue that other offshore renewable technologies are less mature and would yield lower power at a higher cost compared to floating offshore wind.

Input 2:

Some respondents further elaborated that the areas have already undergone extensive democratic processes (public hearings, identification process) with regards to the viability of other renewable technologies⁶. The conclusion from these processes was that these areas are particularly suitable and identified for developing floating offshore wind.

Input 3:

Some of the respondents have mentioned that other nascent technologies can complement/co-exist along with floating wind⁷. For example, one respondent mentioned the possibility of a multi-use floater concept that combines wind turbines with wave power. Another respondent mentioned that floating solar can complement floating offshore wind.

Response 1:

The Ministry has taken note of this remark. The Ministry's assessment is that other offshore renewable energy technologies are not sufficiently mature to generate similar power yields compared to floating offshore wind given the expected timeframe.

Response 2-3:

The Ministry has taken note of this remark.

⁶ See e.g. Fornybar Norge, Vårgrønn

⁷ See e.g. 1-Tech BV, Siravind

Question 3

Input 1:

The majority of the respondents agree that the proposed two-step model (Alternative 1) is best suited for the upcoming floating wind tender rounds within Vestavind F (incl. Utsira Nord) and Vestavind B. The majority argue that this model will give appropriate time to mature and de-risk the projects in close collaboration with the supply chain prior to the competition for state support. This will improve the quality of the projects, increase the quality of competitive bids, and increase the probability of project realisation compared to the other alternative joint model (alternative 2). Therefore, the majority argued that it is reasonable to assume that the requirement for state support will be lower in the two-step model (alternative 1) compared to the joint model (alternative 2).

Input 2:

Some mentioned that their support for the two-step model is conditional on the clarification surrounding step 2 prior to the competition for area allocation.⁸

Input 3:

TSO Statnett supported the 2-step model as they believe this would lower the risk of grid delays compared to alternative 1.

Input 4:

One respondent noted that they believe both models could work.⁹

Input 5:

The majority of the respondents recommended that projects that fail in the first state aid auction round should retain the right to the area and be eligible for participation in future competitions for state support.

Response 1:

The Ministry has taken note of this remark.

Response 2:

The Ministry has taken note of this remark and will provide further clarifications when announcing the competition.

Response 3-5:

The Ministry has taken note of this remark.

⁸ See Offshore Norge

⁹ See Vattenfall/Seagust

Question 4

Input 1:

In general, the majority of the respondents believe that the two-step model will generate significant and sufficient competition.

Input 2:

Some have recommended adjustments to different phases of the two-step model which can further enhance an effective competition.

Some of these recommendations are related to clarifications to key information ahead of the competition for area allocation such as the need to clarify the grid connection solution and its division of roles and responsibilities with regards to developing, financing, and operations. The Norwegian Regulatory Authorities (RME) recommended that the regulatory framework surrounding grid and production should be clarified in advance of the area allocation competition in order to reduce the developers risk premium.

Additionally, some of the respondents added that the clarifications surrounding the timing and framework of the state support competition should be released ahead of the area allocation competition.

On the topic of the chosen project concept, one respondent highlighted that the authorities should provide as much flexibility, alternatively set boundaries which the developers must obey, instead of having to deliver on the set project concept in their application.¹⁰

Another respondent proposes a balance between committing to the project concept and flexibility to do necessary adjustments.¹¹

Some have highlighted that the framework and timeline for the next support competition should also be clarified ahead of this competition round.

Input 3:

One respondent proposed a measure to allocate the additional areas in Vestavind F as options to the awarded developers of Utsira Nord.¹²

Response 1-2:

The Ministry has taken note of this remark and will provide further clarifications when announcing the competition.

Response 3:

The Ministry has taken note of this remark, however the remaining parts of Vestavind F is not opened for offshore wind.

¹⁰ See e.g. EnBW

¹¹ See e.g. Aker Offshore Wind / Oean Winds / Statkraft

¹² See e.g. Utsiravind

Question 5

Input 1:

In general, the majority of the respondents support the award of projects areas based on qualitative criteria. The majority also believe that the outlined main criteria (cost level 2030, innovation and technology development, execution capability, sustainability, and positive ripple effects) are relevant and provide a good basis for selection of the best projects for this round.

Input 2:

Some of the respondents argue that the “execution capability” should have a higher weighting, and that less weight should be placed on the “cost level 2030” criteria.

Input 3:

The majority underlined the importance to evaluate the credibility and realism of the “cost level 2030” and “innovation criteria”.

Input 4:

Some have proposed that the timing of the criteria cost level year 2030 and innovation and technology development should be adjusted further out to reflect the current delays.¹³

Input 5:

The majority pointed out that any additions to the current qualitative criteria would be time-consuming, costly, and delay the process further. The majority highlight that any changes to the criteria will need to be clarified to the developers in well advance of the competition. This is necessary to provide them with time to adjust the applications.

Input 6:

Some respondents propose adding new criteria. One respondent proposed adding a criterion to reflect the developer’s ability

Response 1-5:

The Ministry has taken note of this remark and will provide further clarifications when announcing the competition. The Ministry agrees that it is important to evaluate the credibility and realism of the “cost level 2030” and “innovation” criteria.

Response 6-7:

The Ministry has taken note of this remark.

¹³ See e.g. Fornybar Norge, Aker Offshore Wind/Ocean Winds/Statkraft.

<p>for system integration.¹⁴ One of the respondents propose adding a co-location criterion¹⁵. The Norwegian Water Resources and Energy Directorate (NVE) proposed including technology developments within grid connection solution into the innovation and technology development main criteria.</p> <p><i>Input 7:</i> Some propose to set up an expert panel committee composed of external and neutral professionals to evaluate the applications.¹⁶ Some argue that the authorities need to put in place an enforcement mechanism to avoid overpromising and under-delivery¹⁷.</p>	
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¹⁴ See Nordvegen Vind

¹⁵ See Belona, Norges Fiskarlag

¹⁶ See Aker Offshore Wind/Ocean Winds / Statkraft

¹⁷ See e.g. GCE Node,

Question 6	
<p><i>Input 1:</i> The majority agree that option 2 (two separate but consecutive competitions) is the preferred approach. The majority of the respondents agree that the first competition should be for the project areas in Utsira Nord. The majority have argued that a possible inclusion of all project areas within Vestavind F and Vestavind B in a joint competition will lead to delays of the competition.</p> <p><i>Input 2:</i> With regards to the outlined alternatives to awarding support per project or per MW, the majority propose alternative A (support per project for Utsira Nord), and for a minimum two projects in each area. If the alternative used is per MW, some have highlighted the need for additional clarification from the authorities.</p> <p><i>Input 3:</i> Some have noted that for future tenders round it would be appropriate to use per MW, especially when the competing projects areas are in different locations. ¹⁸</p>	<p><i>Response 1-2:</i> The Ministry has taken note of this remark and will provide further clarifications when announcing the competition.</p> <p><i>Response 3:</i> The Ministry has taken note of this remark.</p>

Question 7	
<p><i>Input 1:</i> In general, the majority of the respondents responded that a “well-designed” Contract for Difference (CfD) is the optimal support instrument to attract competition, lower risks, reduce costs, and therefore leads to</p>	<p><i>Response 1-5:</i> The Ministry has taken note of this remark. Due to budgetary considerations, an uncapped CfD is not a feasible option. The Ministry will provide further</p>

¹⁸ See e.g. EnBW, Nordvegen vind, RWE/NTE

<p>the least amount of government support. A well-designed CfD is generally described by the respondents as uncapped, 2-sided, long term (15-20 years), with an indexed-modelled contract price. Conversely, a CfD that differ from this, will lead to higher risk, higher costs and lower competition.</p> <p><i>Input 2:</i> However, if a well-designed CfD is not feasible some of the respondents argue that an investment support scheme is the second to best alternative.</p> <p><i>Input 3:</i> Some argue that investment support is the best alternative, with a couple of respondents noting that it will lead to lower total support amount paid out by the government compared to a CfD. ¹⁹ It is noted by some that the developers can benefit from other incomes sources through the balancing markets or through long-term PPAs. Some point out that the payment of the investment support should occur as early as possible.</p> <p><i>Input 4</i> One respondent proposed a hybrid approach mixing certain properties from both an investment support scheme and a CfD scheme. This would entail an upfront investment aid combined with a determined power price floor. ²⁰</p> <p><i>Input 5:</i> Statnett emphasizes the importance of support schemes being designed in a way that encourages stakeholders to participate in balancing markets.</p>	<p>clarifications when announcing the competition.</p>
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¹⁹ See Shell/Lyse/Eviny, Statkraft, Zero

²⁰ See Nordvegen Vind

Question 8	
<p><i>Input 1:</i> There is a broad agreement among the majority of the respondents that state aid will be required for the development of large-scale floating offshore wind (FOW) projects within the Vestavind B and F areas. It is argued that FOW is still in its early stages, and, along with high associated costs coupled with uncertain income levels, beyond any chance of profitability in the short term (given a Commercial Operation Date in the 2030s).</p>	<p><i>Response 1:</i> The Ministry has taken note of this remark and submitted a proposal for support scheme to the Norwegian Parliament.</p>

Question 9	
<p><i>Input 1:</i> According to the majority of respondents, the costs, revenues, discount rate and resulting net present value (NPV) of the assumed reference project presented in the consultation are not aligned with their expectations.</p> <p>Although recognizing the uncertainty in cost estimates, the majority of the respondents argue that the underlying cost estimates for the assumed reference project are too optimistic and low. This includes costs associated for both the grid connection system and wind farm. Some respondents have noted that costs associated with financing, taxes, interests during construction, and decommissioning have been omitted from the estimates. These are all real costs elements that the developer bears and should therefore be included when determining support level. A couple have also noted suppliers' capacity reservation costs should also be considered in the estimates.</p> <p><i>Input 2:</i> Additionally, it is argued by the majority that the assumed technology choices for the reference project are unrealistic</p>	<p><i>Response 1-3:</i> The Ministry has taken note of this remark. The Ministry takes the input as an indication that its estimates are too optimistic.</p>

assuming an expected commissioning date in the early to mid-2030s. More specifically, there is a consensus that the reference 22 MW turbines (132kv output), 132kv dynamic cables, and 132kv inter-array grid are highly unlikely to be commercially available to the developers within this period. The respondents argue that this will have a significant impact on the estimated total costs, as applying lower rated turbines will require additional components and services (more turbines require more foundations, cables, anchors, vessels, and so on). This downgrade will in turn raise total operations and maintenance cost (OPEX) and investment costs (CAPEX).

Input 3:

Regarding expected revenues, the majority of the respondents argue that the assumed captured power prices based on NVE's long-term forecast are on the optimistic side compared to other forecasts. Although acknowledging that power price forecasts are inherently uncertain, some respondents argue that the assumed revenues should not be solely based on NVE's long-term forecast. To reflect a broader perspective, some have suggested incorporating or supplementing similar long-term power forecasts from other leading consultancies. Notably, according to TSO Statnett, their long-term power forecast for the NO2 price area is lower compared to NVE's forecast. In addition, some have commented that the expected production is uncertain due to the lack of physical wind resource measurement campaigns within the areas.

Input 4:

Some have also pointed out that the simplified NPV assessment in the consultation document should not be interpreted as the level of state aid

Response 4:

The Ministry has taken note of this remark.

necessary to bring projects in Vestavind B and F to fruition.	
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Question 10	
<p><i>Input 1:</i> None of the respondents provide quantifiable adjustments due to confidentiality reasons.</p> <p><i>Input 2:</i> Some of the respondents pointed out the recent result from the AR6 round in which the Green Volt floating wind project was awarded a CfD strike price of 139,93 £/MWh in 2012 prices, which according to one of the respondent converts to approximately 2,7 NOK/kWh in today's value.²¹</p> <p><i>Input 3:</i> The majority highlight that CAPEX costs for both the grid connection system and wind farm are considered too low and should be adjusted upwards. Some added that contingency levels of 10% is considered low when assuming high uncertainty surrounding costs and technological development, and therefore should be adjusted upwards.²² Some of the respondents noted that CAPEX costs associated with the grid will vary from project to project and will be affected by any potential coordinated grid connection. Therefore, this cost element is difficult to pinpoint accurately.</p> <p><i>Input 4:</i> Some have commented that the annual OPEX estimate appear higher than what is expected. Some noted that the decommissioning cost (DECEX) is considered low. One respondent added that it is also necessary</p>	<p><i>Response 1-5:</i> The Ministry has taken note of this. The Ministry takes the input as an indication that its estimates are too optimistic, but due to few reference projects, confidentiality and market and technology uncertainty any updates in estimates will still be extremely uncertain.</p>

²¹ See Vårgrønn

²² See Aker Solutions

<p>to include contingency levels on DECEX as this has been omitted.²³</p> <p><i>Input 5:</i> The majority of the respondents argue that the assumed discount rate of 6% is too low when calculating NPV²⁴. It was argued that floating offshore wind technology is still immature and carries a higher risk profile than bottom-fixed wind, and therefore a higher required return on equity. In addition, debt interest rates have risen in recent years. Some have cited the applied discount rate in the recent French floating wind auction (7,6 – 11%, average 9,3%). It has also been highlighted that DNV applies 8% discount rate in their cost calculations for FOW projects. Applying a higher discount rate will lower the NPV.</p>	
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Question 11	
<p><i>Input 1:</i> Some of the inputs have included other income possibilities such as Guarantees of origin (GoO), balancing services, and integration of hydrogen. However, according to the majority of the inputs, GoO are the most relevant but will at best have a marginal positive effect on the NPV. Some of the respondents were particularly seeking clarity from the authorities on the regulation surrounding GoO.</p> <p><i>Input 2:</i> Without providing specific estimates, TSO Statnett highlighted that potential additional revenues from participating in balancing markets could have an impact on projects net present value.²⁵</p>	<p><i>Response 1-2:</i> The Ministry has taken note of this remark.</p>

²³ See Equinor

²⁴ See Aker Solutions, Aker Offshore Wind/Ocean Winds/Statkraft, Fornybar Norge, RWE/NTE;

²⁵ See Statnett

Question 12	
<p><i>Input 1:</i> The majority do not provide much quantifiable adjustments due to confidentiality reasons. Some respondents underline that the «Over-night» approach applied to the estimation is not realistic and excludes significant financial costs accrued during the development and construction phase. In reality, there are financing costs during the construction period which can typically last for 3-4 years. Additional costs elements that should be added include insurance costs, balancing costs, reservations costs in supply chain, port infrastructure upgrades, decommissioning costs, and taxes. According to one input, the reservation costs in the supply chain can be up to 10% of the contract value.²⁶</p> <p><i>Input 2:</i> It is suggested by some to incorporate a broader scenario sensitivity analysis on the NPV calculations to reflect the highly uncertain cost estimates and to include additional sensitivities by incorporating different long-term power price scenarios.</p> <p><i>Input 3:</i> According to one input, balancing costs costs may be expected to be around EUR 1-2/MWh (real prices basis 2023) in the NO2 electricity price zone.²⁷</p>	<p><i>Response 1-3:</i> The Ministry has taken note of this remark. The Ministry takes the input as an indication that its estimates are too optimistic.</p>

Question 13	
<p>The majority of the consultation bodies are positive to the Innovation Fund's method being used to estimate the subsidy per tonne of CO₂ equivalent</p>	<p><i>Response 1:</i> The Ministry has taken note of this remark.</p>

²⁶ See Deep Wind Offshore

²⁷ See EnBW

<p>emissions avoided. None of the respondents suggested other methods. The majority of the inputs from the public consultation thus confirms the Ministry's assessment that this method is well suited to estimate the subsidy per tonne of CO₂e emissions avoided.</p>	
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Question 14	
<p><i>Input 1:</i> The majority of feedback from the consultation is that the subsidy estimates are too optimistic. The detailed summary of the input to the cost estimates is previously addressed above in questions 9-12. The majority the inputs claim that the estimated subsidies per tCO₂e emissions avoided will be too low if applying the NPV-calculations. This adjustment leads to a large increase in estimated subsidies per tCO₂e emissions avoided.</p> <p><i>Input 2:</i> Some of the respondents proposed adjustments to the estimated <i>life-cycle emissions for the reference project</i>. Firstly, the Ministry proposed to calculate the reference scenario and reference project emissions over ten years, in accordance with the Innovation Fund's methodology. The majority of the respondents argue that the entire operating lifetime of 30 years should be used as the basis for these estimates.²⁸ The main argument put forward is that floating offshore wind in Vestavind B and F will contribute to emission reductions during their entire lifetime and concession period of 30 years. It will also avoid the annual estimated subsidies per tonne of</p>	<p><i>Response 1-2:</i> The Ministry has taken note of this remark. The Ministry will estimate subsidies per tCO₂e emissions avoided using the proposed budget of 35 bNOK and the IF methodology. Furthermore, the Ministry will calculate the CO₂ emission avoidance over 30 years. Life-cycle emissions for the reference project will be set according to the estimates from the Sørilige Nordsjø II applications and Brussa et. al (2023). Finally, EU's reference scenario in year 2035 is proposed as a reference scenario.</p>

²⁸ See e.g. Fornybar Norge (Renewables Norway), Hydro, Offshore Norway, the consortium Aker Offshore Wind, Statkraft & Ocean Winds, the consortium RWE & NTE, Skjoldblad and Vattenfall+Seagust.

CO ₂ e avoided emissions appearing artificially high, as the NPV-calculations cover the entire operating period.	
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Question 15	
<p><i>Input 1:</i> The majority of the respondents support the Ministry's assessment that other relevant policies or measures will not be sufficient to ensure profitability of major floating offshore wind projects. There are only a couple who disagree, and these i.e. refer to the schemes administrated by Enova and the Green Industry Financing Fund.</p>	<p><i>Response 1:</i> The Ministry has taken note of this remark. Thus, the Ministry's assessment is that other relevant policies or measures, including Enova and The Green Industry Financing Fund, are not sufficient to ensure profitability of major floating offshore projects.</p>

Question 16	
<p><i>Input 1:</i> When it comes to <i>reference project emissions</i>, there were some inputs in the consultation noting that floating offshore wind generally has higher emissions over their lifetime than bottom-fixed wind. Some of the respondents also note that floating offshore wind generally have higher lifetime emissions than bottom-fixed offshore wind.²⁹ These respondents argue that life-cycle emissions for the reference project may be underestimated if it is based on the average of the Sørilige Nordsjø II estimates.</p> <p><i>Input 2:</i> However, some respondents propose specific adjustments. DNV points to applying the upper quartile of the Sørilige Nordsjø II estimates as an alternative. At the same time, DNV still notes that they mean the proposed approach based on</p>	<p><i>Response 1-5:</i> The Ministry has taken note of this remark. The Ministry will calculate the CO₂ emission avoidance over 30 years. Life-cycle emissions for the reference project will be set according to the estimates from the Sørilige Nordsjø II applications and Brussa et. al (2023). Finally, EU's reference scenario in year 2035 is proposed as a reference scenario.</p>

²⁹ See e.g. DNV, Norsk kjernekraft, Equinor, Vårgrønn, the consortium RWE and NTE, Vattenfall+Seagut and Motvind Norge.

average life-cycle emissions also can be defended given the uncertainty in several aspects of the overall methodology. One respondent referred to life-cycle emission estimates from Brussa et. al. (2023).³⁰ This is a recent article, and the analyzed floating offshore wind project has several similar characteristics to the reference project.³¹

At the same time, some of the respondents note that the reference project includes more emission sources than the reference scenario due to different system boundaries.³² The reference project includes scope 1-3 emissions (basically all direct and indirect emissions), whilst the reference scenario only include scope 1 and 2 (basically all direct and some indirect emissions). For instance, this means that emissions related to the procurement of goods, construction, transport, and decommissioning are included in the reference project emissions, but not in the reference scenario.

These respondents argue that the estimated emissions for the reference project would be substantially smaller if the system boundary was set in the same way as the reference scenario emissions.³³ For instance, the consortium Aker Offshore Wind, Statkraft and Ocean Winds argues that the emission factors would be close to zero and significantly lower than 0,0084 tCO₂e/MWh if emissions related to procurement of goods, construction, dismantling, and transport are excluded from the reference project emissions as it is in the reference scenario. On this basis,

³⁰ Brussa et. al. (2023) [Life-cycle assessment of a floating offshore wind farm in Italy](#)

³¹ The article from Brussa et.al. (2023) is proposed by Norwegian Nuclear Power, who refers to three external sources. The analysis from Brussa et. al. (2023) is based on a *theoretical* floating offshore wind farm, with a turbine size of 15 MW and semi-sub foundations. For reference, the reference project assumes a turbine size of 22 MW and the same type of foundations. The other two sources cited by Norsk kjernekraft are considered irrelevant, as one is from 2012 and has non-comparable characteristics to the reference project (for instance 5 MW turbines) and the other is a master thesis.

³² See e.g. DNV, Fornybar Norge and the consortium Aker offshore wind, Statkraft and Ocean Winds

³³ See e.g. DNV, the consortium Aker Offshore Wind, Statkraft and Ocean Winds, Fornybar Norge (Renewables Norway) and Offshore Norway.

they recommend setting the reference project emissions to zero to achieve similarity between the two factors and to simplify.

Input 3:

The respondents who commented on the reference scenario supported to use the EU reference scenario 2020 in year 2030. Ministry's approach.

Input 4:

Some of the respondents also argued that the emissions in the reference scenario could be underestimated by applying the EU reference scenario. One argument put forward is that the EU reference scenario 2020 includes less emission sources than the reference project emissions, due to the system boundary differences described above. Another argument put forward is that much of Norway's increased energy demand in the coming years will come from the industry's need to replace the current use of fossil fuels with renewable electricity.³⁴ This could lead to the emissions benefit being underestimated with the proposed method, as these emission sources are not reflected in the EU reference scenario 2020.

³⁴ See e.g. Fornybar Norge (Renewables Norway), Offshore Norge, Equinor and Vårgrønn.