Norwegian University of Life Sciences

Master's Thesis 2020 30 ECTS
School of Business and Economics
Supervisor: Ståle Navrud
Co-supervisor: Anders Dugstad

Strong headwinds – Valuing environmental impacts of a planned wind power development in Aurskog-Høland

Mona Eide Onstad
Master of Science in Economics
School of Business and Economics

Abstract

The main aim of this thesis is twofold: i) add to the scarce empirical evidence of the environmental costs of local wind power developments in Norway, and ii) add to the methodological development of stated preference methods in this context by comparing estimates from Contingent Valuation (CV) and Choice Experiments (CE) over two elicitation formats (Willingness to pay (WTP) to avoid the wind farm and Willingness to accept (WTA) compensation to have the wind farm). After careful pilot testing, data for 393 respondents in the Aurskog-Høland Municipality were obtained in an internet survey with recruitment both from an internet panel and by phone. The subsample that was asked for WTA in both CE and CV worked well, while we quite early in the sampling period had to stop the WTP subsample due to heavy local protests to this elicitation format. This resulted in only 85 observation for the WTP subsample and the remaining 308 in the WTA subsample instead of the planned 50-50 split. In CE, the attribute of overhead powerlines needed for the wind power development was found to cause the largest welfare loss to the locals. In CV a disparity was observed between mean WTA of NOK 8600 (NOK 7822 – 9378), and mean WTP of NOK 1578 (NOK 1457 – 1699) per household per year. Thus, welfare loss due to the wind power development was more than 5 time higher in the WTA subsample. After the first interval regression models, the dependent variable was altered in order to analyze the two separate consideration a respondents makes when answering the CV question: i) whether to pay or demand compensation, ii) if they decide to pay or demand in compensation, how much should it be. This was an important distinction to make, because some variables changed coefficients in the separate analysis. The income variable, for example, had opposite signs of the coefficients in the WTA sample for the logit model and the interval regression with only positive values. A respondent with lower income was more likely to demand compensation, yet a respondent with higher income demanded more. Thus, the way a policymaker maker asks about compensation is important for the outcome. The results of this thesis can be used in Cost-Benefit analysis to decide whether to pursue a wind power development or not. This is done by aggregating all environmental costs of the wind farm (from CE or CV) over the number of affected households, which can be added to investment and operating costs of the windfarm and compared to the social benefits of electricity production.

Acknowledgement

I would like to thank my main supervisor, professor Ståle Navrud. I am grateful for his insight in environmental and resource economics, his excellent advice and his support in the completion of my thesis. Besides his academic support, I appreciate his understanding, patience and kindness through this journey. I would also like to thank my co-supervisor, Anders Dugstad. He has been a great mentor in helping develop my research questions, editing the data set and helping with the econometric analysis. I admire greatly the generosity of both of my supervisors. It has been an exciting learning opportunity to take part in a larger research project (Research Council of Norway project WINDLAND "Spatial assessment of environment-economy trade-offs to reduce wind power conflicts"), and conducting a pilot study as part of a case study within this project. I am grateful for all that I have learnt in this challenging, yet immensely rewarding process.

I would also like to give my heartful thanks to the School of Economics and Business at NMBU. My years here have been intellectually stimulating and the faculty and classmates alike have pushed me to become a better scholar, economist and person. I would especially like to thank the faculty administration for accommodating my needs and allowing me to put my best work forward. Lastly, I would like to thank my friends, family and Grethe Svardal.

Table of content

List of tables

List of figures

1. Introduction

1.1 Background

A wave of wind power resistance rolled over Norway, prompted by a report made by The Norwegian Water Resource and Energy Directorate (NVE), mapping which areas (on-land) in Norway that are most suitable for having wind parks (Jakobsen et al., 2019). Due to the expressed opposition by locals in these areas, the Norwegian government announced that they will not continue the process of looking into these areas (Energidepartementet, 2019). Out of the 56 municipalities that are a part of the aforementioned areas and that voiced their opinion, 49 said no to wind parks, and three said that they were sceptical to the idea (Solberg, Skei, & Befring, 2019).

The report by NVE lacks consideration of economic variables and environmental costs. An attempt was made to investigate effects on factors such as animals, landscape, nature and tourism. However, they did not consider the welfare loss that might be inflicted upon the people who live in the area.

According to "The Climate Barometer" published by Kantar Analyse, 52% of Norwegians are in favour of wind parks on land. Below is a graph from their report, showing how these attitudes have changed over the last 10 years, from 2009 to 2019. (Livgard, 2019)

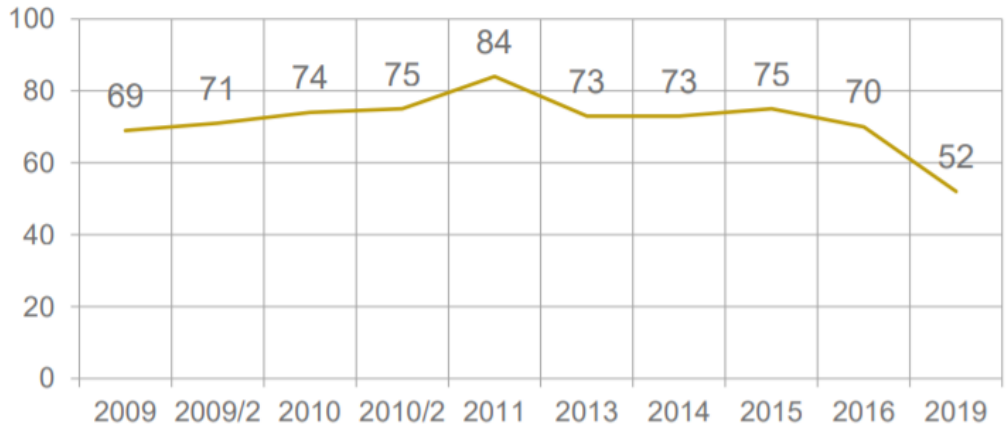


Figure 1.1 The percentage of people positive to having wind turbines on land in Norway.

Source: (Kantar 2019)

The Kantar report also looked at three factors that change people`s attitudes towards windmills; ownership, decreased electricity prices and visibility. They found that 31% of people are more positive towards windfarms if they own a share of it. 53% state that they are

more positive if the wind farm leads to decreased electricity prices. 61% state that if the wind farm is places where they cannot see it, then they will be in favour of it.

1.2 Previous studies

In Norway, only a few stated preference studies related to external effects of wind farms have been conducted. Navrud and Bråten (2007) conducted a choice experiment (CE) that looked at people's WTP for different energy sources. Households' willingness to pay (WTP) to avoid covering future excess electricity demand from imported coal energy and instead by domestic wind power was NOK 1087 per household per year. Their WTP is reduced by NOK 520 if there are many, small wind farms, instead of fewer, larger ones. These results show a preference for renewable sources of energy amongst the Norwegian public, and a preference for concentrating wind power and its environmental impacts to a limited set of areas.

García, Cherry, Kallbekken, and Torvanger (2016) conducted a choice experiment (CE) to map people's attitudes towards wind power, their willingness-to-accept compensation (WTA), and whether the compensation mechanism used in the survey mattered. The attributes of the CE, describing the project alternatives they were asked to choose from, were the number of wind turbines, as well as the type of compensation (i.e. public or private). The respondents preferred public compensations in terms of building a small or medium sized sports facility, to a private reduction in the electricity bill. Garcia et al op. cit. found that people that lived close to the wind farm, and those who use the area for recreational purposes, demanded a higher compensation. Thus, these people seem to be more negatively affected by a wind farm.

Kipperberg et al. (2019) investigated how locals that use an area for recreational purposes are affected by the building of a wind farm nearby. For both on-shore and off-shore wind farms they found significant decrease in welfare though a change in consumer surplus. There is a negative externality on recreation that is cause by the wind farm, which falls in line with the results of García et al. (2016).

In their study, Dugstad, Grimsrud, Kipperberg, Lindhjem, and Navrud (2020) perform a choice experiment to investigate how familiarity and exposure to wind farms affects people's attitudes towards new wind power projects. Comparing the WTA compensation for onshore wind power for respondents who have been exposed to wind farms, and those who have not, they find a higher WTA amongst people that are already used to wind farms. Thus, there is less acceptance of new wind power projects amongst those who have already been exposed to them.

Internationally, there is more literature on non-market valuation of the effects of wind farms. Zerrahn (2017) conducted a literature review on wind power and its externalities. In his review he found that a lot of research shows that people have a positive WTP for wind turbines to be built further away for their homes. (Betakova et al., 2015, Brennan and van Rensburg, 2016, Drechsler et al., 2011, Guo et al., 2015, Jones and Eiser, 2010, Ladenburg and Dubgaard, 2007, Meyerhoff et al., 2010, as cited in Zerrahn, 2017). Choice experiment and contingent valuation studies have looked at WTP to reduce the impact wind turbines have on wild life, and also found positive WTP among the respondents (Álvarez-Farizo and Hanley, 2002, Bergmann et al., 2006, Drechsler et al., 2011, Meyerhoff et al., 2010, as cited in Zerrahn, 2017; Navrud & Bråten, 2007).

In their meta-analysis of the literature on non-market valuation of wind power, Mattmann, Logar, and Brouwer (2016), consistently find that visual effects from wind turbines on landscapes and views, lead to a reduction in welfare. Molnarova et al. (2012) found that the landscape where a wind farm is built matters for people's attitudes towards them. People are more negative towards building wind farms where the landscape is considered more beautiful. The opposite is true for landscape that is more industrial and not considered pretty. Molnarova et al. also find that the positive effects of using wind power as a source of renewable energy instead of non-renewable fossil fuels are not significant in a person's attitude towards wind farms. Thus, an important argument for many countries to switch to wind power as a source of renewable energy is not found to be important to the general public. However, other studies have found a positive WTP for green electricity among consumers (Ma et al., 2015, Soon and Ahmad, 2015, Sundt and Rehdanz, 2015, as cited in Zerrahn, 2017;).

Einarsdóttir, Cook, and Davíðsdóttir (2019) used the contingent valuation method to find people’s WTP to preserve the nature area Búrfellslundur in Iceland, where the national power company want to build a wind farm. The mean WTP was approximately US $128 (NOK 1130).

This thesis compares the values found from using WTA and WTP elicitation formats in State Preference surveys. Throughout literature a disparity between them has been found both theoretically and empirically (Horowitz & McConnell, 2000). The value for WTA is larger than WTP. In their meta-analysis, Horowitz and McConnell (2000) investigate different explanations for the disparity, considering different factors, such as type of good and how the experiment is conducted. From the 45 studies that they examine, they find that there is no difference in the disparity for hypothetical and real experiments, that students actually have a

lower WTA WTP disparity than non-students and they find no evidence of a positive effect on the disparity from repeating an experiment (Horowitz & McConnell, 2000, p. 2). In addition to this, they conclude that incentive compatible mechanisms lead to a larger disparity. The opposite is actually found in Tuncel and Hammitt (2014) meta-analysis of the WTA WTP disparity, where incentive compatible mechanisms lead to a smaller disparity. Both these meta-analyses find the disparity to be smaller for goods that are traded in the market, than for non-market goods (Horowitz & McConnell, 2000; Tuncel & Hammitt, 2014).

The data collected from the survey that is used in this thesis, comes from both a choice experiment (CE) and a contingent valuation method (CV). There are some comparisons of these two stated preference methods in literature. Meyerhoff and Liebe (2008) investigate which method elicits most protest answers. They conduct surveys using both CE and CV methods in two regions in Germany, looking into willingness to pay for forest biodiversity. They do not find a significant difference in number of protest responses for the two methods. In his comparison of CE and CV in the context of valuating services provided in the Sierra Nevada National Park, Sanchez (2013) found that there were more protest answers in the CV question than in the CE. He also found that the estimated parameters from the model were not consistent.

A study comparing the two methods in Macao, China, did not find any significant difference between them, and concluded that both contingent valuation (double-bounded dichotomous choice CVM) and choice experiment are equally suitable when it comes to environmental evaluation in Macao (Jin, Wang, & Ran, 2006).

When studying the value of wetlands in Quebec, Canada, He, Dupras, and G. Poder (2017) compare the WTP values from CE and CV. The willingness to pay to conserve the wetlands per household per year was found be quite similar using the two stated preferences methods, $447 for CE and $465 for CV. Thus, concluding that the results “suggest a fairly robust and consistent equivalence between CV and CE” (He et al., 2017, p. 68).

In my thesis I wish to contribute with data on estimated economic damage to citizens of local wind power developments in Norway. I will also add to the methodological development of stated preference methods in this context by comparing estimates from Contingent Valuation (CV) and Choice Experiments (CE) over two elicitation formats (WTP and WTA).

1.3 Research questions

The main objective of this thesis is to estimate the economic damage that citizens experience from the development of a wind farm in a local nature area. Damages include non-use and use values, such as visual impacts on the landscape, impacts on wildlife and effects on recreational activities. In order to estimate the welfare losses caused by the wind farm, we use the two stated preference methods; choice experiments, and contingent valuation. The internet survey is conducted by the professional survey agency Norstat and has 393 respondents from Aurskog-Høland municipality.

There were two versions of the survey; in one the respondents were asked about their willingness to accept (WTA), and in the other their willingness to pay (WTP). The surveys were randomized, so it was arbitrary who got which version of the survey. There are two ways that the WTA survey differs from the WTP survey: 1) the reference level and 2) whether municipal charges increase or decrease. In the reference scenario in the WTA survey there is no wind farm, and if it is built the citizens will be compensated for the negative effects that is has on the environment as well as the direct effects to them. The compensation will be a decrease in municipal charges. In the reference scenario for the WTP survey, the wind farm will be built, but the citizens can pay an increase in municipal charges for a less extensive wind farm. They must pay because the municipality will lose income if a less extensive wind farm is built. Both changes in municipal charges lasts while the wind farm is operating.

With these reference scenarios in mind, I can now formulate the two first research questions.

Research question 1: What is the mean willingness to pay in contingent valuation (WTP-CV) for the residents of Aurskog-Høland Municipality in order to avoid the planned Setten local wind power project, located in a recreational area?

Research question 2: What is the mean willingness to accept in contingent valuation (WTA-CV) for the residents of Aurskog-Høland Municipality in order to accept the planned Setten local wind power project, located in a recreational area?

Even though both WTP and WTA are employed to measure the same, they tend to give different answers. The amount of money that someone is willing to accept to give up something is not always the same as what they are willing to pay to obtain it. One difference between the two approaches is that WTP depends on your own income, and WTA depends on the perceived income of the other party. Studies find that there are indeed differences in WTA

and WTP (Horowitz & McConnell, 2002; Tuncel & Hammitt, 2014). Since the different valuation methods tend to give different answers, the choice of method is very important. In this thesis I wish to compare the WTP and WTA and see if they elicit different results. My second research question is therefore:

Research question 3: Is there a disparity between WTA and WTP in the context of residents' preferences toward a local wind power project?

The stated preference methods used in this thesis are choice experiment and contingent valuation. Champ, Boyle, Brown, and Peterson (2017) summarize the main differences between a choice experiment and the contingent valuation method. In a contingent valuation question, a respondent is presented with a business as usual reference scenario, as well as one change. In a choice experiment there is also a reference scenario, but there is not only one change that it is being compared to. The change is more complex, as each attribute changes. There are also more alternatives in the choice experiment than in the contingent valuation question, the business as usual scenario as well as several alternatives with different levels of attributes. Finally, there is only one choice being made in the contingent evaluation question, whereas the choices are repeated on the choice experiment. Due to these differences, my fourth research question is:

Research question 4: Is there a difference in the WTA and WTP when obtained by choice experiment compared to the contingent valuation method?

The table below summarizes the research questions, with their corresponding hypothesis.

Table 1.1 Research questions and hypothesis

Research Questions
RQ1: What is the mean willingness to pay in contingent valuation (WTP-CV) for the residents of Aurskog-Høland Municipality in order to avoid the planned Setten local wind power project, located in a recreational area?
RQ2: What is the mean willingness to accept in contingent valuation (WTA-CV) for the residents of Aurskog-Høland Municipality in order to accept the planned Setten local wind power project, located in a recreational area?
RQ3: Is there a disparity between mean WTA and WTP in contingent valuation (CV) of residents' preferences toward a local wind power project?

H3.1: In CV, mean WTP to avoid environmental impacts of Setten Wind farm is equal to mean WTA/household/year to accept the development of the wind farm.
H3.2: In CE, mean WTP to avoid environmental impacts of Setten Wind farm is equal to mean WTA/household/year to accept the development of the wind farm.
RQ4: Is there a difference in the WTA and WTP when obtained by choice experiment compared to the contingent valuation method?
H4.1: There is no difference in the WTA and WTP when obtained by choice experiment compared to the contingent valuation method.

2. Theory

2.1 Nonmarket valuation

Nonmarket valuation of environmental goods puts values on goods that are not valued in a market. Because many environmental goods are not "naturally" valued in a marked, they are not always taken into consideration in decision-making for policymakers. The damage to the environment caused by a project, such as a wind farm, leads to changes in utility for those affected. Environmental valuation seeks to put a monetary value on that change in utility (Perman, Ma, Common, Maddision, & McGilvray, 2011). Nonmarket valuation is paramount in the search of optimal solutions when it comes to environmental goods.

The valuation methods used in economics are all based on the idea of an individual`s preferences (Champ et al., 2017). The intuition is that as long as a person prefers one thing over another, then this information can be used by policymakers to use public funds more efficiently. The values produced by nonmarket valuation are relative. One might investigate a change in utility that someone experiences from having access to one type of nature area compared to another, rather than the intrinsic value of the particular nature areas (Champ et al., 2017).

There are two measures of welfare, the compensation welfare measure and the equivalent welfare measure. Champ et al. explains these welfare measures through the example of a policy to clean up a polluted lake. The compensating welfare measure is defined as "the amount of income I would give up after the policy has been implemented that would exactly return my utility to the status quo utility level before cleanup." (2017, p. 30). One can then define the willingness to pay for the individual as this amount of money, where the individual

is indifferent between a clean-up policy that they help pay for, and no policy at all, where they get to spend that money however they prefer.

To define the equivalent welfare measure Champ et al. use the same example of a lake, however, in this example the lake has not been polluted, and the question is what amount of money the individual is willing to accept in compensation to be okay with the lake pollution. The equivalent welfare measure is defined as "the amount of additional income I would need with the initial conditions to obtain the same utility as after the change." (2017, p. 30).

Which measure is used depends on who has the property rights, as well as the nature of the good in question (Mitchell & Carson, 1989, p. 23). In the WTP example the lake has already been polluted and the right to emit was with the polluters. To get the lake back to a cleaner state, it is up to the individual to pay. In the WTA example, the right is with the individual, and the polluter must pay to compensate for the welfare loss that they are causing.

2.2 Welfare economics

Welfare economics use the concepts of efficiency and optimality to "identify circumstances under which one allocation of resources is better than another" (Perman et al., 2011, p. 7). Figure 2.1 is a depiction from Mitchell and Carson (1989, p. 18) and shows the optimal production in an economy. It is a simplistic illustration with two goods, the private good x and a public good q. The production possibility frontier (PPF) shows the combination of goods produced that is possible in the economy. The social welfare function (SWF) represents the utility of the consumers/people in the economy. At any point along the curve, the individual has the same utility, and is therefore indifferent to where they are on the curve. That is why it is often called the indifference curve.

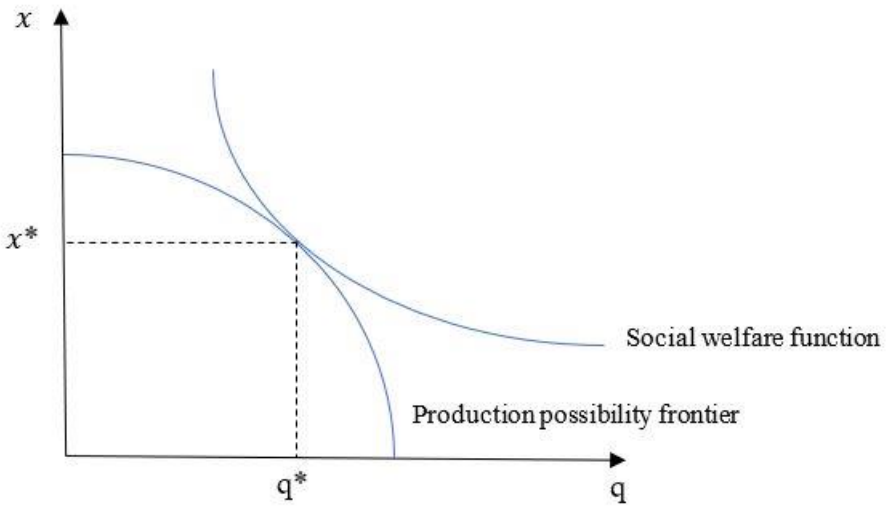


Figure 2.1 Welfare Maximizing point (x,q*) where SWF=PPF*

The optimal output in the economy is where the SWF tangents the PPF (Mitchell & Carson, 1989, p. 18). Any other point that is still within the production possibilities, will have an indifference curve to the left of where the SWF is, and will thus have a lower level of utility. At such a point, a pareto improvement is possible. A pareto improvement is when it is possible to make someone better off without anyone becoming worse off. Pareto optimality is achieved when all possible pareto improvement has been made (Perman et al., 2011).

The notion of the pareto criterion is used in welfare economics in order to place a monetary value on costs and benefits of "the gains and losses to those affected by a change in the level of provision of a public good" (Mitchell & Carson, 1989, p. 20). The pareto criterion relies on the concept of preference, as well as the assumption that individuals, households, consumers or firms strive to maximize their utility (Mitchell & Carson, 1989, p. 20). This is exactly what we are trying to do in this study of how the local population in Aurskog-Høland is affected by the building of a wind farm.

There are some drawbacks to these measures of optimality. There is no emphasis on fairness, how output is distributed between individuals in the economy (Perman et al., 2011) Another issue is that the social welfare function is based on the concept of cardinal utility, where aggregation and subtractions of utilities are possible. If the utility functions were ordinal, these arithmetic operations would not make sense (Perman et al., 2011). Aggregating utilities is not necessarily an easy or reliable task, so many economists prefer using ordinal utility functions instead. Then they apply other measures of efficiency, that do not require interpersonal utility comparisons (Perman et al., 2011, p. 64).

2.3 Choice modelling

In my thesis I am using choice modelling in order to determine the WTP and WTA of the residents in Aurskog-Høland. Choice modelling is an indirect stated preference. It is indirect because the respondent does not state their willingness to pay, rather they reveal what their willingness to pay is, through choosing between different alternatives. There are different attributes to an environmental good. Through choice modelling, these are changed for the different possible choices in order to determine their assigned value (Champ et al., 2017). This allows researchers to study specific components of an environmental good by seeing what happens when they change only one of the characteristics that they are studying. They can also have multiple changes and therefore end up with "a response surface of values rather than a single value" (Champ et al., 2017, p. 134).

Champ et al. (2003) summarize some further advantages and disadvantages of choice experiments. The tendency when it comes to choice modelling, is to not have issues with endogeneity, nor collinearity. The method estimates the preferences of the respondents and evaluates trade-offs between different alternatives. When the respondents make their choices, the characteristics can be presented in a way that is close to a real-life setting. This concretization of the issue can make it easier for the respondents to reveal their true preferences. There are also some advantages that stem from experience of using the choice experiment method, as well as not needing a very large sample due to "experimental design theory" (Champ et al., 2017, p. 135).

The disadvantages that are highlighted by Champ et al. (2017) are as follows. Choice modelling may have issues with respondents not answering according to their preference, but rather that they try to answer strategically. There could also be a bias from the fact that it is a hypothetical situation, it is not about real money, or real spending. The situation of having to decide based on different choices that the respondent might not have considered before can also be hard. If the respondent finds it too challenging to consider these options, then their answers might not reflect how they would act in a real-life situation. There would thereby be a loss of external validity. Another disadvantage that they mention is that both the experimental design and the econometric models needed to analyse the data have become complex. This entails that a certain level of expertise is required in order to conduct both successfully.

2.4 Internet survey

The survey method employed in this project is an internet survey. In stated preference research, internet surveys have become a common survey method, sometimes without properly taking into account how using internet surveys instead of another method[1] may affect the results (Lindhjem & Navrud, 2011). Lindhjem and Navrud (2011) have reviewed and compared different survey methods to internet survey. They have compared coverage, sampling and respondents that choose not to answer the survey, as well as validity and differences in measurements. They find equal or lower welfare estimates, lower degree of experimental control and that internet surveys "often confound measurement and sample composition effects" (Lindhjem & Navrud, 2011, p. 309).

Fricker and Schonlau (2002) conducted a literature review to find out whether it is true that internet surveys are cheaper, faster and that more people are willing to respond to them. With internet surveys there are no printing and postage costs, which saves money. However, there could be other expenses, such as programmer costs, so they are not necessarily cheaper. They do not find them to have higher response rates or be faster as it does not "necessarily follow that the increased delivery speed will translate into a significantly shorter survey fielding period" (Fricker & Schonlau, 2002, p. 356). Benefits that they do find of internet surveys are related to a decrease of measurement error. Especially that there is no transcription error, because the data from the survey is downloaded directly and not typed in by a researcher.

In a more recent study, Daikeler, Bošnjak, and Lozar Manfreda (2020) performed an updated meta-analysis to investigate whether response rates have increased as internet has become more widespread and frequently used. By conducting 114 experimental comparisons of internet surveys and other survey methods, they found that internet surveys have 12% lower response rates than other survey methods. This does, however, depend on several factors, such as the country where the survey is being conducted, the recruitment strategy and the target population.

Mjelde, Kim, and Lee (2016) in their study comparing internet and interview surveys in choice experiments found some evidence of social desirability behaviour where a respondent answers to please the researcher that is present. They saw that most of the WTPs obtained by interviews were larger than those obtained in the internet surveys. Because there is a risk of

[1] Such as face-to-face, telephone or mail surveys.

social desirability behaviour, Mjelde et al. (2016) point out that for issues that are politically sensitive, it might be best to use internet surveys.

3. Methods

The survey contains two different approaches to nonmarket valuation; choice experiment and contingent valuation method. They are stated preferences, and can measure both use and non-use value of the good, as opposed to revealed preferences that only measure use-values (Perman et al., 2011, p. 415).

3.1 Choice experiment

In a choice experiment, an individual is asked to choose which alternative they prefer. In our study, they must choose between 3 different development plans for a wind farm. Each alternative has 4 different attributes, including a reduction or an increase in taxes. By manipulating these attributes for each choice that the respondents make, we are able to find out how the respondent's utility is affected by a change in each of the attributes. Perman et al. (2011, p. 430) identifies the goal of most choice experiments "to determine the trade-off between the levels of the remaining attributes against cost".

Champ et al. (2017, p. 134) outline several benefits of conducting a choice experiment. One advantage is that by manipulation of the attributes, there are many possibilities for research. The choice made by a respondent is also not just one sole answer, buy an array of values. Champ et al. also point out that as it is the researcher that manipulates the attribute in the choice experiment, this generally leads to the attributes being exogenous and not collinear. Choice experiment, as well as contingent valuation method, are good for researching use and non-use values. The choice experiment can easily be presented in a way that makes it realistic and therefore easier for the respondent to answer.

Champ et al. (2017, p. 135) also go through some on the drawbacks of the method. As the method is a stated preference, some respondents might answer strategically to achieve their own goal, instead of answering according to their true preference. Since the situation presented is hypothetical, that could also lead to biased answers. The respondents could also face what Champ et al. refer to as "cognitive difficulty". The respondent must comprehend the scenario that is presented in the choice experiment, understand the different attributes and the consequences of them changing for each choice and then determine which alternative they prefer. If the respondent is not able to do all this, then they will not answer according to their

true preference. The final drawbacks that Champ et al. mention, is that both constructing the choice experiment survey, and conducting the econometric analysis of the models require more advanced skills than other methods do.

3.2 Contingent valuation

In a contingent valuation question (CV), a representative sample of the population is asked about their WTA or WTP for an environmental good (Perman et al., 2011, p. 415). The objective is to elicit their preferences for the good. This is done by hypothetically creating a market for it in the survey, where the respondent can state their WTP or WTA (Mitchell & Carson, 1989). The three parts of the contingent valuation method, as described by Mitchell and Carson (1989, p. 3), are firstly a detailed description of the good that is being valued as well an explanation of the hypothetical situation of how the good will be available to the respondent. Secondly, the respondent is presented with the question of their WTP or WTA. It must be phrased to elicit their true valuation of the good and avoid any imposed biases by the researcher. Thirdly, the survey should include questions about the characteristics of the respondent, as well as their preferences when it comes to the good that is being valued, and their use of said good.

The NOAA Panel on Contingent Valuation provide guidelines that should be followed for the CV method to be useful (Arrow et al., 1993). These include clearly informing the respondent about the damage that is being valued, presenting the payment vehicle while pointing out the relevant budget constraints (Arrow et al., 1993, p. 42). The panel also emphasizes that the payment scenario should be familiar to the respondent, it should be something that the respondent is used to paying, so that the scenario is rooted in something familiar.

Champ et al. (2017, p. 121) point out some issues that can arise when designing of a contingent valuation question. It is important that the scenario is explained clearly, and that the respondent manages to fully comprehend it, so that they can make reflected decisions that reveals their true WTA or WTP. However, there is a risk of information overload and that the survey will prove too cumbersome for the respondent to answer all the questions. In addition, a contingent valuation survey should be rooted in realism, so that it is easy for the respondents to relate to the questions and imagine themselves in the scenario being described. A common problem when a respondent is asked about their WTP in hypothetical scenario is that they state a higher value because they know that they will not have to pay that amount of money. Champ et al. give an example of an issue that could arise while using taxes as a payment

vehicle. A respondent is already familiar with paying taxes and can conceptualise what an increase or decrease in taxes look like. However, some people are politically against an increase in taxes, and could answer a that they are not willing to pay more in taxes, even though they do value the good/service that they are asked to pay for.

3.3 Econometric method

The econometric methods used to analyze the data for the choice experiment is a mixed logit regression. For the contingent valuation interval and logistic regression have been used.

3.3.1 Interval Regression

The data from the contingent valuation question is censored. The data is in intervals, where the lowest endpoint of the interval is the amount of money that the respondent chose, and the highest endpoint of the interval is the higher amount of money that the respondent did not choose. The true value of the respondent lies somewhere in between those endpoints and is not known to the researcher. The interval regression allows for two dependent variables, one for the lower endpoint of the interval, and one for the higher endpoint (StataCorp, ND).

The model can be expressed as follows:

$$y* = \beta_0 + \boldsymbol{x\beta} + u, u|\boldsymbol{x} \sim N(0, \sigma^2)$$

Wooldridge (2013, p. 573) explains that the dependent variable y "has a normal, homoscedastic distribution with a linear conditional mean", and that estimates for the coefficients $\boldsymbol{\beta}$ and the standard deviation σ are acquired through maximization of the log-likelihood.

3.3.2 Logit Regression

A logit regression is used when there is a binary dependent variable. The regression studies how likely it is that the depend variable is equal to one. The logit model uses a cumulative standard logistic distribution, which has probabilities between 0 and 1 (Stock & Watson, 2015). In this kind of binary response model, the probability that y equals 1, is what is most interest (Wooldridge, 2013). The Stock and Watson (2015, p. 442) book on econometrics show the following functional form of the logit regression:

$$\Pr\left(Y = 1 \middle| X_1, X_{2,} \dots, X_k\right) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k)}}$$

It displays the likelihood that the dependent variable equals one, given the independent variables. The βs are the coefficients of each regressor, and the functional form comes from the cumulative standard logistic distribution.

3.3.3 Mixed logit

The data for the choice experiment is a panel data. This means that the responses of one person are not independent observations, they are repeated choices. Thus, the coefficients vary for each respondent, but is "constant over choice situations for each person" (Train, 2009, p. 145). As follows, they are not independent and identically distributed. In order to deal with this, I am using a mixed logit model that analyses discrete choices with simulations.

In his book on Discrete Choice Methods, Train (2009, pp. 145-146) explains the specifications of mixed logit for discrete choices for panel data. The utility of the individual in the dataset is defined as follows:

$$U_{njt} = \beta_n x_{njt} + \varepsilon_{njt}$$

n is the respondent, j is the alternative chosen and t is the choice in the choice experiment. β is a vector of parameters, x is a vector of variables and ε_{njt} is the error term that is not observed. It is "iid extreme value over time, people, and alternatives" (Train, 2009, p. 145). The unconditional probability (P_{ni}) from Train (2009) is the integral of the product of the probability that the respondents makes a certain sequence of choices and the density function $f(\beta)$. It looks as follows:

$$P_{n\boldsymbol{i}} = \int \prod_{t=1}^{6} \left[\frac{e^{\beta' n x_{ni_t t}}}{\sum_J e^{\beta' n x_{njt}}} \right] f(\beta) d\beta$$

i is the sequence of 6 choices in the choice experiment. Instead of one logit formula, there is a product of logit formulas for each choice. Train (2009, p. 146) explains how the probability is simulated as follows: "A draw of β is taken from its distribution. The logit formula is calculated for each period, and the product of these logits is taken. This process is repeated for many draws, and the results are averaged."

3.4 Survey Design

The surveys[2] were developed by Anders Dugstad, Ståle Navrud, and the WINDLAND project. Norstat conducted them online and 393 people from Aurskog-Høland municipality responded to the surveys. There were two different versions sent out, one was made to obtain the WTA of the respondents, whereas the other was made to learn their WTP. The surveys were randomized, so it was arbitrary who got which version of the survey. We wanted to gather about the same amount of WTA and WTP respondents, however, the WTP version of the survey was met with disapproval of many locals. Consequently, we decided to only go forward with the WTA version of the survey. Therefore, the WTA version had 308 respondents, while the WTP version had only 85.

The survey starts by gathering information about the respondents, such as their age, gender and where they live. They are then asked about which political issues they think should be in focus in the municipality, as well as their attitudes towards wind farms on land and at sea in Norway. The respondent is then provided with information about Scanergy's plans for building "Setten wind farm". A map provided, outlining the area where Scanergy intends to build the wind farm. There are several questions regarding use and non-use value of the areas where Scanergy are planning to build the wind farm, before the respondent is familiarized with the choice experiment.

The respondent is presented with the four attributes that will be manipulated in each of the 6 choices the they have to make. These are:

1) The number of wind turbines and the environmental effects of them
2) Underground cable and/or overhead lines to transport electricity
3) Height of wind turbines
4) A reduction of yearly taxes in the WTA survey and an increase in yearly taxes in the WTP survey

The environmental consequences of each attribute are explained in detail, and there are visual representations of each of them. An example of this is the edited picture below, where the respondent can see what 12 wind turbines will look like from the lake Setten.

[2] The surveys can be found in the appendix.

Figure 3.1 Wind turbines seen from lake Setten, example of illustration in survey

Source: (Scanergy, 2018)

Through randomization, half the respondents are also presented with visibility maps, showing the areas where the wind turbines will be visible. There are three different maps. The first map shows from where the turbines will be visible if they are 150 meters tall. The second shows the same, but for turbines of 250 meters. These are the two height extremes in our survey. The third map is larger, displaying where the wind turbines will be visible from for the whole of Aurskog-Høland municipality.

After going through the aspects of each attribute, the respondent is presented with the choice experiment. For each choice they make, they must choose between three alternatives. Either the business as usual scenario (BAU), or two different building plans of the wind farm, where the four attributes are manipulated differently. The business as usual alternative looks different in the WTA and the WTP survey. The BAU in WTA is a situation where there is no wind park. Here every attribute is zero, including the variable for compensation. Meaning that the citizens of the municipality will not receive any compensation of reduced yearly taxes when no wind farm is built. In the WTP survey, the BAU scenario is building the most extensive wind farm. The respondent can always choose the BAU alternative of 12 wind turbines of 250 meters of height, overhead lines that are used to transport electricity in both the town and forest area, and no increase in yearly taxes to the municipality.

An example of a choice from the WTA survey is shown in figure 4.2 below. The first alternative in blue is the business as usual scenario, which is always available for the respondent to choose. The two other alternatives in orange are the ones that vary.

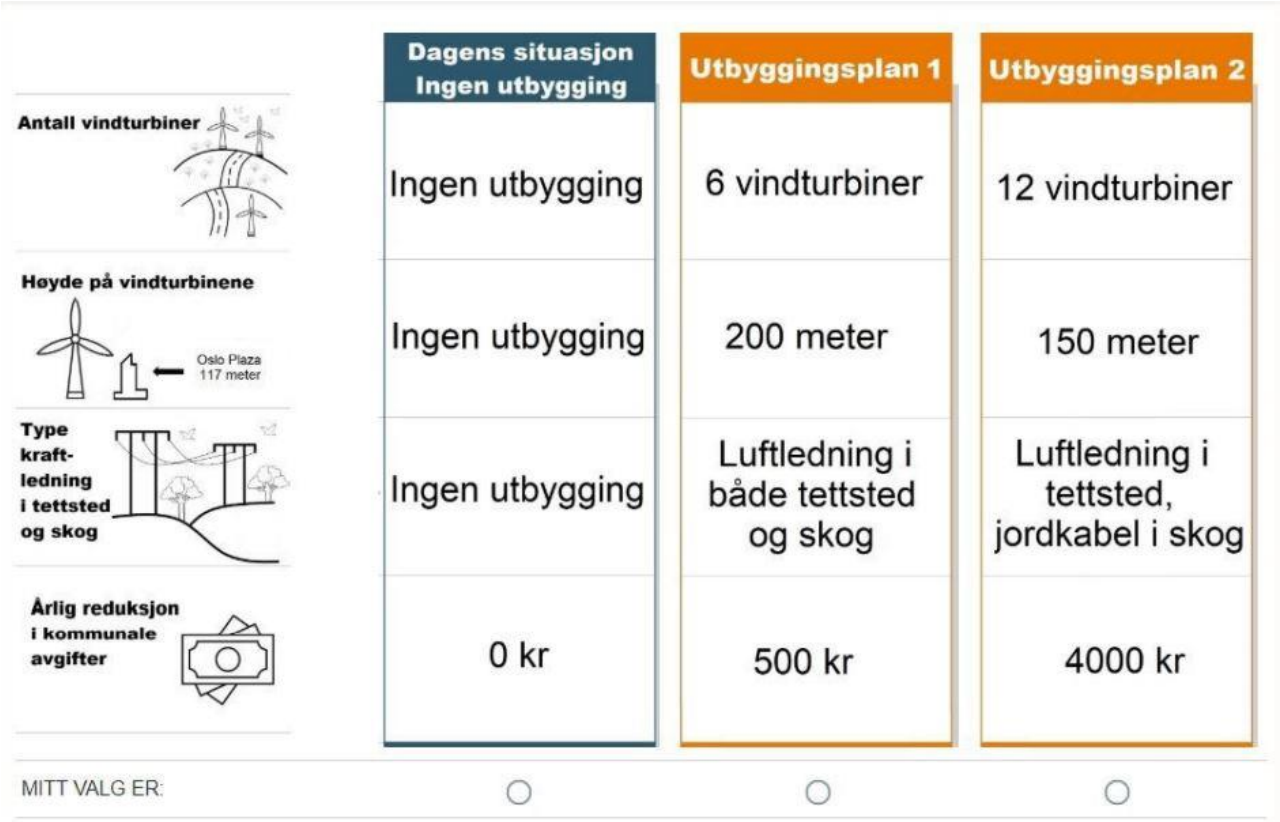


Figure 3.2 Example choice card in Choice experiment; WTA sample

After the choice experiment, the respondents that chose the business as usual scenario every time were asked why they made those choices. This is done to find out whether their choices reflect their true preferences, or if they chose only chose the BAU in order to protest. As explained in chapter 4.4, I use this information to remove protest answers.

The respondents are then presented with the contingent valuation question. In both cases they are asked to consider the most extensive building plan, a wind farm of 12 turbines that are 250 meters tall, with the electricity transported in overhead lines in both the village and the forest area. The respondents answering the WTA survey were asked the following:

"What is the smallest amount, if anything, that your household demands in reduction of yearly taxes payed to the municipality to accept the building of this wind farm?"

In the WTP survey, the question is phrased as follows:

"What is the maximum amount, if anything, that your household is willing to pay in increased yearly taxes to the municipality to avoid the construction of this wind farm?"

Respondents that answered zero were, just as in the choice experiment, asked why they chose this answer so that we could remove the protest answers. All respondents were also asked whether they would have answered similarly under normal circumstances with no corona virus.

The last section of the survey is used to map out the respondent's feeling of ownership to the nature areas affected by the wind farm, as well as getting some background information about the respondents.

3.5 Pilot study

Before having Norstat administer the survey online, Ståle Navrud, Anders Dugstad and I conducted a pilot study in Aurskog-Høland Municipality. We had several objectives for testing our survey. These included making sure that we had phrased everything clearly and that it was easy to understand. This was crucial in order to secure answers that reflected the true values and opinions of the respondent. For the same objective, it was important to make sure that the survey contained the right balance of being informative enough to provide the respondent with enough information to answers the questions, and not overwhelming the respondent with material. Conducting the pilot study in Aurskog-Høland also gave us access to local information, enabling us to tweak the survey according to local factors. We used this information to change names of places to those more commonly used by the population.

The pilot study was carried out in Setskog and Bjørkelangen villages, in Aurskog-Høland Municipality. 11 people participated in the study. 6 women and 5 men with an average age of 50 years. At schools in the respective villages, we conducted the one-on-one interviews. There was one protest answer for both willingness to accept (WTA) and willingness to pay (WTP), thus giving us the opportunity to learn why they protested. This helped us develop the statements that the respondents were asked to choose from to explain why they had only chosen "today's situation" in the choice experiment or stated zero WTP/WTA in the contingent valuation question. The average value of WTA for the contingent valuation was NOK 7500, and NOK 2740 for WTP.

We were concerned that the respondents might get overwhelmed by having to make six choices in the choice experiment. However, we noticed that they still made reflected decisions

come the last choice, so we were able to keep the choice experiment as is. Some people struggled with understanding our premise of there being several possible building plans for Scanergy (with different numbers and heights of turbines, different powerlines and different reduction/increase in municipal charges). To make it clearer, we specified that there are several possible development plans for the Setten wind farm. Some respondents also reacted negatively to the change in annual charges to the Municipality. To curb such reactions, we wrote in the end of the survey that the changes in municipal charges were only hypothetical and for the purpose of the study.

We also noticed that some respondents in the one-on-one interviews did not closely study the visibility map, showing where the wind turbines will be visible from. To prompt them to observe it more closely, we added a question about whether the turbines would be visible from their home.

Once changes had been made from the pilot study, Norstat developed the online survey. We then, thoroughly tested it, and made changes so that it would work smoothly.

When the survey was sent out to people in Aurskog-Høland, half were randomly selected for the WTP survey, and the other half got the WTA survey. The surveys caused quite an uproar amongst the citizens that were negative to building a wind farm in Aurskog-Høland. The WTP survey had the strongest reactions, and through groups on Facebook, people encouraged each other boycott the survey. There were also rumours that we worked for Scanergy and were trying to change people's minds about the wind farm. We released statements explaining our objectives for the research and that it is impartial. Nonetheless, the opposition to the WTP version of the survey persisted, and we decided to halt the WTP survey, and only continue with the WTA version. This explains why we have only 85 respondents for the WTP survey, and 308 for the WTA survey.

4. Results and discussion

4.1 Sample vs. Population characteristics

To find out to what extent the results are representative for the rest of the population, the demographics of the respondents are compared to the rest of the adult population in Aurskog-Høland municipality. The factors that we are comparing are gender, income, education and age, and are shown in table 4.1 below.

Table 4.1 Sociodemographic variables in the sample and population of Aurskog-Høland municipality (> 18 years)

		WTA sample	*WTP sample*	*Aurskog-Høland*
Gender				
	Male	58.6%	48.7%	50.5%
	Female	41.4%	51.3%	49.5%
Income				
	Midpoint of gross household income	NOK 964 260	NOK 911 539	NOK 654 000
Education				
	Primary/lower secondary school	4.21	5.00	34.91
	Upper secondary school	23.51	26.25	42.23
	Vocational schools	26.67	23.75	2.39
	Higher education, short (Bachelor)	31.93	31.25	16.17
	Higher education, long (Masters or PhD)	13.33	13.75	3.85
	Unspecified or no completed education	0.35	0	0.45
Age				
	18-29	11.23	6.25	16.24
	30-39	14.39	15.00	15.57
	40-49	18.95	27.50	18.17
	50-99 -59	24.94	23.75	18.08
	60-69	15.78	18.75	14.33
	70 and above	14.73	8.75	17.61
	Average age	50.93	50.58	49.11

(SSB, 2018, 2019, 2020)

The gender distribution in the WTP sample is quite close to that of Aurskog-Høland. In the WTA sample however, men are a bit overrepresented. The mean income in the samples is higher than the average income of Aurskog-Høland. The income in the sample is the midpoint of the income category chosen by the respondent, which might explain some of the difference in income. We also have an overrepresentation of people with higher education. The average age in the samples is about the same as that of Aurskog-Høland. The WTP sample has fewest respondents in the youngest age category of 18-29, and most respondents in age category 40-49. Both the WTA and the WTP sample has more respondents in the age category 60-69 than Aurskog-Høland, and fewer in the 70 and above category.

4.2 Protest answers

Some respondents do not answer the survey according to their true willingness to pay, or their true willingness to accept. They might have other objectives in mind, such as attempting to influence a political decision or showing an opposition to the study being conducted. Such answers are called "protest answers". It is eminent that these are excluded from the analysis for our results to reflect the respondent's true values. We expect that the protest answers for the choice experiment are contained in the responses where "today's situation" was chosen every time. This is the business as usual (BAU) choice. For WTA the BAU has no development of wind power at Setten. For WTP, the BAU scenario is building the most extensive wind farm at Setten. Those that responded "today's situation" in every choice, were asked to indicate which of the reasons below, from table 4.2, that explained them choosing BAU in all choices. If they answer "other" they are asked to write their reason.

Table 4.2 Most important reason for choosing alt. 1 (status quo) in the Choice Experiment; WTA and WTP versions

Choice experiment WTA

Reasons for choosing alt 1	Perc.	Freq.
1. The alternatives had consequences for nature, environment and landscape that were too big compared to the benefits	43.45	73
2. I do not want reduced annual taxes to the municipality	0.60	1
3. I do not want to put a monetary value on the destruction of nature	20.24	34
4. I do not believe that Setten wind farm will be built	2.98	5
5. Setten wind farm will not make any noteworthy contribution to reducing climate gas emission	2.98	5
6. I prefer other sources of renewable energy other than wind power	14.88	25
7. It means a lot to me to conserve the area where Setten wind farm might be built	10.71	18
8. I am moving away, so this is not relevant to me	0.00	0
Do not know	0.60	1
Other, please specify	3.57	6
Total	100.00	168

Choice experiment WTP

Reasons for choosing alt 1	Perc.	Freq.
1. I do not think that the other alternatives are worth paying for	15.00	3
2. The state should cover the lost income that the municipality is subjected to with a less extensive development plan	0.00	0
3. I cannot afford paying more in yearly taxes to the municipality	15.00	3
4. I do not think the wind farm will be built, so I am not willing to pay anything	0.00	0
5. I am not concerned about the consequences of the wind farm being built	0.00	0
6. I am in favour of a maximum increase of the production of clean energy from wind power in the municipality	25.00	5
7. I do not want increased yearly taxes to the municipality	20.00	4
8. It was the best option considering the climate challenges that we are facing	0.00	0
9. I am moving away, so this in not relevant to me	0.00	0
Do not know	15.00	3
Other, please specify	10.00	2
Total	100.00	20

The percentage of respondents that chose each reason, as well as the frequency in which they were chosen, are shown in the table 4.3. For WTA a large portion of the respondents chose alternative 1 (i.e. no wind farm development) in the choice experiment because they deemed

the consequences larger than the benefits. Such an answer is not a protest answer and will therefore be included in the analysis. What will not be included, however, are answers number 2, 3, 4 and 8, because they show that the response given in the survey does not reflect the respondent's true value for willingness to accept. "Do not know" and "other" are also excluded from the analysis. Including them, there are 47 protest answers for WTA. The reason most frequently chosen in the WTP survey is that the respondent is in favour of increasing the production of clean energy in the municipality. This is not a protest answer and will be included in the analysis. Reasons 2, 4, 7 and 9 are protests, and will henceforth be excluded together with "do not know" and "other". In total there are 9 protest answers for WTP.

Table 4.3 Most important reason for zero willingness-to-pay (WTP) and zero willingness-to accept compensation (WTA) in Contingent Valuation.

Contingent Valuation WTA

Reasons for choosing zero	Perc.	Freq.
1. The alternatives had consequences for nature, environment and landscape that were too big compared to the benefits	40.91	18
2. Setten wind farm will not make any noteworthy contribution to reducing climate gas emission	6.82	3
3. I do not want to put a monetary value on the destruction of nature	31.82	14
4. I do not believe that Setten wind farm will be built	6.82	3
Do not know	4.55	2
Other	9.09	4
Total	100.00	44

Contingent Valuation WTP

Reasons for choosing zero	Perc.	Freq.
1. The state should cover the lost income that the municipality is subjected to with a less extensive development plan	16.67	2
2. I cannot afford paying more in yearly taxes to the municipality	16.67	2
3. It was the best option considering the climate challenges that we are facing	16.67	2
4. I do not think the wind farm will be built, so I am not willing to pay anything	8.33	1
5. I am in favour of a maximum increase of the production of clean energy from wind power in the municipality	25.00	3
Do not know	0.00	0
Other	16.67	2
Total	100.00	12

Tabel 4.3 shows the frequency distribution on the most important reasons for choosing zero in the contingent valuation portion of the survey. For WTA the most common answer is the same as for the choice experiment; that the consequences are larger than the benefits. The answer most frequently chosen is also the same for WTP; that the respondents want an increase of production of clean energy in the municipality. For WTA reasons 3 and 4 are protests[3], for WTP 1 and 4 are. Also, both for WTA and WTP "do not know" and "other" are

[3] One could argue that reason 1 for WTA=0 is a protest answer as they state environmental consequences are too large compared to the benefits but still demand zero compensation. Thus, their answer does not reflect their welfare loss from the environmental impacts of the wind farm, which is what the WTA-question is trying to measure. However, choosing the «No development» alternative was the only way to show that they disliked the development if they thought the environmental impacts were too large compared to the benefits or the climate

excluded from the analysis. In total there are 23 protest answers for WTA and 5 protest answers for WTP.

4.3 Choice experiment

The marginal WTP and WTA values from the choice experiment are presented below. The marginal effects and standard errors are calculated using the delta method. The welfare estimates are calculated by dividing the coefficient of the attribute[4] by the coefficient of the cost attribute.

Table 4.4 The marginal WTP/WTA of the choice experiment. Separate for the WTA and WTP subsabples. The standard error is in parenthesis.

Choice experiment marginal effects

(1000 reps)	**WTA**	**WTP**
Number of turbines	-550***	11
	(102)	(94)
200m height of turbines	-4371***	82
	(882)	(748)
250m height of turbines	-1449**	303
	(777)	(844)
Overhead lines both in village(town) (Setskog) and in forest	-5975***	2877***
	(1414)	(1040)
Overhead in village(town) underground in forest	-4813***	750
	(945)	(1077)
Underground in village(town), overhead in forest	-2570***	612
	(682)	(1071)
Mean value	-19729***	4635
	(2673)	(3260)
Log likelihood	-933.4	-351.6
R^2	0.406	0.272
Adjusted R^2	0.402	0.259

benefits too small (resp. reasons1 and 2). However, we kept these respondents in the analysis as these reasons were not so clear-cut as protest reason compared to reasons 3 and 4.

[4] Full model in appendix

Number of obs	1566	456
Number of respondents	261	76

***p<0.15, **p<0.10, ***p<0.05**

Mixed logit with simulations with 1000 Halton draws was used to estimate the models. I assume that the coefficient for cost is fixed – that it is the same for all the respondents. The estimates then become normally distributed, and I thus avoid extremely high values for WTP. The preferences for the non-monetary attributes are assumed to be normally distributed. People can have both positive and negative preferences, and these can vary in the population. For example, an individual can prefer fewer wind turbines because of the damage they infer on the local environment. Another can have the opposite preference because they view the wind turbines as beneficial with regards to combat climate change.

I specify full correlation between the independent variables in the model[5]. In the WTP model, many variables are significantly correlated. In the WTA model, number of turbines is significantly correlated with the medium height of turbines (200m). I have used the specification corr for the regressions in Stata, which specifies that the random coefficients are correlated. The WTP model has a lower adjusted R^2 than the WTA model. For the WTA model 40% of the variation is explained by the regression whereas 26% in the WTP model.

In the WTP model the only significant variable is that of overhead power lines in the village and forest. Thus, I am not able to test hypothesis H3.2, that the mean WTP to avoid environmental impacts of Setten Wind farm is equal to mean WTA/household/year to accept the development of the wind farm. In the WTP sample there are only 76 respondents (after removing the protest answers). This is part of the reason for why there are so few significant variables, as smaller samples need large effects to be significant. Also, this sample had a higher drop-out rate because the choices proved difficult for many respondents. Respondents that had strong opinions would to a larger extent drop out because the choices proved too difficult.

Respondents are willing to pay NOK 2877 on average, in increased yearly taxes to the municipality to avoid overhead lines in the village as well as the forest area. That is, they are willing to pay NOK 2877 in order to have the baseline, which is underground cables in both the village and forest area.

[5] Correlation matrix in appendix

Every variable is significant in the WTA model, and of substantial size. The overall welfare loss is the sum of WTA/WTP for each attribute. For WTA it is NOK 19729 (14490 – 24968) per household per year. On average, the respondents need a tax reduction of NOK 550 per wind turbine that is built. When it come to the height of the turbines, a respondent demands NOK 4371 in reduction in yearly taxes to accept wind turbines of 200 meters instead of 150. Surprisingly, the respondents need a smaller compensation to accept wind turbines of 250 meters – NOK 1449.

The only variable that is significant in the WTP sample i.e. overhead lines both in the village and in the forest, is the largest in the WTA sample. On average, respondents want a NOK 5975 reduction in taxes to accept overhead power lines in both the forest, and the village. The respondents need NOK 4813 to accept overhead lines in the village and underground in the forest. They need less compensation for underground power lines in the village and overhead the forest, NOK 2570. The overhead lines are what causes the largest reduction in utility to the respondents, especially in the village.

The 95% confidence interval for the WTA estimate for overhead lines both in village and in the forest is NOK 3203 – 8747. The confidence interval for the WTP sample is NOK 838 – 4916. They overlap; thus, I cannot reject the null hypothesis that there is no difference between the estimates for that attribute.

4.4 Contingent valuation

Figure 4.1 and figure 4.2 show the WTA and the WTP from the contingent valuation question in the survey. The protest answers have been removed from the sample, as well as the respondents that answered, “do not know” (65 respondents for WTA, 15 for WTP).

In both figures, the x-axis shows the different amounts in NOK chosen by respondents. They are calculated from the midpoints of each interval. The y-axis shows the percentage that chose a particular amount. The respondent could choose intervals up to NOK 12 000, and were asked to specify the amount if their WTA/WTP was larger than NOK 12 000. There are notably higher values chosen in the WTA sample, going above NOK 50 000, the highest being NOK 300 000[6].

[6] Since I cannot rule out that some respondents have such welfare losses, I will keep these high values in the analysis. Note, however, that the mean value for WTA is very sensitive to the high values. Removing answers of NOK 50 000 and above nearly halves the mean WTA/household/year from NOK 8600 (NOK 7822 – 9378) to NOK 4777 (NOK 4618 – 4936).

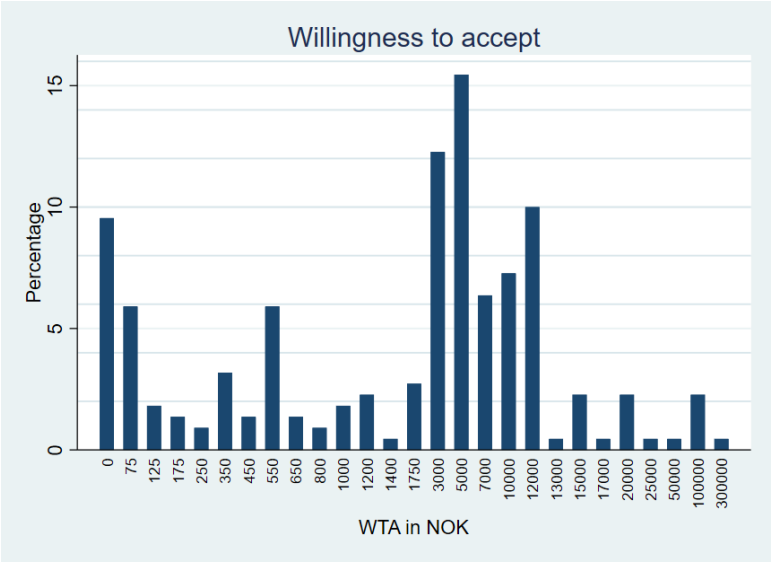


Figure 4.1 Contingent valuation WTA. Frequency distribution.

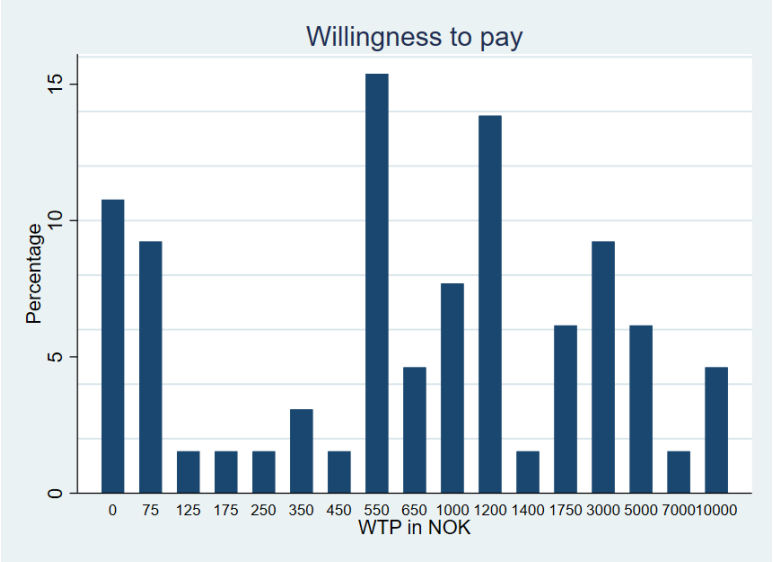


Figure 4.2 Contingent valuation WTP. Frequency distribution.

The values most chosen for WTP are NOK 3000 and NOK 1750. For WTP they are NOK 550 and NOK 1200. The distribution is similar to a normal distribution with left censoring. The median value of WTA is NOK 3000, and NOK 1000 for WTP. The mean WTA is NOK 8600 with the 95% confidence interval of NOK 7822 – 9378. The mean WTP is NOK 1578, with a 95% confidence interval of NOK 1457 - 1699. I am now able to answer the three first research questions.

Research question 1: What is the mean willingness to pay in contingent valuation (WTP-CV) for the residents of Aurskog-Høland Municipality in order to avoid the planned Setten local wind power project, located in a recreational area?

Mean WTP/household/year = NOK 1578 (NOK 1457 – 1699)

Research question 2: What is the mean willingness to accept in contingent valuation (WTA-CV) for the residents of Aurskog-Høland Municipality in order to accept the planned Setten local wind power project, located in a recreational area?

Mean WTA/household/year = NOK 8600 (NOK 7822 – 9378)

Research question 3: Is there a disparity between WTA and WTP in the context of residents' preferences toward a local wind power project?

The 95% confidence intervals for mean WTP and mean WTA do not overlap. Thus, hypothesis H3.1, that the mean WTP to avoid environmental impacts of Setten Wind farm is equal to mean WTA/household/year to accept the development of the wind farm is rejected.

WTA and WTP are significantly different; and there is indeed a disparity between WTA and WTP.

4.4.1 Regression variables

The variables of my regression models are presented in the table below. I have written a with a short description for each of them, some summary statistics and my hypothesis for their relation to the dependent variable.

Table 4.5 Regression variables and descriptive statistics

		WTA						***WTP***					
Var	**Description**	**Mean**	**St. dev**	**Min**	**Max**	**Obs**		**Mean**	**St. dev**	**Min**	**Max**	**Obs**	
WTA & WTP	Willingness to pay (WTP)/Willingness to accept compensation (WTA); in NOK	8600	25 000	0	300000	220		1670	2350	0	10000	65	
lnage[7]	Log of age of respondent	50.9	15.2	18	82	285	+/-	50.6	14.0	19	85	80	+/-
female	Dummy, 1 if respondent is female, 0 otherwise	0.414	0.493	0	1	285	+/-	0.513	0.5	0	1	80	+/-
lnhhinc[8]	Log of midpoint household income	964260	568219	100000	5500000	270	+/-	911539	503178	100000	3500000.5	78	+
lntaxes[9]	Log of amount payed by household in annual taxes to the municipality	13504	4551	0	40000	193	+	12969	4614	1500	24000	53	+
HigherEducation	Dummy, 1 if respondent has completed higher education (3 years or more at university), 0 otherwise	0.454	0.498	0	1	284	+/-	0.45	0.500	0	1	80	+/-
AttachmentSetskog	Likert scale from 1 to 7, where 1 is no attachment to Setkog and 7 is strong attachment	3.046	1.918	1	7	285	+	2.338	1.533	1	7	80	+
AttachmentAH	Likert scale from 1 to 7, where 1 is no attachment to Aurskog-Høland and 7 is strong attachment	5.502	1.469	1	7	285	+	5.075	1.63	1	7	80	+
VisibilityMap	Dummy[10], 1 if respondent was shown the visibility map, 0 otherwise	0.505	0.500	0	1	285	+/-	0.525	0.500	0	1	80	+/-
visible	Dummy, 1 if the respondent is shown the visibility map and the wind turbines are visible from their home, 0 otherwise	0.099	0.298	0	1	274	+	0.052	0.222	0	1	77	+
notvisible	Dummy[11], 1 if the respondent is shown the visibility map and the wind	0.387	0.487	0	1	274	-	0.455	0.498	0	1	77	-

[7] For all ln transformed variables, mean, st.dev, min and max are presented without the transformation. With the ln transformation, these values are for WTA: mean (3.879), st.dev (0.335), min (2.890), max (4.407). For WTP: mean (3.881), st.dev (0.304), min (2.944), max (4.443)
[8] With ln transformation for WTA: mean (13.632), st.dev (0.568), min (11.513), max (15.520). For WTP: mean (13.580), st.dev (0.558), min (11.513), max(15.068).
[9] With ln transformation for WTA: mean (9.362), st.dev (1.032), min (0), max (10.597). For WTP: mean (9.362), st.dev (0.554), min (7.314), max (10.086).
[10] Half the respondents were shown maps that show where the wind turbines will be visible from, and then asked Q16; if it will be visible from their home.
[11] This variable is the reference variable to VisibilityMap and visible in the regressions

	turbines are not visible from their home, 0 otherwise												
recreation	Dummy for Q8a, 1 if the respondent has done any recreational activity in Bjørnbassheia or Lembruheia in the last 12 months, 0 otherwise	0.291	0.454	0	1	258	+	0.213	0.409	0	1	80	+
concerned	Likert scale from 1 to 7, 1 if the respondent is not concerned with the environmental effects of the wind farm, 7 if they are very concerned	4.89	1.99	1	7	285	+	4.13	2.02	1	7	80	+
HeardOf	Dummy for Q5b, 1 if the respondent has previously heard of at least one of the areas Bjørnbassheia or Lembruheia, 0 otherwise	0.435	0.496	0	1	285	+/-	0.338	0.473	0	1	80	+/-
Norway	Likert scale from 1 to 7, 1 if the respondent is negative to building wind farms in Norway, 7 if they are positive	3.55	2.26	1	7	285	+	4.21	2.37	1	7	80	+
Setten	Likert scale from 1 to 7, 1 if the respondent is negative to building the wind farm Setten, 7 if they are positive	3.31	2.35	1	7	285	+	3.96	2.39	1	7	80	+

In the table the columns +/- explain how I hypothesise that the independent variables are related to the dependent variable of willingness to pay in increased yearly taxes, or willingness to accept compensation from decreased taxes. I do not expect the first variables “lnage” and “female” to affect the WTA nor the WTP of the respondent. When it comes to the variable “lnhhinc”, I think that there will be a positive relationship for WTP and no relationship for WTA. Since the payment vehicle of the survey is taxes, an increase in taxes is limited by a respondent's income. I expect that a person that earns more is willing to pay a higher amount in taxes. I do not expect the same for WTA, since a reduction in taxes has no such limitation.

Since the payment vehicle in the survey is municipal charges, I do suspect there to be a significant, positive relationship between both WTA and WTP and “lntaxes”. Having taxes be the payment vehicle grounds the payment in something that respondents are used to paying. This makes the scenario more realistic, however, it also conceptually limits the payment/compensation to something that can be deemed a reasonable increase/decrease in taxes. For WTA, someone who pays only a small amount in taxes to the municipality might not be comfortable demanding a high compensation, as that could lead to them not paying any taxes at all. Thus, they might not want to go above the amount they already pay. Those that

pay a higher amount might feel comfortable demanding more. That is why I hypothesise that there will be a positive relationship between WTA and "lntaxes". I also suspect there to be a positive relationship between WTP and "lntaxes". In a similar way, someone who pays little in taxes to the municipality might be less likely to imagine an increase in taxes as large as someone who already pays more. I expect them to be somewhat anchored in what they already pay, someone who pays more already is more likely to have a larger WTP.

I think that respondents with a higher education are likely to be more informed about environmental effects of wind power, as well as issues of climate change and benefits of wind power. Thus, depending on how they view these conflicting concerns, the relationship between higher education and WTA/WTP could go either way. I expect that a stronger attachment to Setskog, as well as Aurskog-Høland municipality, will lead to higher values of WTA and WTP. This is because if they value that area more, then the damage caused by the wind farm might feel more worse to them. When it comes to the variable "VisibilityMap", I can imagine two opposite effect from seeing a map of where the wind turbines will be visible from. A respondent might not already be informed on the visual impacts of the wind farm. If it is more comprehensive than imagined, I suspect that it will lead to higher values of WTA and WTP. However, they may also find it to be less extensive than expected, thus judging there to be less harm than feared, leading to lower values of WTA and WTP. When it comes to the respondents that will be able to see wind turbines from their home, I expect them to have higher WTA and WTP values, and the opposite for those who cannot.

People who use the areas Bjørnbassheia or Lembruheia (where Scanergy plan on building the wind farm) for recreational activities have a use value of the areas, which I expect will lead to higher values of WTP and WTA. The variable "concerned" is related to non-use value of the area. The more concerned a respondent is of the environmental effects of the wind farm, the higher WTA or WTP I anticipate them to have.

"HeardOf" tells us something about the respondents' familiarity with the area where Scanergy plans to build the wind farm. I hypothesise that someone familiar with the area is more inclined to want to preserve it, thereby having higher values of WTA and WTP. However, fondness of the areas might also matter. If someone knows of the areas, but are not very fond of them, that might lead to lower values of WTA and WTP.

The variables "Norway" and "Setten" tell us about attitudes towards wind power in Norway and Setten, respectively. I expect there to be a negative relationship between being positive

towards wind power, and WTA and WTP. Those that support wind farms are likely to need less compensation to accept it and will probably not be willing to pay much to avoid it – if anything.

I had wanted to learn whether there is a "Not In My Back Yard" effect present among the respondents, where they favour wind farms in general, but not in their own municipality. Unfortunately, our phrasing of the question about the respondents' attitudes towards wind farms in Norway does not allow us to look into the NIMBY effect. To be able to investigate a NIMBY effect, we should have asked the participants not to consider Setten wind farm when answering the question, only other wind farms in the country. Since the question about attitudes towards wind farm in Norway came before that of Setten wind farm, it is likely that their opinion towards Setten wind farm dictated how they answered the question about wind farms in Norway. The variables "Setten" and "Norway" are similar, with correlations of 0.89 for WTA and 0.88 for WTP, indicating that this might have been the case. Conducting a hypothesis test concludes that the null hypothesis that they are the same cannot be rejected at a 5% significance level.

4.4.2 Interval regression models

I conduct my regression analysis using an interval regression model. With an ordinary least squares (OLS) model, I failed to reject the null hypothesis of linearity. The interval regression model allows me to correct for heteroscedasticity, by implementing the specification "robust" in Stata. I am also able to use the intervals from the survey, instead of the midpoint between them (which was used for OLS and tobit).

Table 4.6 Interval regression model explaining which regression variables lead to higher and lower amounts of compensation demanded. Standard errors are in the parenthesis.

Interval regression WTA					
	Model 1	Model 2	Model 3	Model 4	Model 5
lnAge	-1.82***	-1.70***	-1.76***	-1.89***	-1.82***
	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)
female	-1.15***	-1.13***	-1.15***	-1.11***	-1.08***
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
lnhhinc	-0.00	0.04	0.05	0.05	-0.01
	(0.10)	(0.10)	(0.10)	(0.10)	(0.09)
lntaxes	0.09**	0.10***	0.09**	0.08*	0.14***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)
HigherEducation	0.63***	0.61***	0.61***	0.60***	0.60***
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
visible	-1.32***	-1.39***	-1.39***	-1.35***	-1.35***
	(0.31)	(0.31)	(0.31)	(0.31)	(0.31)
VisibilityMap	-0.03	-0.00	-0.02	-0.03	-0.01

	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
AttachmentAH	0.09***	0.10***	0.10***	0.08**	
	(0.04)	(0.04)	(0.04)	(0.04)	
recreation	0.29***	0.34***	0.34***		
	(0.12)	(0.12)	(0.12)		
concerned	-0.04*			-0.03	-0.04*
	(0.03)			(0.03)	(0.03)
Setten		0.10***			
		(0.02)			
Norway			0.10***		
			(0.03)		
HeardOf				0.39***	
				(0.10)	
AttachmentSetskog					0.14***
					(0.03)
constant	13.43***	11.77***	11.86***	13.04***	13.20***
	(1.52)	(1.55)	(1.51)	(1.54)	(1.49)
lnsigma					
constant	0.95***	0.94***	0.94***	0.95***	0.95***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Log likelihood	-7763.9	-7755.1	-7755.0	-7760.1	-7758.9
R^2	0.381	0.382	0.382	0.381	0.382
Adjusted R^2	0.380	0.381	0.381	0.381	0.381
Number of obs	141	141	141	141	141

***p<0.15, **p<0.10, ***p<0.05**

Due to issues with correlation[12], I have separated the correlated variables into different regression models. For instance, the variables "Setten", "nor" and "concerned" are correlated. It makes sense a respondent's attitudes towards a wind farm in Norway is related to their attitudes towards Setten wind farm, which again is related to the concern that they feel about the impacts of Setten wind farm. By separating these variables, I avoid issues with multicollinearity. The adjusted R^2 values tell me that the models explain about 38% of the variation in WTA.

In every model "lnAge" and "female" have a negative relationship with WTA, at a 5% significance level. This is surprising, as I hypothesised that they would not have any significant effect on WTA. In my models, a 1% increase in age leads to a 1.70% to 1.89% decrease in WTA, and a female respondent demand from 108% to 115% less in compensation. This should mean that both women and older people feel less damage from the

[12] See correlation matrices in appendix

wind farm. This is, however, not necessarily the case. It is also probable that both women and elder people feel less entitled to demand compensation.

The income variable "lnhhinc" has no significant effect, as predicted. The compensation that a respondent demands is not dependent on their income, it is, however, dependent on how much they pay in annual municipality charges (*lntaxes*). In my models, paying 1% more in municipal charges leads to an increase in WTA of 0.08% – 0.14%. Although this is as expected, it could mean that we underestimate the damage experienced by the respondents, because they are limited by the framework of taxes, and that the true WTA is larger than it seems in our results.

Higher education is also as expected, where having at least a bachelor's degree leads to between a 60% to 63% increase in WTA. A variable that does not behave as expected is "visible". I assumed that respondents who would be able to see wind turbines from their homes would demand higher compensation, yet, the model is showing the opposite effect. The effect of having wind turbines visible from a respondent's home is a decrease in compensation of 132% - 139%; compared to those that got the visibility map and will not see the wind turbines from their homes. Note, however, that only half the respondents in the sample were shown the visibility map and asked whether the wind turbines would be visible or not. It is probable that some respondents that were not shown the visibility map already knew that the turbines would be visible from their homes, so they are incorrectly categorized as zero in this variable.

The variables "AttachmentAH", "AttachmentSetskog", "recreation", and "HeardOf" all behaved as hypothesised. "HeardOf" and "recreation" have the largest coefficients. Those that are already familiar with the areas where Scanergy plan to build the wind farm, demand 39% more in compensation. Respondents that use the area for recreational activities demand 29% to 34% more. The variables are not in the same regression, as they have a correlation of 0.39. People who use the areas are bound to be familiar with them. Still, I do find the distinction of the variables interesting, as "HeardOf" hints at a respondent's familiarity and attachment to the area, whereas "recreation" encompasses use value. Both have a significant impact on WTA.

The variables "Setten" and "Norway" have a coefficient that is the opposite of what I hypothesised. They have the same, positive coefficient, being more positive towards wind farms by one unit leads to a 10% increase in compensation demanded. This could be because

maybe people with higher acceptance of wind power also accept that compensation should be paid to those that are directly affected, whereas people who are opposed to wind farms are against the notion of getting compensation as they might view it as a "bribe" in order to get people to accept the wind farm.

The variable "concerned" is not as expected either. The coefficient of -0.04 is small, and only significant at a 15% level in two of the models. A one unit increase on the Likert scale of being concerned results in a 4% reduction WTA. It could be that the respondents who are concerned about the environmental effects of the wind farm are also very concerned about climate change, and therefore demand less compensation. However, since the coefficient is small, and only significant at a 15% level, I will not conclude anything.

Table 4.7 Interval regression model explaining which regression variables lead to higher and lower WTP. Standard errors are in the parenthesis.

	Interval regression WTP					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
female	0.68***	0.36***	0.52***	0.57***	0.49***	0.62***
	(0.15)	(0.14)	(0.15)	(0.15)	(0.14)	(0.13)
lnhhinc	0.41***	0.45***	0.46***	0.17		0.23*
	(0.15)	(0.12)	(0.12)	(0.13)		(0.14)
lntaxes	0.17*	-0.02	-0.07	0.24***	0.11	
	(0.12)	(0.11)	(0.10)	(0.10)	(0.11)	
HigherEducation	-0.21	-0.13	-0.10	-0.38***	-0.01	-0.43***
	(0.17)	(0.15)	(0.15)	(0.16)	(0.16)	(0.14)
recreation	1.02***	0.98***	0.87***		1.09***	0.32***
	(0.12)	(0.10)	(0.10)		(0.12)	(0.15)
HeardOf	-0.54***	-0.46***	-0.52***		-0.48***	-0.89***
	(0.19)	(0.18)	(0.19)		(0.16)	(0.17)
concerned	0.27***			0.24***	0.26***	0.35***
	(0.04)			(0.04)	(0.04)	(0.03)
AttachmentAH	0.31***				0.34***	0.34***
	(0.06)				(0.06)	(0.05)
Setten		-0.33***				
		(0.03)				
Norway			-0.29***			
			(0.03)			
AttachmentSetskog				0.37***		
				(0.05)		
visible					-0.85***	
					(0.29)	
VisibilityMap					0.43***	
					(0.15)	
lnAge						1.62***
						(0.20)
constant	-3.74**	1.53	1.91	-0.14	2.04*	-6.16***

	(2.02)	(1.93)	(1.82)	(1.81)	(1.27)	(1.76)
lnsigma constant	0.65*** (0.04)	0.65*** (0.03)	0.66*** (0.04)	0.66*** (0.04)	0.64*** (0.04)	0.77*** (0.03)
Log likelihood	-2555.2	-2553.7	-2565.1	-2561.8	-2599.8	-3818.5
R^2	0.363	0.364	0.361	0.362	0.352	0.048
Adjusted R^2	0.361	0.362	0.359	0.360	0.350	0.046
Number of obs	44	44	44	44	45	64

***p<0.15, **p<0.10, ***p<0.05**

Seeing that we encountered opposition to the WTP version of our survey, the WTP sample has substantially fewer observations. WTP has 65 observations and the variable "lntaxes" only has 53. My models explain about 36% of the variation in WTP. There has been issues with correlation[13] between variables in these models as well, which is why some variables are removed from certain models. Due to correlation issues, model 6 includes "lnAge", but not "lntaxes". When "lntaxes" is not included, the adjusted R^2 plummets to 0.046. It is probable that this model contains omitted variable bias and is only looked to get an indication of how age matters for WTP. The variable is positive and significant, indicating that older people are willing to pay more than younger people.

In the WTA models I found that women requested less compensation than men. In the WTP models, the opposite effect is found, an increase in willingness to pay of 36% - 68% for female respondents compared to men. This is surprising, as the variable is often found to be negative in literature. Also contrary to the WTA models above, but expected for economic theory, household income is positive and significant at a 5% level in WTP models 1-3, although not in the fourth model. A 1% increase in household income leads to between a 0.41% to 0.46% increase in willingness to pay. Because taxes are the payment vehicle, this relationship is in accordance with the hypothesis; how much someone can pay depends on their income.

The variable "lntaxes" is only significant at a 5% level in the fourth model, and at a 15% level in the first model. The coefficients are positive, 0.17 and 0.24, paying more taxes signifies a higher willingness to pay. Since this is not found in all the models, however, it is difficult to

[13] See appendix for WTP correlation matrix

conclude that there is indeed a relationship between them. Had the number of observations been larger, the results might have been more conclusive.

The variable “HigherEducation” is only significant in one of the models, so I cannot determine a relationship between the variable and WTP. Both “recreation” and “HeardOf” are significant at a 5% level. In these models, they have opposite signs. In the WTA models both variables had a positive coefficient. In these models, “recreation” is positive, whereas “HeardOf” is negative. In my models, using the areas of the planned wind farm for recreational purposes leads to between an 87% to 109% increase in WTP. This indicates that the damage to those who have a use value of the area is around twice as large as those who do not. Being familiar with the areas already – by having heard of them, leads to a 46% to 54% decrease in WTP. This could mean that those who know the areas in the WTP sample are not very fond of them, and do not find them as worthy of preservation.

As opposed to the WTA model, the variable “concerned” has a positive coefficient, and is significant at a 5% level. A respondent that is more concerned, by one unit on the Likert scale, is willing to pay 24% - 27% more in increased taxes to avoid the building of Setten wind farm. This falls in line with my hypothesis for the variable.

The variables “AttachmentAH” and “AttachmentSetskog” also behave as predicted, with positive coefficents of 0.31 and 0.34 for “AttachmentAH” and 0.37 for “AttachmentSetskog”. “Setten” and “Norway” are also as predicted, and opposite to how they are in the WTA models as they should be. Thus, being more in favour of the wind farm Setten (by one unit on the 1-7 Likert scale) leads to a 33% reduction in WTP to avoid the wind farm. For wind farms in Norway, there is a 29% reduction in WTP by being one more unit (on the 1-7 Likert scale) in favour of wind farms.

There is a counterintuitive negative coefficient for the variable ”visible”, which is opposite to my hypothesis. There were, however, only four respondents that stated that the wind turbines would be visible from their homes. Thus, it might not be wise to make a conclusion with so few observations. The variable “VisibilityMap” is interestingly significant, and positive in this model. Having been shown the map of the areas where the wind turbines would be visible from, increases WTP by 43%. My hypothesis was that it would not be significant, which was the case in the WTA model. The reason that being shown the visibility map leads to an increase in WTP might be that the visual damage seemed more encompassing to the respondents than they originally thought.

4.4.3 Logit model for decision to pay/compensate

In the models above, two decisions are displayed in the same model:

1) *Does* the respondent demand compensation (WTA) to have the wind farm or not; and does the respondent pay to avoid the wind farm (WTP) or not?
2) If WTA>0 or WTP>0. *How much* compensation does the respondent demand, -or how much are they willing to pay?

In the following models I have separated these two decisions in order to see whether the same or different variables explains both of these decisions. First, I look at the decision to ask for compensation/pay by using a logit model in Stata. My dependent variable is now a dummy variable that is equal to one if the respondent stated a WTA/WTP that is larger than zero, and 0 if their WTA/WTP equals zero. The results can be seen in table 4.8 below.

Table 4.8 Logit models explaing what determines whether respondents demand compensation to accept (WTA) the Setten wind farmn (=1) or not (0=), and whether they are willing to pay (WTP) to avoid the same wind farm (=1) or not (=0) (WTP). Seperate for the WTA and WTP subsamples. Standard errors are in the parenthesis.

Logit models		
	WTA	WTP
lnAge	-0.71***	
	(0.31)	
female	-0.97***	
	(0.16)	
lnhhinc	-0.64***	-0.18
	(0.17)	(0.42)
lntaxes	-1.62***	-0.08
	(0.36)	(0.20)
HigherEducation	1.06***	-0.93**
	(0.18)	(0.52)
visible	-2.13***	
	(0.30)	
VisibilityMap	-0.45***	
	(0.18)	
AttachmentAH	0.12	0.05
	(0.09)	(0.07)
recreation	0.36**	
	(0.19)	
concerned	-0.73***	0.72***
	(0.05)	(0.11)
HeardOf		-0.87***
		(0.41)
constant	33.16***	3.84
	(4.36)	(5.33)

Log likelihood	-575.92	-165.97
R^2	0.220	0.158
Adjusted R^2	0.207	0.128
Number of obs	141	44
Correctly classified	90.07%	93.18%

***p<0.15, **p<0.10, ***p<0.05**

Due to few observations, the WTP model had problems with convergence, both "female" and "recreation" predicted success perfectly and had to be omitted from the model, thus the model might suffer from omitted variable bias. The adjusted R^2 values are lower here than previous models, especially for WTP. A large percentage is correctly classified.

In the WTA logit regression, "lnAge" and "female" also have significant, negative coefficients just like in the interval regression mode. Women and elder people are less likely to demand compensation. The income variable was not significant in the previous model for WTA, but it is significant, and negative, for the decision to demand compensation. This signifies that those with less income are more likely to demand compensation. The marginal utility of money is larger for people with less income, meaning that they will get a higher utility from demanding compensation, which might be the reason that they are more likely to do so. The income variable is not significant for the WTP model, the decision to pay to avoid a wind farm is not dependent on the income of the respondent.

The variable "lntaxes" has a negative coefficient that is significant at a 5% level for WTA, it is not significant for WTP. This is also opposite to the "lntaxes" coefficient in the interval regression model. Respondents that pay less in municipal charges are more likely to demand compensation. The reasons for this could be like those above. People that pay less in municipal charges might not be as well off, and thereby have a higher utility of compensation and be more likely to ask for it.

"HigherEducation" is significant in both models but have opposite signs. Respondents of the WTA survey are more likely to demand compensation if they have completed higher education, yet the opposite is true for the respondents of the WTP survey. It is probable that there are more protest answers in the WTP survey that have been difficult to find and remove, which then would affect coefficient estimates for WTP.

The variables "visible" and "VisibilityMap" are also significant and negative in the WTA model. Being able to see the wind turbines from a respondent's home makes them less likely

to demand compensation. This falls in line with the finding in the interval regression model, both contradicting my hypothesis for the variable. As mentioned, since only half the respondents in the sample were shown the visibility map and asked whether the wind turbines would be visible or not, it is probable that some respondents that were not shown the visibility map already knew that the turbines would be visible from their homes, so they are incorrectly categorized as zero in this variable.

Attachment to Aurskog-Høland municipality, which was significant in the interval regression models, is not significant in the decision to demand compensation or to pay to avoid Setten wind farm. Using the areas of the planned wind farm for recreational purposes makes someone more likely to demand compensation. Just as in the interval regression models, the variable "concerned" is significant and has a negative coefficient for WTA, and a positive coefficient for WTP. It could be that respondents in the WTA survey view the compensation as a "bribe", and are therefore opposed to it, explaining why the coefficient for "concerned" is negative. The variable "HeardOf" was only included in the WTP model due to correlation issued in the WTA regression. Which, like in the interval regression model, is negative and significant. Thus, being already familiar with the areas leads to a respondent being less likely to be willing to pay to avoid the wind farm.

4.4.4 Interval regressions with only positive values

By using a truncated sample of only positive values of WTA and WTP, I will examine the second aspect of the first interval regression models, namely the decision of how much compensation a respondent should demand or how much they should pay to avoid the wind farm. The results of this interval regression model are found in table 4.9 below.

Table 4.9 Interval regression model looking only at respondents that have a positive WTA, explaining which regression variables lead to higher and lower amounts of compensation demanded. Standard errors are in the parenthesis.

	Only positive values WTA				
	Model 1	Model 2	Model 3	Model 4	Model 5
lnAge	-1.57***	-1.81***	-1.71***	-1.61***	-1.55***
	(0.10)	(0.11)	(0.10)	(0.10)	(0.10)
female	-0.86***	-0.81***	-0.79***	-0.81***	-0.85***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
lnhhinc	0.35***	0.29***	0.26***	0.40***	0.34***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
lntaxes	0.14***	0.17***	0.18***	0.13***	0.19***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
HigherEducation	0.24***	0.20***	0.21***	0.22***	0.22***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
visible	0.68***	0.86***	0.90***	0.65***	0.66***

	(0.11)	(0.10)	(0.09)	(0.11)	(0.11)
VisibilityMap	0.17***	0.12***	0.15***	0.17***	0.20***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
AttachmentAH	0.09***	0.11***	0.10***	0.09***	
	(0.02)	(0.02)	(0.02)	(0.02)	
recreation	0.23***	0.28***	0.27***		
	(0.06)	(0.06)	(0.06)		
concerned	0.21***			0.22***	0.23***
	(0.01)			(0.01)	(0.01)
Setten		-0.15***			
		(0.01)			
Norway			-0.19***		
			(0.01)		
HeardOf				0.32***	
				(0.06)	
AttachmentSetskog					0.02
					(0.02)
constant	6.43***	9.49***	9.60***	6.02***	6.51***
	(0.77)	(0.78)	(0.78)	(0.78)	(0.77)
lnsigma					
constant	0.29***	0.30***	0.29***	0.29***	0.30***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Log likelihood	-5735.41	-5766.45	-5735.28	-5726.12	-5752.43
R^2	0.413	0.410	0.413	0.414	0.412
Adjusted R^2	0.412	0.409	0.412	0.413	0.411
Number of obs	129	129	129	129	129

***p<0.15, **p<0.10, ***p<0.05**

The R^2 values were calculated using McFadden's R^2. The adjusted R^2 are a bit larger than those in the first interval regression models. My models explain about 41% of the variation in willingness to accept.

The income variable was not significant in the first interval regression models, and had a negative coefficient in the logit model, significant at a 5% level. In this model the variable "lnhhinc" is significant and has a positive coefficient. A one percent increase in income leads to between a 0.26% to 0.40% increase in WTA in my models. Interestingly, income works in two different ways, dependent on the decision being made. When the decision is to demand compensation, those that earn less will be more likely to demand it, however, when it comes to the amount demanded, people who earn more will demand more.

Just like in the first interval regression models, "lntaxes" have a positive and significant coefficient. Those that pay more taxes also demand more compensation. This contrasts with the logit model, where "lntaxes" was negative and those who pay little taxes were more likely to demand compensation.

The variable for completed higher education is positive and significant here as well, but a lot smaller. In these truncated models, someone with at least 3 years of university education will demand at least 20% more compensation, whereas in the previous interval regression models they demanded at least 60% more. The finding of a 60% increase might have encompassed the higher likelihood of demanding compensation as well as the larger compensation demanded. By separating the two decisions I see that a respondent with higher education is more likely to demand compensation, and will demand a higher sum, although only by about 20% and not 60%.

Both "visible" and "VisibilityMap" have positive coefficients that are significant at a 5% level. This is also in contrast with the other models. "Visible" has significantly negative coefficients in both the interval regression models, and the logit model. As mentioned, there could be some issued with the way the "visible" variable is defined. My results show that having the wind turbines be visible from someone's home makes them less likely to ask for compensation, but when they do ask, they ask for about 60% more. Having been shown the map of where the wind turbines would be visible from leads to less likelihood to demand compensation, but when they demand compensation, they ask for between 12% and 20% more. Since only those that saw the visibility map could see for themselves whether the wind farm would be visible from their home, this could explain that seeing the map makes them demand higher compensation.

For «visibility» it could be the case that those that have decided to demand compensation (WTA > 0) have accepted that they could be compensated for the external effects of the wind farm, as opposed to the full WTA sample used in the interval regression models and logit model where there might be respondents that thinks that compensation is unethical and seen as a bribery (Even if protest zeros were removed based on their most important reason for answering zero, we cannot rule out that other respondents might have at least partly protest behaviour influencing their answers).

The variable "recreation" is the same here as in previous models. "AttachmentAH" was not significant in the decision to ask for compensation, but it does increase the amount asked. Attachment to Setskog does not affect how much compensation is demanded.

The variable "concerned" is positive and significant at a 5% level. A respondent that is worried about the environmental effects of the planned wind farm asks for 21-23% more in compensation. The variable was not significant in the first regression models, and was

significant, but negative in the logit model. Being concerned makes a respondent less likely to ask for compensation but increases the amount for those that do request it.

Respondents that are more in favour of wind farms in Norway and Setten demand less compensation, by 19% and 15% respectively. This finding fits with my hypothesis but goes against the finding of the first interval regression models. Due to correlation issues, I was not able to include these variables in the logit regression models. It is likely that the reason the coefficients for Norway and Setten were positive in the first interval regression models is that those respondents are more likely to demand compensation. When it comes to the amount being requested, however, they ask for less.

The variable "HeardOf" has a significant, positive coefficient in this model. Respondents that are already familiar with the areas where Scanergy plan to build the wind farm are, as found in the logit model, less likely to ask for compensation. Those that do, however, request 32% more compensation to accept the wind farm.

Table 4.4.10 Interval regression model looking only at respondents that have a positive WTP, explaining which regression variables lead to higher and lower WTP. Standard errors are in the parenthesis.

Only positive values, WTP						
model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
female	-0.13*	-0.34***	-0.30***	-0.30***	-0.28***	-0.23***
	(0.09)	(0.10)	(0.09)	(0.08)	(0.08)	(0.07)
lnhhinc	0.21***	0.39***	0.39***	0.08*		-0.09
	(0.08)	(0.08)	(0.08)	(0.05)		(0.06)
lntaxes	0.13**	0.02	0.00	0.17***	0.09	
	(0.08)	(0.08)	(0.08)	(0.07)	(0.08)	
HigherEducation	0.08	0.02	0.02	-0.06	0.14*	-0.20***
	(0.10)	(0.09)	(0.09)	(0.09)	(0.10)	(0.08)
recreation	0.48***	0.58***	0.54***		0.44***	0.43***
	(0.08)	(0.08)	(0.08)		(0.07)	(0.08)
HeardOf	-0.25***	-0.28***	-0.31***		-0.13*	-0.34***
	(0.11)	(0.11)	(0.11)		(0.09)	(0.09)
concerned	0.05***			0.05***	0.09***	0.15***
	(0.02)			(0.02)	(0.02)	(0.02)
AttachmentAH	0.29***				0.28***	0.20***
	(0.02)				(0.02)	(0.02)
Setten		-0.08***				
		(0.02)				
Norway			-0.09***			
			(0.02)			
AttachmentSetskog				0.27***		
				(0.02)		
visible					-0.80***	
					(0.27)	

VisibilityMap					-0.02 (0.08)	
lnAge						1.55*** (0.11)
constant	1.14 (1.25)	1.92 (1.35)	2.10* (1.33)	3.53*** (0.87)	4.29*** (0.72)	0.60 (1.01)
lnsigma						
constant	0.09*** (0.03)	0.14*** (0.03)	0.14*** (0.03)	0.10*** (0.03)	0.09*** (0.03)	0.04* (0.02)
Log likelihood	-2035.58	-2072.68	-2071.71	-2042.51	-2079.18	-2800.64
R^2	0.332	0.320	0.320	0.330	0.318	0.081
Adjusted R^2	0.329	0.317	0.318	0.328	0.315	0.078
Number of obs	41	41	41	41	42	57

***p<0.15, **p<0.10, ***p<0.05**

The McFadden's adjusted R^2 are a bit smaller than in the first interval regression models, that had the complete sample. My models explain about 32% of the variation in willingness to pay.

The variable "female" was surprisingly positive and significant in the first interval regression models. In these models, however, they are also significant, but negative. Women are willing to pay about 30% less than men. Due to the small sample size, and problems with perfect prediction, I was not able to include the variable "female" in the logit regression. There were only 2 women in our sample that chose 0 WTP, whereas there were 5 men that chose the same. Thus, the reason for the positive coefficient in the first interval regression models is because women are probably more likely to be willing to pay something, but the amount that they pay is less than that of men.

The coefficient of variables "lnhhinc", "taxes", "AttachmentAH", "AttachmentSetskog", "lnAge", and "visible" are akin to those of the first interval regression models. The variables "HigherEducation" and "VisibilityMap" were significant in the decision to pay but is not significant in choosing the amount.

The variables "recreation", "HeardOf", "concerned", "Norway" and "Setten" all had coefficients of the same sign as in the first interval regression models but are smaller in these models. In the first interval regression models, it looked like concern for the environmental effects of the wind farm lead to an increase of willingness to pay of about 25%. Here, however, the increase in WTP is only by 5 and 9%. When separating the decision of whether to pay or not, and how much to pay, the amount lessens for these variables. It seems like the

variables are important in the decision to pay or not and were therefore overestimated in the first models.

Because the WTA and WTP variables contain two separate decision, namely the decision to demand/pay anything at all, and then, if they do – how much, it has been very useful to separate these decisions into two different models. This was an important distinction to make, because some variables changed coefficients in the separate analysis.

4.5 Discussion

Research question 4 asks whether there is a difference in the WTA and WTP when obtained by the choice experiment and the contingent valuation question. As the WTP in the choice experiment was not significant, I can only make the comparison for WTA. The choice experiment gave the total welfare loss of WTA of NOK 19729 (14490 – 24968) per household per year. The mean WTA in the contingent valuation method was found to be NOK 8600 (7822 – 9378) per household per year. Their 95% confidence intervals do not overlap, so they are statistically different. Thus, WTA-CE gives larger values than WTA-WTA (by a factor of 2.3). Hypothesis 4.1, that there is no difference in the WTA and WTP when obtained by choice experiment compared to the contingent valuation method is rejected.

When comparing the CE and CV methods for WTP, both Jin et al. (2006) and He et al. (2017) find them to be very similar and equally suitable for environmental valuation. However, in his comparison of the CE and CV methods, Sanchez (2013) did not find the models consistent in their estimation of the parameters. The reason for the disparity found in WTA-CE and WTA-CV could be due to the general notion that people as consumers have experience in stating their WTP (although mainly for private goods in terms of accepting or rejecting to buy a good at a given market price; mimicking a simple CE), but are not used to demanding compensation (WTA) and especially not when asked in an open-ended question (in CV). Consumers seem to easier accept a stated specific amount in CE than stating the same high amount when asked directly their minimum WTA to accept wind power.

In their comparison of the CE and CV method, Meyerhoff and Liebe (2008) looked at the number of protest answers each method elicited, and did not find any significant difference. Sanchez (2013) however, had more protest answers in the CV method than the CE. In the CE I found 56 protest answers in total. In the CV I found only 28. However, if I were to include the less clear-cut answers for WTA=0 in the CV, the number of protest answers would be 49, which is closer to the number of protests in CE. Also, it is probable that there were more

protest answer answers in the WTP version of the survey that I was not able to find and remove from the sample.

Mattmann et al. (2016) find that visual effects lead to a reduction in welfare. I have fond the same in my thesis. In the choice experiment the welfare loss per wind turbine is of NOK 550. There is also a welfare loss of having turbines that are 250 meters tall (NOK 1449) and 200 meters tall (NOK 4371), compared to 150 m tall turbines.

I have found that using the nature area around the wind farm for recreational purposes lead to a higher welfare loss, which has also been observed in other studies (García et al., 2016; Kipperberg et al., 2019). This is as expected as those that use the affected area for recreation (or get reduced quality of their recreational experience of the area) loose recreational use value in addition to landscape aesthetic use value and non-use value.

For the CV question I find that the WTA survey gives higher values for welfare loss than the WTP survey. This WTA WTP disparity is also found in literature (Horowitz & McConnell, 2002; Tuncel & Hammitt, 2014). As the WTP version encountered opposition by locals and had to be stopped early, great care should be taken when designing CV surveys of wind farms and the WTA version should to greater extent than currently be considered as the appropriate elicitation method when the respondents perceive that they have the property rights to nature.

5. Conclusion

My first research question asks: What is the mean willingness to pay in contingent valuation (WTP-CV) for the residents of Aurskog-Høland Municipality in order to avoid the planned Setten local wind power project, located in a recreational area? In the contingent valuation (CV) question, the mean WTP to avoid a wind farm, per household per year was NOK 1578 (1457 – 1699).

The second research question asks: What is the mean willingness to accept in contingent valuation (WTA-CV) for the residents of Aurskog-Høland Municipality in order to accept the planned Setten local wind power project, located in a recreational area? The mean WTA to allow a wind farm, per household per year was NOK 8600 (7822 – 9378).

The third research question asks: Is there a disparity between WTA and WTP in the context of residents' preferences toward a local wind power project? In the CV question they are found to be statistically different, making the presence of a WTA – WTP disparity evident. Hypothesis H3.1, that mean WTP to avoid environmental impacts of Setten Wind farm is

equal to mean WTA/household/year to accept the development of the wind farm is rejected. As most of the results of the WTP-CE were not significant, I was not able to test hypothesis H3.2, that the mean WTP to avoid environmental impacts of Setten Wind farm is equal to mean WTA/household/year to accept the development of the wind farm. I was, however, able to investigate whether the estimates for the variable for overhead power lines are equal. I could not reject the null hypothesis that they are equal, so no disparity was found for the WTP-CE and the WTA-CE for the estimates of overhead power lines.

The fourth research question asks: Is there a difference in the WTA and WTP when obtained by choice experiment compared to the contingent valuation method? As WTP-CE was not significant, the comparison was only made for WTA-CV and WTA-CE. WTA-CE gives statistically significant larger values than WTA-CV (by a factor of 2.3). Hypothesis 4.1, that there is no difference in the WTA and WTP when obtained by choice experiment compared to the contingent valuation method was rejected. Thus, there is a disparity in WTA-CE and WTA-CV estimates.

In the choice experiment (CE) I found that overhead power lines in the village and in the forest lead to the largest welfare loss of the planned Setten wind farm for the citizens of Aurskog-Høland municipality. The respondents of the CE part of the survey were willing to accept NOK 5975 (3203 – 8747) in compensation to allow overhead lines instead of underground cables in the village and forest when connecting the wind farm to the main grid. In the CE-WTP survey, they were willing to pay NOK 2877 (838 – 4916) to have underground cables instead of overhead lines. As the confidence interval of the estimates overlap, no WTA – WTP disparity is found in that CE estimate. The second largest welfare loss, for the CE-WTA survey, came from overhead lines in the village and underground lines in the town. The third largest welfare loss came from having wind turbines that are 200 meters high instead of 150 meters.

In the contingent valuation (CV) question, some significant explanatory variables had different signs of their coefficients in the different regression models. When it came to the decision of whether to demand compensation, the logit model showed that respondents with lower incomes were more likely to demand compensation than those with higher income. However, the interval regression model for only positive values of WTA showed that those respondents that had decided to demand compensation, demanded higher WTA with higher income. Thus, the way a policymaker maker asks about compensation is important for the outcome.

The choice experiment identifies the value of avoiding different aspects of the development of the wind farm, by valuing the welfare loss from each attribute and summing over the attributes. The values put on the different attributes in CE can be used to design a wind farm that minimizes overall welfare loss if it is built. Among the attributes, having power lines underground instead of overhead lines from the wind farm back to the main grid, creates the largest welfare gain.

Aggregating all environmental costs of this wind farm (from CE or CV) over the number of affected households can be added to investment and operating costs of the windfarm and compared to the social benefits of electricity production used in a Cost-Benefit analysis of whether to pursue the wind power development or not.

Literature

Arrow, K., Solow, R., Portney, P. R., Leamer, E. E., Radner, R., & Schuman, H. (1993). Report of the NOAA panel on contingent valuation. *Federal register, 58*(10), 4601-4614.

Champ, P. A., Boyle, K. J., Brown, T. C., & Peterson, L. G. (2017). *A Primer on Nonmarket Valuation, Second Edition* (Vol. 3): Springer.

Daikeler, J., Bošnjak, M., & Lozar Manfreda, K. (2020). Web versus other survey modes: an updated and extended meta-analysis comparing response rates. *Journal of Survey Statistics and Methodology, 8*(3), 513-539.

Dugstad, A., Grimsrud, K., Kipperberg, G., Lindhjem, H., & Navrud, S. (2020). Acceptance of national wind power development and exposure: A case-control choice experiment approach.

Einarsdóttir, S. R., Cook, D., & Davíðsdóttir, B. (2019). The contingent valuation study of the wind farm Búrfellslundur-Willingness to pay for preservation. *Journal of cleaner production, 209*, 795-802.

Energidepartementet, O. o. (2019). Nasjonal ramme for vindkraft. Retrieved from https://www.regjeringen.no/no/tema/energi/fornybar-energi/nasjonal-ramme-for-vindkraft2/id2662796/

Fricker, R. D., & Schonlau, M. (2002). Advantages and disadvantages of Internet research surveys: Evidence from the literature. *Field methods, 14*(4), 347-367.

García, J. H., Cherry, T. L., Kallbekken, S., & Torvanger, A. (2016). Willingness to accept local wind energy development: Does the compensation mechanism matter? *Energy Policy, 99*, 165-173.

He, J., Dupras, J., & G. Poder, T. (2017). The value of wetlands in Quebec: a comparison between contingent valuation and choice experiment. *Journal of Environmental Economics and Policy, 6*(1), 51-78.

Horowitz, J. K., & McConnell, K. E. (2000). A review of WTA/WTP studies. *Wtp Studies (October 2000)*.

Horowitz, J. K., & McConnell, K. E. (2002). A review of WTA/WTP studies. *Journal of environmental economics and Management, 44*(3), 426-447.

Jakobsen, S. B., Mindeberg, S. K., Østenby, A. M., Dalen, E. V., Lundsbakken, M., Bjerkestrand, E., . . . Engebrigtsen, K. H. (2019). *FORSLAG TIL NASJONAL RAMME FOR VINDKRAFT*. Retrieved from Norges vassdrags- og energidirektorat:

Jin, J., Wang, Z., & Ran, S. (2006). Comparison of contingent valuation and choice experiment in solid waste management programs in Macao. *Ecological Economics, 57*(3), 430-441.

Kipperberg, G., Onozaka, Y., Bui, L. T., Lohaugen, M., Refsdal, G., & Sæland, S. (2019). The impact of wind turbines on local recreation: evidence from two travel cost method–contingent behavior studies. *Journal of Outdoor Recreation and Tourism, 25*, 66-75.

Lindhjem, H., & Navrud, S. (2011). Using internet in stated preference surveys: a review and comparison of survey modes. *International Review of Environmental and Resource Economics (Forthcoming)*.

Livgard, E. F. (2019). *Kantar Klimabarometer 2019*. Retrieved from

Mattmann, M., Logar, I., & Brouwer, R. (2016). Wind power externalities: A meta-analysis. *Ecological Economics, 127*, 23-36.

Meyerhoff, J., & Liebe, U. (2008). Do Protest Responses to a Contingent Valuation Question and a Choice Experiment Differ? *Environmental and Resource Economics, 39*(4), 433-446. doi:https://link.springer.com/journal/volumesAndIssues/10640

Mitchell, R. C., & Carson, R. T. (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method*. 1616 P Street, N.W., Washington, D.C. 20036: Resources for the Future.

Mjelde, J. W., Kim, T.-K., & Lee, C.-K. (2016). Comparison of Internet and interview survey modes when estimating willingness to pay using choice experiments. *Applied Economics Letters, 23*(1), 74-77.

Molnarova, K., Sklenicka, P., Stiborek, J., Svobodova, K., Salek, M., & Brabec, E. (2012). Visual preferences for wind turbines: Location, numbers and respondent characteristics. *Applied Energy, 92*, 269-278.

Navrud, S., & Bråten, K. G. (2007). Consumers' preferences for green and brown electricity: a choice modelling approach. *Revue d'économie politique, 117*(5), 795-811.

Perman, R., Ma, Y., Common, M., Maddision, D., & McGilvray, J. (2011). *Natural Resource and Environmental Economics, Fourth Edition*. Edinburgh Gate, Harlow Essex CM20 2JE England: Pearson Education Limited.

Sanchez, J. M. U. (2013). Valoracion contingente y experimentos de eleccion aplicados en el Parque Nacional Sierra Nevada, Venezuela. (Contingent Valuation and Choice Experiments Applied to the Sierra Nevada National Park in Venezuela. With English summary.). *Economia (Universidad de Los Andes): Nueva Etapa, 38*(35), 57-100. doi:http://iies.faces.ula.ve/

Scanergy. (2018). *SETTEN VINDPARK Melding med forslag til utredningsprogram*. Retrieved from

Solberg, E. L., Skei, L., & Befring, Å. M. (2019, 17. October 2019). Regjeringen dropper nasjonal rammeplan for vindkraft. Retrieved from https://www.nrk.no/norge/regjeringen-dropper-nasjonal-rammeplan-for-vindkraft-1.14744999

SSB. (2018). Inntekts- og formuesstatistikk for husholdninger. Retrieved from https://www.ssb.no/statbank/table/06944/

SSB. (2019). Befolkningens utdanningsnivå. Retrieved from https://www.ssb.no/statbank/table/09429/

SSB. (2020). Alders- og kjønnsfordeling i kommuner, fylker og hele landets befolkning (K) 1986 - 2020. Retrieved from https://www.ssb.no/statbank/table/07459/

StataCorp. (ND). intreg - Interval regression. Retrieved from https://www.stata.com/manuals13/rintreg.pdf

Stock, J. H., & Watson, M. W. (2015). *Introduction to Econometrics, Updated Third Edition*. Edinburgh Gate, Harlow Essex CM20 2JE England: Pearson.
Train, K. E. (2009). *Discrete Choice Methods with Simulation*: Cambridge University Press.
Tuncel, T., & Hammitt, J. K. (2014). A New Meta-analysis on the WTP/WTA Disparity. *Journal of environmental economics and Management, 68*(1), 175-187. doi:http://www.sciencedirect.com/science/journal/00950696
Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach, Fifth International Edition*: South-Western, Cengage Learning.
Zerrahn, A. (2017). Wind power and externalities. *Ecological Economics, 141*, 245-260.

Appendix 1

Frequency tables for WTA and WTP CV

For WTA 65 respondents answered, “no not know”. They are not included. WTP:15

Table 0.1 Frequency tables WTA-CV and WTP-CV

WTA in NOK	*Perc.*	*Freq.*
0	9.55	21
75	5.91	13
125	1.82	4
175	1.36	3
250	0.91	2
350	3.18	63
450	1.36	3
550	5.91	13
650	1.36	3
800	0.91	2
1000	1.82	4
1200	2.27	5
1400	0.45	1
1750	2.73	6
3000	12.27	27
5000	15.45	34
7000	6.36	14
10 000	7.27	16
12 000	10.00	22
13 000	0.45	1
15 000	2.27	5
17 000	0.45	1
20 000	2.27	5
25 000	0.45	1
50 000	0.45	1

WTP in NOK	*Perc.*	*Freq.*
0	10.77	7
75	9.23	6
125	1.54	1
175	1.54	1
250	1.54	1
350	3.08	2
450	1.54	1
550	15.38	10
650	4.62	3
800	0	0
1000	7.69	5
1200	13.85	9
1400	1.54	1
1750	6.15	4
3000	9.23	6
5000	6.15	4
7000	1.54	1
10 000	4.62	3
Total	100.00	65

100 000	2.27	5
300 000	0.45	1
Total	100.00	220

Choice experiment models

Tabell 1 Choice experiment model. Standard error in parenthesis.

	WTA	**WTP**
Cost	0.00049***	-0.00051***
	(0.00005)	(0.00013)
Number of turbines	-0.27059***	-0.00580
	(0.04870)	(0.04835)
200m height of turbines	-2.15117***	-0.04188
	(0.44808)	(0.38120)
250 m height of turbines	-0.71290	-0.15525
	(0.38086)	(0.43094)
Overhead lines both in village and in forest	-2.94062***	-1.47207***
	(0.69840)	(0.52308)
Overhead lines in village and underground in forest	-2.36867***	-0.38356
	(0.47345)	(0.54343)
Underground lines in village and overhead in forest	-1.26497***	-0.31329
	(0.33119)	(0.53706)
111 constant	0.52705***	0.34401***
	(0.06404)	(0.07359)
121 constant	3.68706***	0.45929
	(0.61965)	(0.57111)
131 constant	2.26313***	2.31913***
	(0.50917)	(0.69997)
141 constant	1.16156	1.03970
	(0.85020)	(0.75556)
151 constant	2.49991***	-1.35877*
	(0.55022)	(0.90334)
161 constant	2.07243***	1.16578
	(0.41136)	(0.93212)

122 constant	1.61554***	1.41826***
	(0.37808)	(0.54953)
132 constant	0.25342	1.64910***
	(0.29800)	(0.67265)
142 constant	-0.60838	2.27568***
	(0.93647)	(0.75300)
152 constant	0.48238	0.40537
	(0.43656)	(0.72242)
162 constant	0.74978***	2.26539***
	(0.29330)	(0.78784)
133 constant	-0.18105	-0.87108*
	(0.25263)	(0.53563)
143 constant	2.56538***	-1.67701***
	(0.54575)	(0.72525)
153 constant	0.00279	-1.67431***
	(0.50296)	(0.65182)
163 constant	0.09303	-0.34823
	(0.27683)	(0.90482)
144 constant	1.14029**	-1.33070
	(0.67571)	(1.21971)
154 constant	0.97021	-0.44839
	(0.62807)	(0.92114)
164 constant	0.15230	-0.94207
	(0.37452)	(1.08247)
155 constant	1.16577**	-0.44963
	(0.62760)	(0.58369)
165 constant	0.11076	1.99908***
	(0.33054)	(0.66957)
166 constant	0.15317	-0.21112
	(0.40300)	(0.99564)
Log likelihood	-933.4	-351.6
R^2	0.406	0.272
Adjusted R^2	0.402	0.259
Number of obs	1566	456
Number of respondents	261	76

***p<0.15, **p<0.10, ***p<0.05**

Correlation matrices

Table 0.2 Correlation matrix WTA CE

	turbines	*Height_mid*	*Height_high*	*overheadlines*	*Overhead_underground*	*Underg_overhead*
turbines	1.0000					
height_mid	0.1855	1.0000				
height_high	0.3417	-0.2664	1.0000			
overheadlines	0.2929	0.1689	0.1493	1.0000		
overhead_underground	0.2495	0.0883	0.0543	-0.1789	1.0000	

Undergroun_overhead	0.1017	0.1802	-0.0373	-0.1798	-0.1780	1.0000

Table 0.3 Correlation matrix WTP CE

	turbines	*Height_mid*	*Height_high*	*overhelines*	*Overhead_underground*	*Underground_overhead*
turbines	1.0000					
height_mid	-0.2248	1.0000				
height_high	0.4268	-0.5725	1.0000			
overheadlines	0.4358	-0.1666	0.4140	1.0000		
overhead_underground	-0.1888	-0.0241	-0.1966	-0.3879	1.0000	
Undergroun_overhead	-0.2217	0.1326	-0.1536	-0.4817	-0.1810	1.0000

Table 0.4 Correlation matrix WTA CV

	lnAge	*female*	*lnhhinc*	*lntaxes*	*HigherEducation*	*AttachmentAH*	*visible*	*VisibilityMap*	*recreation*	*concerned*	*setten*	*nor*	*AttachmentSetskog*	*HeardOf*
lnAge	1.00													
female	-0.20	1.00												
lnhhinc	-0.20	-0.02	1.00											
lntaxes	-0.05	0.06	0.20	1.00										
HigherEducation	-0.16	0.23	0.27	0.02	1.00									
AttachmentAH	0.15	-0.02	0.01	0.14	-0.05	1.00								
visible	0.14	0.00	-0.07	0.01	0.05	0.09	1.00							
VisibilityMap	0.13	-0.16	-0.16	-0.14	-0.04	0.09	0.33	1.00						
recreation	-0.10	-0.04	-0.01	0.04	-0.02	0.10	0.11	0.04	1.00					
concerned	0.02	0.03	-0.07	0.12	-0.09	0.23	0.09	0.02	0.24	1.00				
setten	-0.10	0.01	-0.01	-0.02	0.11	-0.18	0.01	-0.08	-0.17	-0.68	1.00			
nor	-0.04	0.03	-0.06	-0.00	0.05	-0.17	0.02	-0.04	-0.17	-0.65	0.89	1.00		
AttachmentSetskog	0.10	-0.07	-0.05	0.06	-0.07	0.32	0.18	0.05	0.39	0.21	-0.19	-0.18	1.00	
HeardOf	0.05	-0.07	-0.11	0.05	-0.07	0.18	0.16	0.02	0.39	0.07	-0.13	-0.10	0.38	1.00

Table 0.5 Correlation matrix WTP CV

	lnAge	*female*	*lnhhinc*	*lntaxes*	*HigherEducation*	*AttachmentAH*	*visible*	*VisibilityMap*	*recreation*	*concerned*	*setten*	*nor*	*AttachmentSetskog*	*HeardOf*
lnAge	1.00													
female	-0.15	1.00												
lnhhinc	0.03	-0.17	1.00											
lntaxes	0.38	-0.10	0.01	1.00										
HigherEducation	0.06	0.24	0.10	-0.09	1.00									
AttachmentAH	-0.16	-0.24	0.09	-0.18	-0.28	1.00								
visible	-0.04	0.02	-0.19	0.08	0.04	0.04	1.00							
VisibilityMap	0.07	-0.09	-0.36	-0.03	-0.11	0.10	0.18	1.00						
recreation	-0.05	0.00	-0.10	0.02	-0.13	0.15	-0.11	-0.12	1.00					
concerned	0.06	0.06	-0.16	-0.10	0.24	0.16	0.26	0.19	0.07	1.00				
setten	0.20	-0.11	0.11	0.04	0.02	-0.49	-0.22	-0.04	-0.14	-0.67	1.00			
nor	0.05	0.02	0.10	-0.02	0.07	-0.44	-0.25	-0.00	-0.23	-0.68	0.88	1.00		

AttachmentSetskog	-0.07	0.07	0.23	-0.15	-0.01	0.52	0.12	-0.16	0.31	0.13	-0.30	-0.29	1.00
HeardOf	0.24	-0.10	0.13	0.07	-0.20	0.19	0.08	0.08	0.26	0.13	-0.21	-0.25	0.31	1.00

Appendix 2

WTA survey

Vennligst bekreft at de utfylte opplysningene under er riktige. Dersom opplysningene ikke er fylt ut eller er gale, kan disse besvares eller endres.

age
Hva er din alder?

zipcode
Hva er ditt postnummer?

gendernew
Hvilket kjønn er du?

- Mann
- Kvinne
- Annet

fylke2020
Fylke:

kommune2020
Kommune:

Hvor mange år har du bodd i Aurskog-Høland kommune?

Spesifiser:

Hvor mange av disse årene har du bodd i Setskog? (Skriv 0 om du aldri har bodd der)

Spesifiser:

Hvilke av disse sakene mener du er viktigst å prioritere i din kommune?

Velg de 2 viktigste sakene for deg og din husholdning?

- [ ] Bedre eldreomsorg
- [ ] Bedre oppvekstsvilkår for barn og unge og bedre skoler
- [ ] Mer naturvern
- [ ] Bedre helsetjenester
- [ ] Mer produksjon av fornybar energi (For eksempel vindkraft og vannkraft)
- [ ] Mer kultur
- [ ] Økte ressurser til politi
- [ ] Bedre integrering av innvandrere
- [ ] Mer landbruk
- [ ] Hyppigere kollektivtransport
- [ ] Annet, vennligst spesifiser:

Hvor positiv eller negativ er du til vindkraftutbygging på land i Norge?

Svært negativ						Svært positiv	
1	2	3	4	5	6	7	Vet ikke
○	○	○	○	○	○	○	○

Hvor positiv eller negativ er du til vindkraftutbygging til havs i Norge?

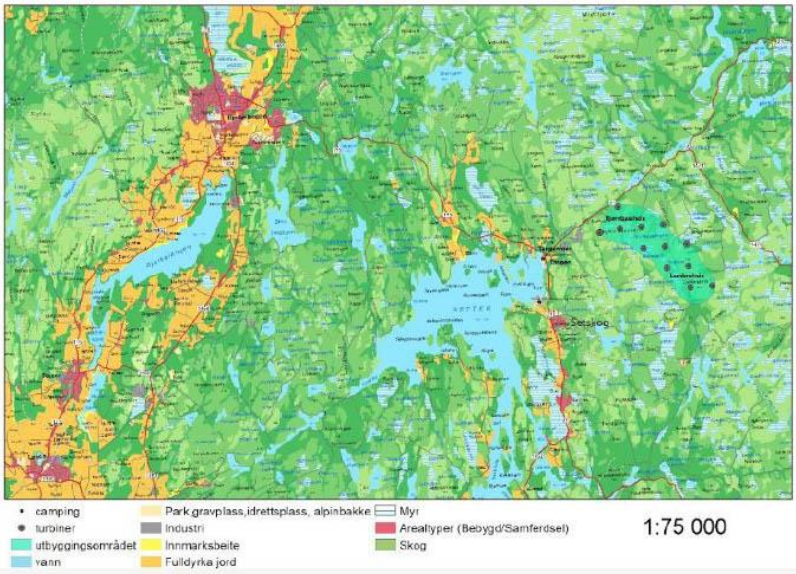
Svært negativ						Svært positiv	
1	2	3	4	5	6	7	Vet ikke
○	○	○	○	○	○	○	○

Denne undersøkelsen gjennomføres av NORSTAT for forskere ved Norges miljø- og biovitenskapelige universitet (NMBU) på Ås og Statistisk sentralbyrå (SSB). Undersøkelsen handler om utbygging av et vindkraftanlegg i Aurskog-Høland kommune.

Plan for bygging av vindkraftanlegg i Aurskog-Høland kommune

Selskapet Scanergy planlegger utbygging av «Setten vindkraftanlegg» i Aurskog-Høland kommune. Vindkraftanlegget planlegges bygd i naturområdene Bjørnbassheia og Lembruheia i åsen nordøst for Tangenkrysset. Utbyggingsområdet er markert som en turkis oval til høyre i kartet nedenfor. Området består for det meste av skog, myr og tjern. 12 turbiner er planlagt. Ytterkantene av utbyggingsområdet ligger mellom 2 og 4 kilometer i luftlinje fra innsjøen Setten. Nærmeste boligbebyggelse til Setten vindkraftanlegg er Tangemoen, som ligger omtrent 1,5 kilometer unna.

Kart over deler av Aurskog-Høland med utbyggingsområdet for Setten vindkraftanlegg



Omtrent hvor langt er det fra boligen din til utbyggingsområdet for Setten vindkraftanlegg?

- ◯ 0 - 4 km
- ◯ 5 - 9 km
- ◯ 10 – 15 km
- ◯ 16 – 25 km
- ◯ Mer enn 25 km
- ◯ Vet ikke

Hvor positiv eller negativ er du til utbygging av Setten vindkraftanlegg?

Svært negativ						Svært positiv	
1	2	3	4	5	6	7	Vet ikke
◯	◯	◯	◯	◯	◯	◯	◯

Har du tidligere hørt om områdene Bjørnbassheia og Lembruheia?

- ◯ Ja, jeg har tidligere hørt om begge områdene
- ◯ Ja, jeg har tidligere kun hørt om Bjørnbassheia
- ◯ Ja, jeg har tidligere kun hørt om Lembruheia
- ◯ Nei, jeg har tidligere ikke hørt om noen av områdene

Eier eller leier/låner du eller familien din fritidsbolig/hytte i Setskog?

- ☐ Ja, eier
- ☐ Ja, leier/låner
- ◯ Nei

Q6B

Eier eller leier/låner du eller familien din fritidsbolig/hytte i Aurskog-Høland kommune?

- ☐ Ja, eier
- ☐ Ja, leier/låner
- ◯ Nei

Har du de siste 12 måneder foretatt noen av de følgende friluftslivsaktivitetene på eller i nærheten av Bjørnbassheia og/eller Lembruheia?

Kryss av alle alternativer som stemmer for deg.

- ☐ Fottur
- ☐ Fugletitting og/eller fuglefotografering
- ☐ Annen naturfoto
- ☐ Jakt
- ☐ Fiske
- ☐ Kjøring med firehjuling (ATV)
- ☐ Telttur
- ☐ Sykling
- ☐ Jogging/Løping
- ☐ Skitur
- ☐ Sopptur
- ☐ Bærplukking
- ◯ Nei, jeg har ikke foretatt fritidsaktiviteter i disse områdene de siste 12 måneder
- ☐ Annet; spesifiser: _____

Omtrent hvor mange dager de siste 12 måneder har du foretatt slike friluftsaktiviteter på eller i nærheten av Bjørnbassheia og/eller Lembruheia?

Tell alle aktiviteter som varte mer enn 1 time per dag som 1 dag.

- ○ Ikke i det hele tatt
- ○ 1-5 dager
- ○ 6-10 dager
- ○ 11-24 dager
- ○ 25-49 dager
- ○ 50 dager eller mer

Omtrent hvor mange dager har du foretatt slike friluftsaktiviteter i andre områder i Aurskog-Høland kommune de siste 12 måneder? Tell alle aktiviteter som varte mer enn 1 time per dag som 1 dag.

- ○ Ikke i det hele tatt
- ○ 1-5 dager
- ○ 6-10 dager
- ○ 11-24 dager
- ○ 25-49 dager
- ○ 50 dager eller mer

Hvor enig eller uenig er du i følgende påstander?

Jeg har en sterk tilknytting til nabolaget mitt

Svært uenig 1	2	3	4	5	6	Svært enig 7

Hvor enig eller uenig er du i følgende påstander?

Jeg har en sterk tilknytting til Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7


Hvor enig eller uenig er du i følgende påstander?
Jeg har en sterk tilknytting til Aurskog-Høland kommune
Svært uenig 1
2
3
4
5
6
Svært enig 7


Hvor enig eller uenig er du i følgende påstander?
Jeg kan flytte til et annet nabolag hvis det forbedrer mine arbeids- og levevilkår
Svært uenig 1
2
3
4
5
6
Svært enig 7


Hvor enig eller uenig er du i følgende påstander?
Jeg kan flytte til en annen kommune hvis det forbedrer mine arbeids- og levevilkår
Svært uenig 1
2
3
4
5
6
Svært enig 7

Q16A

Har du noen gang sett et vindkraftanlegg i Norge eller i utlandet?

- ◯ Ja, sett i Norge
- ◯ Ja, sett i utlandet
- ◯ Ja, sett både i Norge og i utlandet
- ◯ Nei

Q16B

Har du sett eller hørt om Marker vindkraftanlegg som er synlig fra E18 ved Ørje?

- ◯ Ja, jeg har sett dette vindkraftanlegget
- ◯ Ja, jeg har hørt om dette vindkraftanlegget, men ikke sett det.
- ◯ Nei

Tenk på naturområdene i Setskog.

Q11

Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg setter større pris på å utføre friluftsaktiviteter i Setskog enn i andre områder i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11

Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg ville ikke byttet ut Setskog med noen andre områder i Aurskog-Høland kommune for å utføre friluftsaktivitetene jeg gjør her

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

For de friluftsaktivitetene jeg liker best er omgivelsene og tilretteleggingen i Setskog best

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Å utføre friluftsaktiviteter i Setskog er viktigere for meg enn i andre områder i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Setskog føles som en del av meg

Svært uenig 1	2	3	4	5	6	Svært enig 7


Tenk på naturområdene i Setskog.
Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?
Å oppholde seg i Setskog sier mye om hvem jeg er
Svært uenig 1
2
3
4
5
6
Svært enig 7


Tenk på naturområdene i Setskog.
Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?
Jeg identifiserer meg sterkt med Setskog
Svært uenig 1
2
3
4
5
6
Svært enig 7


Tenk på naturområdene i Setskog.
Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?
Setskog betyr mye for meg
Svært uenig 1
2
3
4
5
6
Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg er veldig knyttet til Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg føler en sterk tilhørighet til Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Mange av mine venner/familie foretrekker Setskog fremfor andre områder i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Hvis jeg slutter å oppholde meg i Setskog vil jeg miste kontakt med enkelte venner

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Mine venner/familie ville blitt skuffet hvis jeg begynte å oppholde meg i andre områder i Aurskog-Høland kommune enn Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12
Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg setter større pris på å utføre friluftsaktiviteter i eller ved Setten enn andre innsjøer i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg ville ikke byttet ut Setten med noen andre innsjøer i Aurskog-Høland kommune for å utføre friluftsaktivitetene jeg gjør her

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

For de friluftsaktivitetene jeg liker best er omgivelsene og tilretteleggingen ved Setten best

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Å utføre friluftsaktiviteter i eller ved Setten er viktigere for meg enn ved andre innsjøer i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Setten føles som en del av meg

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Å oppholde seg i Setten sier mye om hvem jeg er

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg identifiserer meg sterkt med Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Setten betyr mye for meg

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg er veldig knyttet til Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg føler en sterk tilhørighet til Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Mange av mine venner/familie foretrekker Setten fremfor andre innsjøer i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Hvis jeg slutter å oppholde meg i eller ved Setten vil jeg miste kontakt med enkelte venner

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Mine venner/familie ville blitt skuffet hvis jeg begynte å oppholde meg i eller ved andre innsjøer i Aurskog-Høland kommune enn Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Hva mener du om utbygging av Setten vindkraftanlegg?

I denne delen av undersøkelsen ønsker vi å finne ut hva du mener om utbygging av Setten vindkraftanlegg. Det er ikke bestemt om vindkraftanlegget vil bli bygd, og søknaden ligger fortsatt til behandling hos Norges vassdrags- og energidirektorat (NVE). Resultatene fra undersøkelsen kan bli en viktig del av informasjonsgrunnlaget for videre beslutninger.

Q13

Det er ikke bestemt om vindkraftanlegget vil bli bygd. Visste du dette?

- ○ Ja, jeg visste at det ikke er bestemt enda
- ○ Nei, jeg trodde kommunen hadde bestemt at vindkraftanlegget ikke skal bygges
- ○ Nei, jeg kjente ikke til planen om utbygging av Setten vindkraftanlegg
- ○ Annet, vennligst spesifiser: [ ]

Om valgsituasjonene

Tenk deg at det er ulike utbyggingsplaner for Setten vindkraftanlegg. Du vil bli bedt om å velge mellom ulike utbyggingsplaner.

I hvert av totalt seks valg vil du bli bedt om å velge mellom to ulike utbyggingsplaner for Setten vindkraftanlegg eller «Ingen utbygging av Setten vindkraftanlegg».

Om utbyggingsplanene

Hver utbyggingsplan består av fire egenskaper. Disse egenskapene er:

1) Antall vindturbiner og miljøeffekt
2) Jordkabel og/eller luftledning for transport av elektrisitet
3) Høyde på vindturbinene
4) Reduksjon i årlige kommunale avgifter

Nivåene til disse egenskapene vil variere i utbyggingsplanene som presenteres. Vi vil først gå gjennom hver egenskap før du blir bedt om å foreta valg.

Egenskap 1) Antall vindturbiner og miljøeffekt

12 vindturbiner vil dekke strømforbruket til underkant av 8000 norske husholdninger. Med færre turbiner vil utbyggingsområdet bli mindre.

Vindturbinene vil påvirke plante- og dyrelivet i området negativt. Området er viktig for formering av gaupe og ulv, som begge er truede arter. I tillegg finner man storfugl og andre fuglearter i området. Vindturbinene vil endre dyrenes vaner; og redusere bestanden av fugler, flaggermus og insekter. Effektene er større med flere vindturbiner.

Rekreasjonsutøvere, hytteeiere og fastboende innenfor en avstand på 1-2 km fra vindkraftanlegget vil oppleve støy (lav summelyd), skyggekast og blinkende rødt lys på toppen av turbinene.
I tillegg kan iskast fra rotorbladene oppstå innenfor en avstand på 500 meter. Iskast kan gi skader på folk, dyr, biler og bygninger. Ved behov, vil området bli avstengt.
I tillegg krever vindturbinene store arealer til utbygging av både turbiner og nye veier til og mellom turbinene. Hver turbin krever i gjennomsnitt 700 meter ny vei. Veiene fra utbyggingen kan gjøre områdene mer tilgjengelig for folk.

I utbyggingsplanene vil antall vindturbiner variere fra 0 til 12 vindturbiner.

Q14
Stoler du på at utbyggingsselskapet Scanergy i tilstrekkelig grad tar hensyn til deg som innbygger og miljøet?

Jeg stoler ikke på det i det hele tatt						Jeg stoler helt på det
1	2	3	4	5	6	7
○	○	○	○	○	○	○

Egenskap 1) Antall vindturbiner

Bildet viser landskapsendringen ved utbyggingen på en klarværsdag; sett fra innsjøen Setten

Vindmøller sett fra Setten

Bildet er lånt fra Scanergy (redigert).

Egenskap 1) Antall turbiner og veiutbygging

Bildene viser hvordan landskapet ser ut før og etter at vindturbinene har blitt satt opp.

Skogområdet før utbygging:

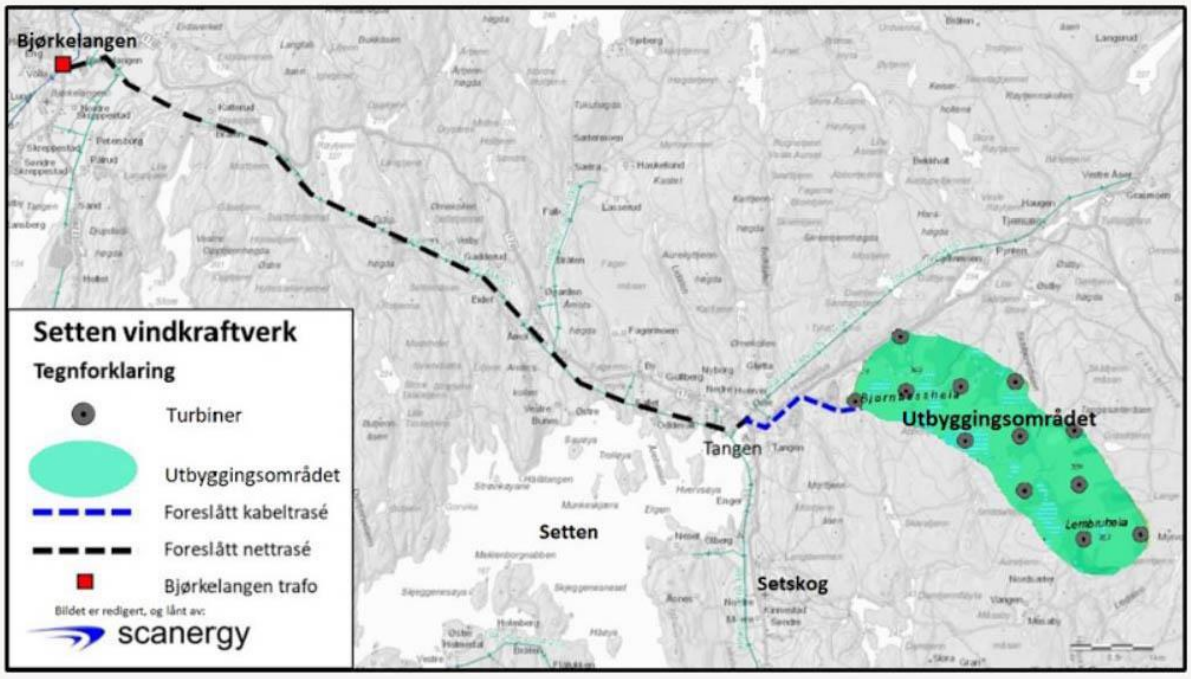
Skogområdet etter utbygging:

Egenskap 2) Jordkabel og/eller luftledning for å transportere elektrisitet

Utbygging av Setten vindkraftanlegg vil kreve nye kraftledninger for å transportere elektrisitet som enten kan legges i kabel under bakken (jordkabel) eller ledninger over bakkenivå (luftledning). Vindkraftanlegget krever nye kraftledninger i følgende områder.

1. Ny kraftledning fra vindkraftanlegget til Tangen; 3 kilometer lang
2. Oppgradering av kraftledning fra Tangen til transformatorstasjonen i Bjørkelangen; 10 kilometer lang

Kraftledningene vil gå gjennom både skogområder og tettsteder. Bruk av jordkabel i skogområdene vil påvirke naturen og landskapet i mindre grad enn luftledning, men koster mer. Luftledningene vil være 23-25 meter over bakken.



Bildet illustrerer hvor de planlagte nye kraftledningene vil gå.

Q16

I utbyggingsplanene vil det variere hvilken type kraftledning som blir brukt i skog- / myrområder og i tettsteder.

Hvor bekymret er du for miljø- og landskapseffektene Setten vindkraftanlegg vil ha som helhet?

Svært lite bekymret						Svært bekymret
1	2	3	4	5	6	7
○	○	○	○	○	○	○

Egenskap 2) Eksempel på luftledning i skogområde

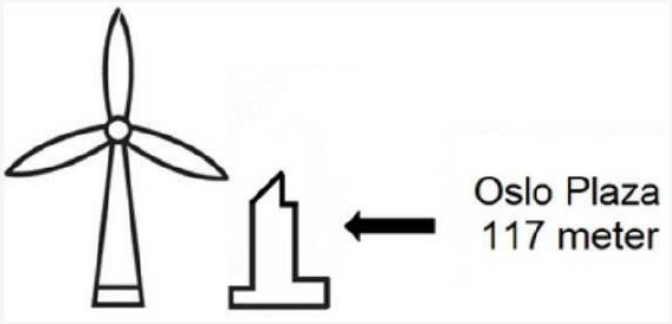
Bildet viser hvordan luftledningene i skogområdene vil se ut. Skog må fjernes for å sette opp ledningene.

Egenskap 2) Eksempel på jordkabel i skogområde

Bildet viser hvordan jordkabel i skogområdene vil se ut. Ved bruk av jordkabel må også skog fjernes så lenge kablene er der, men her vil ikke kablene være synlige. I tillegg vil man få en anleggsvei ved siden av kabelgrøften (ikke vist på bildet).

Egenskap 3) Høyde på vindturbinene

Fra bakken til toppen av vingespissen kan en vindturbin være mellom 150 til 250 meter høy. Høyden er avgjørende for hvor mye strøm en vindturbin kan produsere. Høyere vindturbiner produserer mer strøm og er mer synlige. Vindturbiner kan være synlige over avstander på 40 til 50 kilometer, om det er fri sikt.

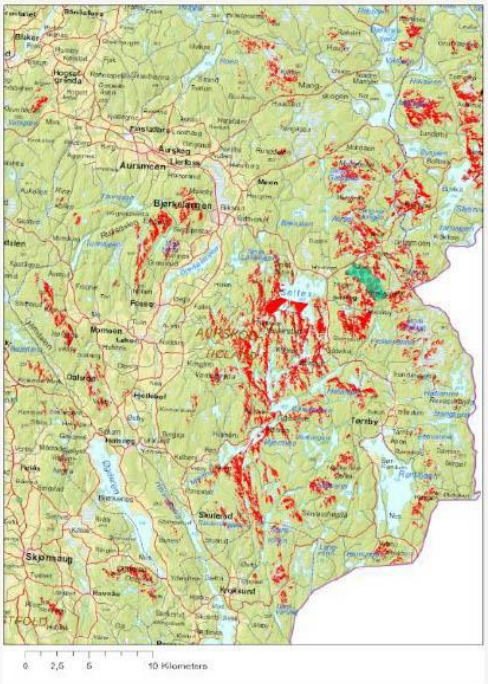


I utbyggingsplanene vil høyden på vindturbinene, målt fra bakken til tuppen av vingespissen, variere fra 150 til 250 meter.

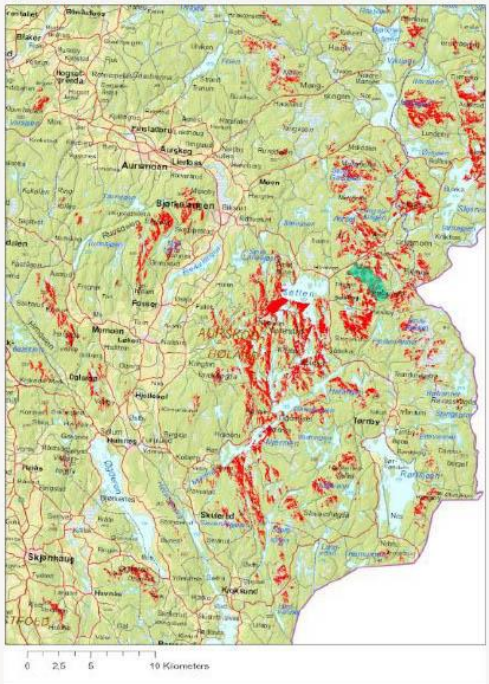
Nå viser vi først synlighetskart for Aurskog -Høland kommune, og i neste bilde for hele området hvor turbinene blir synlige fra. De to kartene her viser områder kun i Aurskog-Høland kommune hvor vindturbinene vil være synlige fra hvis hver turbin er 150 og 250 meter høye. Disse områdene er merket rødt og er omtrent like i de to kartene. Høyden på turbinene har nemlig lite å si for hvilke områder turbinene er synlige fra.

Zoom inn på kartene for å se om du kan se vindkraftanlegget fra der du bor.

Synlighets-kart 150 meters turbiner over Aurskog-Høland



Synlighets-kart 250 meters turbiner over Aurskog-Høland



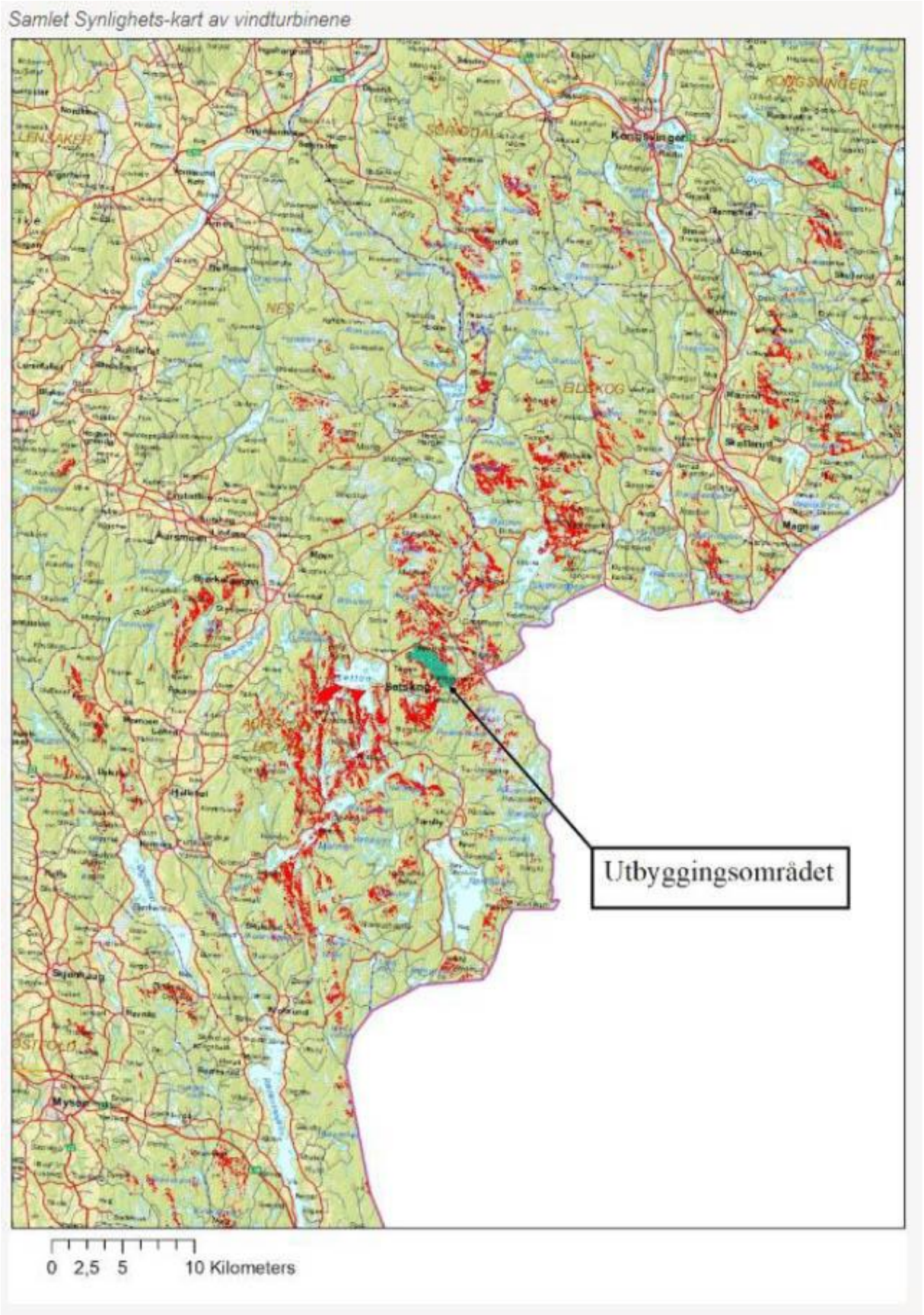
Q16

Vil vindkraftanlegget være synlig der du bor?

- ◯ Ja, jeg bor i et rødt område på kartet
- ◯ Nei, jeg bor ikke i et rødt område på kartet
- ◯ Vet ikke

Egenskap 3) Høyde på vindturbinene – Samlet synlighets-kart av vindturbiner.

Dette kartet viser alle områder hvor vindturbinene vil være synlige fra, også utenfor Aurskog-Høland kommune.


Samlet Synlighets-kart av vindturbinene
Utbyggingsområdet
0 2,5 5 10 Kilometers

Q17

Var synlighetsområdene mindre eller større enn hva du forestilte deg?

- ○ Områdene var større enn jeg forestilte meg
- ○ Områdene var mindre enn jeg forestilte meg
- ○ Områdene var omtrent slik jeg forestilte meg
- ○ Vet ikke

Egenskap 3 - Høyde på vindturbinene

Bildene viser 150 og 250 meters turbiner sett fra innsjøen Setten. Turbinene er mer synlige desto høyere de er.

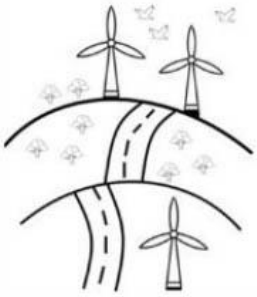
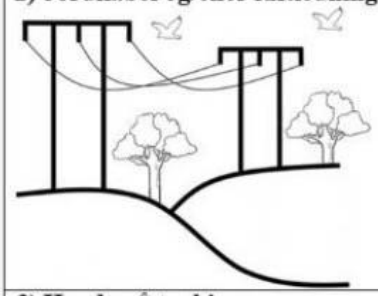
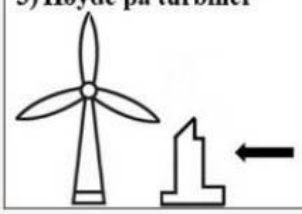
Her er vindturbinene 150 meter høye

Egenskap 3 - Høyde på vindturbinene

Bildene viser 150 og 250 meters turbiner sett fra innsjøen Setten. Turbinene er mer synlige desto høyere de er.

Her er vindturbinene 250 meter høye

Oppsummering av hoved-virkningene av de tre første egenskapene.

Egenskap	Effekter
1) Antall turbiner 	- Negativ påvirkning på natur og dyreliv - Arealbeslag - Støy, lysblink, iskast og skyggekast
2) Jordkabel og/eller luftledning 	- Luftledninger har mer negativ påvirkning på natur og dyreliv - Luftledninger er mer synlige for folk
3) Høyde på turbiner 	- Synlighet - Blinkende rødt lys som kan være forstyrrende

Egenskap 4) Reduksjon i årlig kommunale avgifter

Setten vindkraftanlegg vil føre til økte inntekter for Aurskog-Høland kommune gjennom eiendomsskatt. I tillegg får kommunen driftsinntekter under utbyggingen fra lokale/regionale aktører. Kommunen får høyere inntekter ved større utbygging, det vil si med flere og høyere turbiner.

På den andre siden vil vindkraftanlegget og kraftledningene ha negative virkninger for miljøet og innbyggere i Aurskog-Høland kommune. For å kompensere for de negative virkningene vil kommunen redusere de årlige kommunale avgiftene som husholdningene betaler hvert år vindkraftanlegget står der.

I utbyggingsplanene vil reduksjonen i årlige kommunale avgifter per husholdning variere fra 0 til 4000 kroner.

Q18

Omtrent hvor mye betaler din husholdning i kommunale avgifter (til blant annet vann; avløp; avfall), per år?

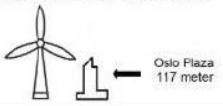
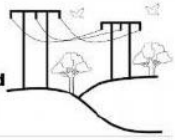
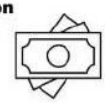
Ca. _____ kr/år

Q18x1

☐ Vet ikke

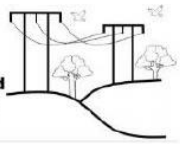
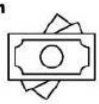
Hvilket alternativ foretrekker du?

Velg det alternativet du foretrekker. Dersom du velger «Dagens situasjon: Ingen utbygging» vil ikke kommunen redusere årlige kommunale avgifter. I dette tilfellet forblir områdene Bjørnbassheia og Lembruheia som i dag, og Setten vindkraftanlegg blir ikke bygd. Husk at valgene du gjør kan medfører at du får mer penger å bruke på andre ting, men at du da får effektene av vindkraftanlegget.

	Dagens situasjon Ingen utbygging	Utbyggingsplan 1	Utbyggingsplan 2
Antall vindturbiner 	Ingen utbygging	6 vindturbiner	12 vindturbiner
Høyde på vindturbinene 	Ingen utbygging	200 meter	150 meter
Type kraft-ledning i tettsted og skog 	Ingen utbygging	Luftledning i både tettsted og skog	Luftledning i tettsted, jordkabel i skog
Årlig reduksjon i kommunale avgifter 	0 kr	500 kr	4000 kr
MITT VALG ER:	○	○	○

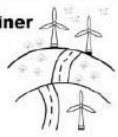
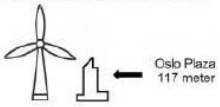
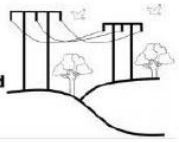
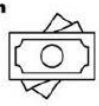
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Dagens situasjon Ingen utbygging	Utbyggingsplan 1	Utbyggingsplan 2
Antall vindturbiner 	Ingen utbygging	8 vindturbiner	10 vindturbiner
Høyde på vindturbinene 	Ingen utbygging	200 meter	250 meter
Type kraft-ledning i tettsted og skog 	Ingen utbygging	Luftledning i tettsted, jordkabel i skog	Jordkabel i både tettsted og skog
Årlig reduksjon i kommunale avgifter 	0 kr	1000 kr	2000 kr
MITT VALG ER:	○	○	○

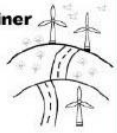
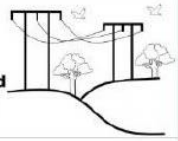
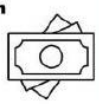
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Dagens situasjon Ingen utbygging	Utbyggingsplan 1	Utbyggingsplan 2
Antall vindturbiner 	Ingen utbygging	12 vindturbiner	2 vindturbiner
Høyde på vindturbinene 	Ingen utbygging	200 meter	150 meter
Type kraft-ledning i tettsted og skog 	Ingen utbygging	Luftledning i tettsted, jordkabel i skog	Jordkabel i tettststed, luft-ledning i skog
Årlig reduksjon i kommunale avgifter 	0 kr	2000 kr	1000 kr
MITT VALG ER:	○	○	○

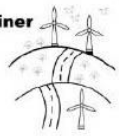
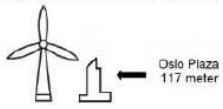
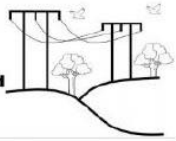
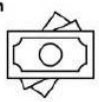
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Dagens situasjon Ingen utbygging	Utbyggingsplan 1	Utbyggingsplan 2
Antall vindturbiner 	Ingen utbygging	12 vindturbiner	2 vindturbiner
Høyde på vindturbinene 	Ingen utbygging	150 meter	150 meter
Type kraft-ledning i tettsted og skog 	Ingen utbygging	Jordkabel i både tettsted og skog	Luftledning i tettsted, jordkabel i skog
Årlig reduksjon i kommunale avgifter 	0 kr	500 kr	4000 kr
MITT VALG ER:	○	○	○

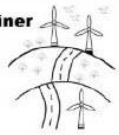
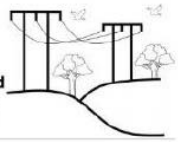
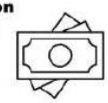
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Dagens situasjon Ingen utbygging	Utbyggingsplan 1	Utbyggingsplan 2
Antall vindturbiner 	Ingen utbygging	8 vindturbiner	4 vindturbiner
Høyde på vindturbinene 	Ingen utbygging	200 meter	150 meter
Type kraft-ledning i tettsted og skog 	Ingen utbygging	Jordkabel i tettststed, luft-ledning i skog	Jordkabel i både tettsted og skog
Årlig reduksjon i kommunale avgifter 	0 kr	4000 kr	500 kr
MITT VALG ER:	○	○	○

Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Dagens situasjon Ingen utbygging	Utbyggingsplan 1	Utbyggingsplan 2
Antall vindturbiner 	Ingen utbygging	2 vindturbiner	10 vindturbiner
Høyde på vindturbinene 	Ingen utbygging	250 meter	200 meter
Type kraft-ledning i tettsted og skog 	Ingen utbygging	Jordkabel i tettststed, luft-ledning i skog	Luftledning i både tettsted og skog
Årlig reduksjon i kommunale avgifter 	0 kr	1000 kr	2000 kr
MITT VALG ER:	○	○	○

Q25

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Jordkabel eller luftledning i tettsted og skogområder

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Q25

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Antall vindturbiner og miljøeffekt

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Q25

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Reduksjon i årlig kommunale avgifter

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Q25

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Høyde på vindturbinene

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Q25

Hvor lett eller vanskelig synes du det var å foreta valgene?

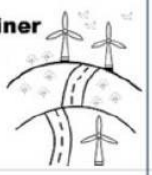
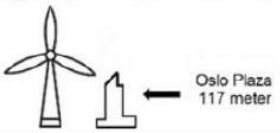
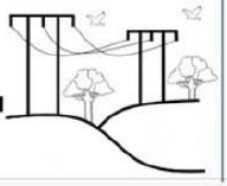
Svært lett 1	2	3	4	5	6	Svært vanskelig 7
○	○	○	○	○	○	○

Q27

Hva var den viktigste grunnen til at du valgte «Ingen utbygging» i alle valgsituasjoner?

- ○ Alternativene hadde for store natur, miljø- og landskapseffekter i forhold til fordelene
- ○ Jeg ønsker ikke reduserte kommunale avgifter
- ○ Jeg vil ikke sette pengeverdi på ødeleggelse av naturen
- ○ Jeg tror ikke Setten vindkraftanlegg kommer til å bli bygd
- ○ Setten vindkraftanlegg vil ikke bidra til å redusere klimagassutslippene i nevneverdig grad
- ○ Jeg foretrekker andre fornybare energikilder enn vindkraft
- ○ Det betyr mye for meg å beholde områdene hvor Setten vindkraftanlegg kan bli bygd slik som de er i dag.
- ○ Jeg skal flytte og dette er derfor ikke relevant for meg
- ○ Vet ikke
- ○ Annet, vennligst spesifiser:

Se for deg at det blir bestemt at «Utbyggingsplan 1», slik den står nedenfor, skal bli bygd i området Lembruheia og Bjørnbassheia. Utbyggingsplan 1 er den mest omfattende og lønnsomme planen for kommunen og utbygger. På den andre siden vil planen ha størst effekt på landskapet, naturen og rekreasjonsmuligheter i Aurskog-Høland kommune.

	Utbyggingsplan 1
Antall vindturbiner 	12 vindturbiner
Høyde på vindturbinene 	250 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog

InfoQ28

Tenk på hva det er verdt for deg å unngå effektene av Setten vindkraftanlegg. Hva er det minste, om noe, din husholdning helt sikkert er villig til å akseptere i reduksjon i kommunale avgifter per år ved bygging av denne planen? Husk at det du oppgir medfører at du har mer penger å bruke på andre ting, men at du da får effektene av vindkraftanlegget.

Q28

Kroner per år:

Hva er den viktigste årsaken til at du svarte 0 kr i forrige spørsmål?

- ○ Alternativene hadde for store natur, miljø- og landskapseffekter i forhold til fordelene
- ○ Setten vindkraftanlegg vil ikke bidra til å redusere klimagassutslippene i nevneverdig grad
- ○ Jeg vil ikke sette pengeverdi på ødeleggelse av naturen
- ○ Jeg tror ikke Setten vindkraftanlegg kommer til å bli bygd
- ○ Vet ikke
- ○ Annet, vennligst spesifisér: _____

Tenk tilbake på spørsmålet om reduserte kommunale avgifter for å akseptere Setten vindkraftutbygging. Ville du svart det samme i en normalsituasjon uten utbrudd av corona-virus?

- ○ Ja, ville svart det samme
- ○ Nei, ville svart høyere beløp
- ○ Nei, ville svart lavere beløp
- ○ Vet ikke

Tenk på naturområdene som blir berørt ved utbygging av Setten vindkraftanlegg. Utsagnene nedenfor handler om følelsen av ditt og innbyggerne av Aurskog-Høland kommune sitt eierskap til naturområdene som blir berørt ved utbygging og bruken av disse.

Q29

Hvor enig/uenig er du i følgende påstander?

Naturområdene som blir berørt av vindkraftanlegget er VÅRE

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29

Hvor enig/uenig er du i følgende påstander?

Jeg føler at naturområdene som blir berørt av vindkraftanlegget tilhører OSS

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29

Hvor enig/uenig er du i følgende påstander?

Jeg føler en høy grad av eierskap til naturområdene som blir berørt av vindkraftanlegget

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29

Hvor enig/uenig er du i følgende påstander?

Jeg føler at naturområdene som blir berørt av vindkraftanlegget er VÅRE

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29

Hvor enig/uenig er du i følgende påstander?

Det er vanskelig for meg å føle eierskap til naturområdene som blir berørt av vindkraftanlegget

Svært uenig 1	2	3	4	5	6	Svært enig 7

Helt til slutt ber vi deg om å oppgi noe bakgrunnsinformasjon om deg selv og husholdningen din

Q31
Er du medlem i en friluft- og/eller miljøorganisasjon?

- ○ Ja, spesifiser: ____
- ○ Nei, men jeg er medlem av Facebook-gruppe om friluftsliv i Aurskog-Høland kommune
- ○ Nei
- ○ Vet ikke

Q32
Vil du eller noen i din husholdning bli direkte påvirket ved utbygging av Setten vindkraftanlegg?

- ☐ Ja, vi eier arealer der det er aktuelt å bygge vindkraftanlegget
- ☐ Ja, vi blir påvirket gjennom jobb i turistnæringen
- ☐ Ja, vi bor i nærheten av områder hvor det er aktuelt å bygge vindkraftanlegget
- ☐ Ja, vi disponerer fritidsbolig/hytte i nærheten av områder hvor det er aktuelt å bygge vindkraftanlegget
- ☐ Ja, vi foretar friluftslivsaktiviteter i utbyggingsområdet og/eller områder i nærheten.
- ☐ Ja, vi jobber innen fornybar energi
- ○ Nei
- ○ Vet ikke
- ☐ Annet, vennligst spesifiser: ____

Q33
Hvor sikker eller usikker er du på at resultatene fra denne undersøkelsen vil bli brukt som en del av beslutningsgrunnlaget for kommunen angående en mulig utbygging av Setten vindkraftanlegg?

Svært usikker						Svært sikker
1	2	3	4	5	6	7
○	○	○	○	○	○	○

Hva er din høyeste fullførte utdanning?

- ○ Grunnskole (7-10 år)
- ○ Videregående skole/gymnas
- ○ Fagbrev
- ○ 3-4 åring universitets/høyskoleutdanning (bachelor/cand.mag.)
- ○ 5-årig universitets/høyskoleutdanning (mastergrad/profesjonsutdanning)
- ○ PhD/doktorgrad
- ○ Vet ikke

Q35

Var du på informasjonsmøtet om Setten Vindkraftanlegg på Setskog?

- ◯ Ja
- ◯ Nei
- ◯ Vet ikke

Q36

Hva var din husholdnings samlede bruttoinntekt (dvs. før skatten er trukket) i 2019?

- ◯ 0 – 200 000 NOK
- ◯ 200 001 – 400 000 NOK
- ◯ 400 001 – 600 000 NOK
- ◯ 600 001 – 800 000 NOK
- ◯ 800 001 – 1 000 000 NOK
- ◯ 1 000 001 – 1 500 000 NOK
- ◯ 1 500 001 – 2 000 000 NOK
- ◯ 2 000 001 – 3 000 000 NOK
- ◯ 3 000 001 – 4 000 000 NOK
- ◯ 4 000 001 – 5 000 000 NOK
- ◯ Mer enn 5 000 000 NOK, oppgi omtrent hvor mye: _____
- ◯ Vet ikke

Q36_2

Hvordan tror du corona-viruset vil påvirke din husholdningsinntekt i 2020 sammenlignet med en normalsituasjon?

- ◯ Mye lavere inntekt
- ◯ Litt lavere inntekt
- ◯ Omtrent samme inntekt
- ◯ Litt høyere inntekt
- ◯ Mye høyere inntekt

Hvilken yrkesstatus beskriver best din situasjon i dag?

- ○ Ansatt/permittert i offentlig sektor
- ○ Ansatt/permittert i privat sektor
- ○ Selvstendig næringsdrivende
- ○ Pensjonist
- ○ Student
- ○ Uføretrygd
- ○ Annet: Vennligst spesifiser: ____

Tusen takk for hjelpen! Vi vil presisere at endringen i kommunale avgifter er rent hypotetisk. Har du andre kommentarer til undersøkelsen eller en mulig utbygging av Setten Vindkraftanlegg kan du skrive her:

WTP survey

Vennligst bekreft at de utfylte opplysningene under er riktige. Dersom opplysningene ikke er fylt ut eller er gale, kan disse besvares eller endres.

age
Hva er din alder?

zipcode
Hva er ditt postnummer?

gendernew
Hvilket kjønn er du?

- ○ Mann
- ○ Kvinne
- ○ Annet

fylke2020
Fylke:

kommune2020
Kommune:

Hvor mange år har du bodd i Aurskog-Høland kommune?

Spesifiser: ____

Hvor mange av disse årene har du bodd i Setskog? (Skriv 0 om du aldri har bodd der)

Spesifiser:

Hvilke av disse sakene mener du er viktigst å prioritere i din kommune?

Velg de 2 viktigste sakene for deg og din husholdning?

- [ ] Bedre eldreomsorg
- [ ] Bedre oppvekstsvilkår for barn og unge og bedre skoler
- [ ] Mer naturvern
- [ ] Bedre helsetjenester
- [ ] Mer produksjon av fornybar energi (For eksempel vindkraft og vannkraft)
- [ ] Mer kultur
- [ ] Økte ressurser til politi
- [ ] Bedre integrering av innvandrere
- [ ] Mer landbruk
- [ ] Hyppigere kollektivtransport
- [ ] Annet, vennligst spesifiser:

Hvor positiv eller negativ er du til vindkraftutbygging på land i Norge?

Svært negativ						Svært positiv	
1	2	3	4	5	6	7	Vet ikke
○	○	○	○	○	○	○	○

Hvor positiv eller negativ er du til vindkraftutbygging til havs i Norge?

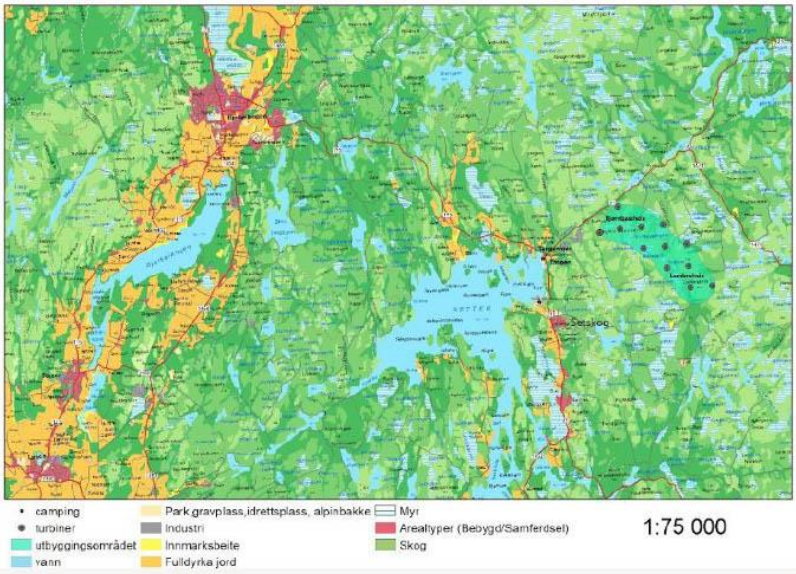
Svært negativ						Svært positiv	
1	2	3	4	5	6	7	Vet ikke
○	○	○	○	○	○	○	○

Denne undersøkelsen gjennomføres av NORSTAT for forskere ved Norges miljø- og biovitenskapelige universitet (NMBU) på Ås og Statistisk sentralbyrå (SSB). Undersøkelsen handler om utbygging av et vindkraftanlegg i Aurskog-Høland kommune.

Plan for bygging av vindkraftanlegg i Aurskog-Høland kommune

Selskapet Scanergy planlegger utbygging av «Setten vindkraftanlegg» i Aurskog-Høland kommune. Vindkraftanlegget planlegges bygd i naturområdene Bjørnbassheia og Lembruheia i åsen nordøst for Tangenkrysset. Utbyggingsområdet er markert som en turkis oval til høyre i kartet nedenfor. Området består for det meste av skog, myr og tjern. 12 turbiner er planlagt. Ytterkantene av utbyggingsområdet ligger mellom 2 og 4 kilometer i luftlinje fra innsjøen Setten. Nærmeste boligbebyggelse til Setten vindkraftanlegg er Tangemoen, som ligger omtrent 1,5 kilometer unna.

Kart over deler av Aurskog-Høland med utbyggingsområdet for Setten vindkraftanlegg



Omtrent hvor langt er det fra boligen din til utbyggingsområdet for Setten vindkraftanlegg?

- ◯ 0 - 4 km
- ◯ 5 - 9 km
- ◯ 10 – 15 km
- ◯ 16 – 25 km
- ◯ Mer enn 25 km
- ◯ Vet ikke

Hvor positiv eller negativ er du til utbygging av Setten vindkraftanlegg?

Svært negativ						Svært positiv	
1	2	3	4	5	6	7	Vet ikke
◯	◯	◯	◯	◯	◯	◯	◯

Har du tidligere hørt om områdene Bjørnbassheia og Lembruheia?

- ○ Ja, jeg har tidligere hørt om begge områdene
- ○ Ja, jeg har tidligere kun hørt om Bjørnbassheia
- ○ Ja, jeg har tidligere kun hørt om Lembruheia
- ○ Nei, jeg har tidligere ikke hørt om noen av områdene

Eier eller leier/låner du eller familien din fritidsbolig/hytte i Setskog?

- ☐ Ja, eier
- ☐ Ja, leier/låner
- ○ Nei

Q6B

Eier eller leier/låner du eller familien din fritidsbolig/hytte i Aurskog-Høland kommune?

- ☐ Ja, eier
- ☐ Ja, leier/låner
- ○ Nei

Har du de siste 12 måneder foretatt noen av de følgende friluftslivsaktivitetene på eller i nærheten av Bjørnbassheia og/eller Lembruheia?

Kryss av alle alternativer som stemmer for deg.

- ☐ Fottur
- ☐ Fugletitting og/eller fuglefotografering
- ☐ Annen naturfoto
- ☐ Jakt
- ☐ Fiske
- ☐ Kjøring med firehjuling (ATV)
- ☐ Telttur
- ☐ Sykling
- ☐ Jogging/Løping
- ☐ Skitur
- ☐ Sopptur
- ☐ Bærplukking
- ○ Nei, jeg har ikke foretatt fritidsaktiviteter i disse områdene de siste 12 måneder
- ☐ Annet; spesifiser: _____

Omtrent hvor mange dager de siste 12 måneder har du foretatt slike friluftsaktiviteter på eller i nærheten av Bjørnbassheia og/eller Lembruheia?

Tell alle aktiviteter som varte mer enn 1 time per dag som 1 dag.

- ○ Ikke i det hele tatt
- ○ 1-5 dager
- ○ 6-10 dager
- ○ 11-24 dager
- ○ 25-49 dager
- ○ 50 dager eller mer

Omtrent hvor mange dager har du foretatt slike friluftsaktiviteter i andre områder i Aurskog-Høland kommune de siste 12 måneder? Tell alle aktiviteter som varte mer enn 1 time per dag som 1 dag.

- ○ Ikke i det hele tatt
- ○ 1-5 dager
- ○ 6-10 dager
- ○ 11-24 dager
- ○ 25-49 dager
- ○ 50 dager eller mer

Hvor enig eller uenig er du i følgende påstander?

Jeg har en sterk tilknytting til nabolaget mitt

Svært uenig 1	2	3	4	5	6	Svært enig 7

Hvor enig eller uenig er du i følgende påstander?

Jeg har en sterk tilknytting til Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7


Hvor enig eller uenig er du i følgende påstander?
Jeg har en sterk tilknytting til Aurskog-Høland kommune
Svært uenig 1
2
3
4
5
6
Svært enig 7


Hvor enig eller uenig er du i følgende påstander?
Jeg kan flytte til et annet nabolag hvis det forbedrer mine arbeids- og levevilkår
Svært uenig 1
2
3
4
5
6
Svært enig 7


Hvor enig eller uenig er du i følgende påstander?
Jeg kan flytte til en annen kommune hvis det forbedrer mine arbeids- og levevilkår
Svært uenig 1
2
3
4
5
6
Svært enig 7

Q16A

Har du noen gang sett et vindkraftanlegg i Norge eller i utlandet?

- ◯ Ja, sett i Norge
- ◯ Ja, sett i utlandet
- ◯ Ja, sett både i Norge og i utlandet
- ◯ Nei

Q16B

Har du sett eller hørt om Marker vindkraftanlegg som er synlig fra E18 ved Ørje?

- ◯ Ja, jeg har sett dette vindkraftanlegget
- ◯ Ja, jeg har hørt om dette vindkraftanlegget, men ikke sett det.
- ◯ Nei

Tenk på naturområdene i Setskog.

Q11

Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg setter større pris på å utføre friluftsaktiviteter i Setskog enn i andre områder i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11

Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg ville ikke byttet ut Setskog med noen andre områder i Aurskog-Høland kommune for å utføre friluftsaktivitetene jeg gjør her

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

For de friluftsaktivitetene jeg liker best er omgivelsene og tilretteleggingen i Setskog best

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Å utføre friluftsaktiviteter i Setskog er viktigere for meg enn i andre områder i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Setskog føles som en del av meg

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Å oppholde seg i Setskog sier mye om hvem jeg er

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg identifiserer meg sterkt med Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Setskog betyr mye for meg

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg er veldig knyttet til Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Jeg føler en sterk tilhørighet til Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Mange av mine venner/familie foretrekker Setskog fremfor andre områder i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Hvis jeg slutter å oppholde meg i Setskog vil jeg miste kontakt med enkelte venner

Svært uenig 1	2	3	4	5	6	Svært enig 7

Tenk på naturområdene i Setskog.

Q11
Hvor enig eller uenig er du i følgende påstander om Setskog?

Mine venner/familie ville blitt skuffet hvis jeg begynte å oppholde meg i andre områder i Aurskog-Høland kommune enn Setskog

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12
Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg setter større pris på å utføre friluftsaktiviteter i eller ved Setten enn andre innsjøer i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg ville ikke byttet ut Setten med noen andre innsjøer i Aurskog-Høland kommune for å utføre friluftsaktivitetene jeg gjør her

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

For de friluftsaktivitetene jeg liker best er omgivelsene og tilretteleggingen ved Setten best

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Å utføre friluftsaktiviteter i eller ved Setten er viktigere for meg enn ved andre innsjøer i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Setten føles som en del av meg

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Å oppholde seg i Setten sier mye om hvem jeg er

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg identifiserer meg sterkt med Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Setten betyr mye for meg

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg er veldig knyttet til Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Jeg føler en sterk tilhørighet til Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Mange av mine venner/familie foretrekker Setten fremfor andre innsjøer i Aurskog-Høland kommune

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Hvis jeg slutter å oppholde meg i eller ved Setten vil jeg miste kontakt med enkelte venner

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q12

Hvor enig eller uenig er du i følgende påstander om innsjøen Setten?

Mine venner/familie ville blitt skuffet hvis jeg begynte å oppholde meg i eller ved andre innsjøer i Aurskog-Høland kommune enn Setten

Svært uenig 1	2	3	4	5	6	Svært enig 7

Hva mener du om utbygging av Setten vindkraftanlegg?

I denne delen av undersøkelsen ønsker vi å finne ut hva du mener om utbygging av Setten vindkraftanlegg. Det er ikke bestemt om vindkraftanlegget vil bli bygd, og søknaden ligger fortsatt til behandling hos Norges vassdrags- og energidirektorat (NVE). Resultatene fra undersøkelsen kan bli en viktig del av informasjonsgrunnlaget for videre beslutninger.

Q13

Det er ikke bestemt om vindkraftanlegget vil bli bygd. Visste du dette?

- ○ Ja, jeg visste at det ikke er bestemt enda
- ○ Nei, jeg trodde kommunen hadde bestemt at vindkraftanlegget ikke skal bygges
- ○ Nei, jeg kjente ikke til planen om utbygging av Setten vindkraftanlegg
- ○ Annet, vennligst spesifiser: [ ]

Om valgsituasjonene

Tenk deg at det er ulike utbyggingsplaner for Setten vindkraftanlegg. Du vil bli bedt om å velge mellom ulike utbyggingsplaner.

I hvert av totalt seks valg vil du bli bedt om å velge mellom to ulike utbyggingsplaner for Setten vindkraftanlegg eller «Ingen utbygging av Setten vindkraftanlegg».

Om utbyggingsplanene

Hver utbyggingsplan for Setten vindkraftanlegg består av fire egenskaper. Disse egenskapene er:

1) Antall vindturbiner og miljøeffekt
2) Jordkabel og/eller luftledning for transport av elektrisitet
3) Høyde på vindturbinene
4) Økning i årlige kommunale avgifter

Nivåene til disse egenskapene vil variere i utbyggingsplanene som presenteres, men ikke i «Utbyggingsplan 1». Utbyggingsplan 1 er mest omfattende og kan alltid velges. Vi vil først gå gjennom hver egenskap før du blir bedt om å foreta valg.

Egenskap 1) Antall vindturbiner og miljøeffekt

12 vindturbiner vil dekke strømforbruket til underkant av 8000 norske husholdninger. Med færre turbiner vil utbyggingsområdet bli mindre.

Vindturbinene vil påvirke plante- og dyrelivet i området negativt. Området er viktig for formering av gaupe og ulv, som begge er truede arter. I tillegg finner man storfugl og andre fuglearter i området. Vindturbinene vil endre dyrenes vaner; og redusere bestanden av fugler, flaggermus og insekter. Effektene er større med flere vindturbiner.

Rekreasjonsutøvere, hytteeiere og fastboende innenfor en avstand på 1-2 km fra vindkraftanlegget vil oppleve støy (lav summelyd), skyggekast og blinkende rødt lys på toppen av turbinene.
I tillegg kan iskast fra rotorbladene oppstå innenfor en avstand på 500 meter. Iskast kan gi skader på folk, dyr, biler og bygninger. Ved behov, vil området bli avstengt.
I tillegg krever vindturbinene store arealer til utbygging av både turbiner og nye veier til og mellom turbinene. Hver turbin krever i gjennomsnitt 700 meter ny vei. Veiene fra utbyggingen kan gjøre områdene mer tilgjengelig for folk.

I utbyggingsplanene vil antall vindturbiner variere fra 0 til 12 vindturbiner.

Q14
Stoler du på at utbyggingsselskapet Scanergy i tilstrekkelig grad tar hensyn til deg som innbygger og miljøet?

Jeg stoler ikke på det i det hele tatt						Jeg stoler helt på det
1	2	3	4	5	6	7
○	○	○	○	○	○	○

Egenskap 1) Antall vindturbiner

Bildet viser landskapsendringen ved utbyggingen på en klarværsdag; sett fra innsjøen Setten

Vindmøller sett fra Setten

Bildet er lånt fra Scanergy (redigert).

Egenskap 1) Antall turbiner og veiutbygging

Bildene viser hvordan landskapet ser ut før og etter at vindturbinene har blitt satt opp.

Skogområdet før utbygging:

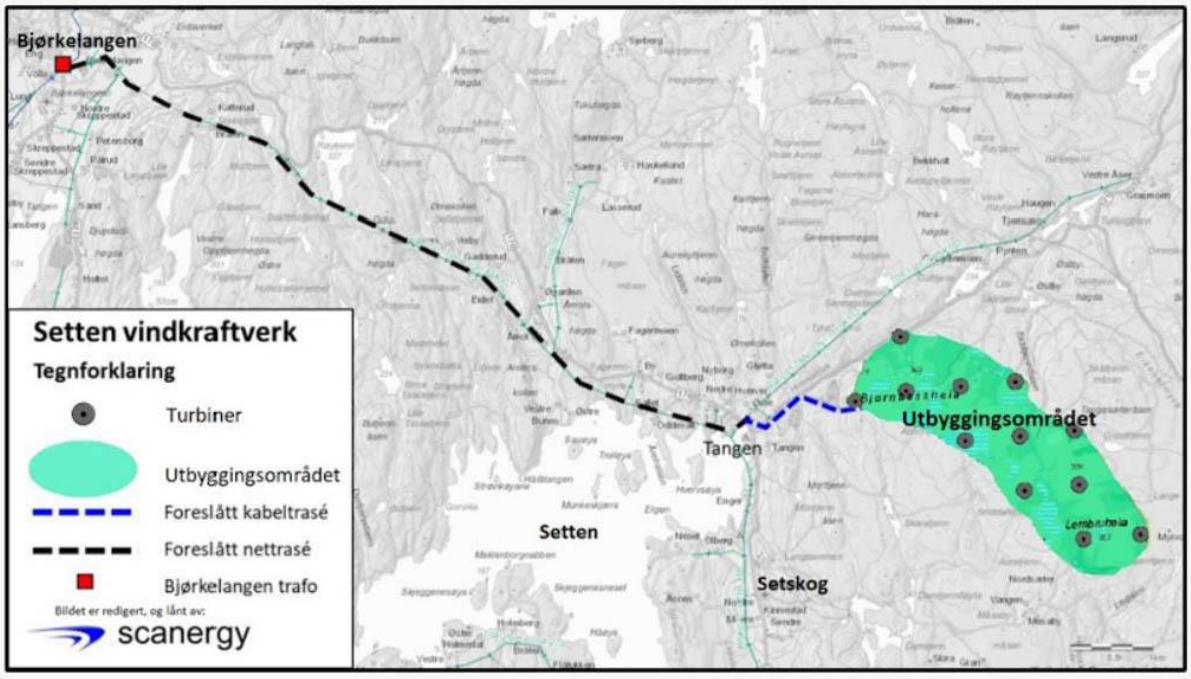
Skogområdet etter utbygging:

Egenskap 2) Jordkabel og/eller luftledning for å transportere elektrisitet

Utbygging av Setten vindkraftanlegg vil kreve nye kraftledninger for å transportere elektrisitet som enten kan legges i kabel under bakken (jordkabel) eller ledninger over bakkenivå (luftledning). Vindkraftanlegget krever nye kraftledninger i følgende områder.

1. Ny kraftledning fra vindkraftanlegget til Tangen; 3 kilometer lang
2. Oppgradering av kraftledning fra Tangen til transformatorstasjonen i Bjørkelangen; 10 kilometer lang

Kraftledningene vil gå gjennom både skogområder og tettsteder. Bruk av jordkabel i skogområdene vil påvirke naturen og landskapet i mindre grad enn luftledning, men koster mer. Luftledningene vil være 23-25 meter over bakken.



Bildet illustrerer hvor de planlagte nye kraftledningene vil gå.

Q16

I utbyggingsplanene vil det variere hvilken type kraftledning som blir brukt i skog- / myrområder og i tettsteder.

Hvor bekymret er du for miljø- og landskapseffektene Setten vindkraftanlegg vil ha som helhet?

Svært lite bekymret						Svært bekymret
1	2	3	4	5	6	7
○	○	○	○	○	○	○

Egenskap 2) Eksempel på luftledning i skogområde

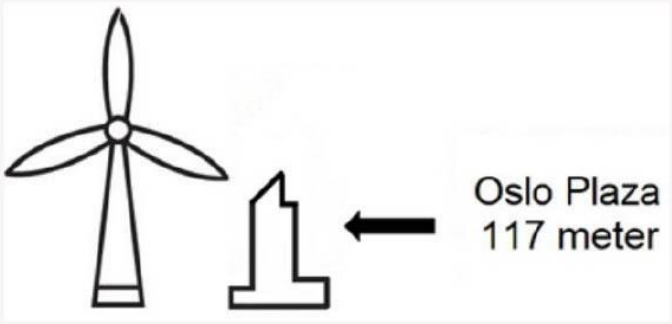
Bildet viser hvordan luftledningene i skogområdene vil se ut. Skog må fjernes for å sette opp ledningene.

Egenskap 2) Eksempel på jordkabel i skogområde

Bildet viser hvordan jordkabel i skogområdene vil se ut. Ved bruk av jordkabel må også skog fjernes så lenge kablene er der, men her vil ikke kablene være synlige. I tillegg vil man få en anleggsvei ved siden av kabelgrøften (ikke vist på bildet).

Egenskap 3) Høyde på vindturbinene

Fra bakken til toppen av vingespissen kan en vindturbin være mellom 150 til 250 meter høy. Høyden er avgjørende for hvor mye strøm en vindturbin kan produsere. Høyere vindturbiner produserer mer strøm og er mer synlige. Vindturbiner kan være synlige over avstander på 40 til 50 kilometer, om det er fri sikt.

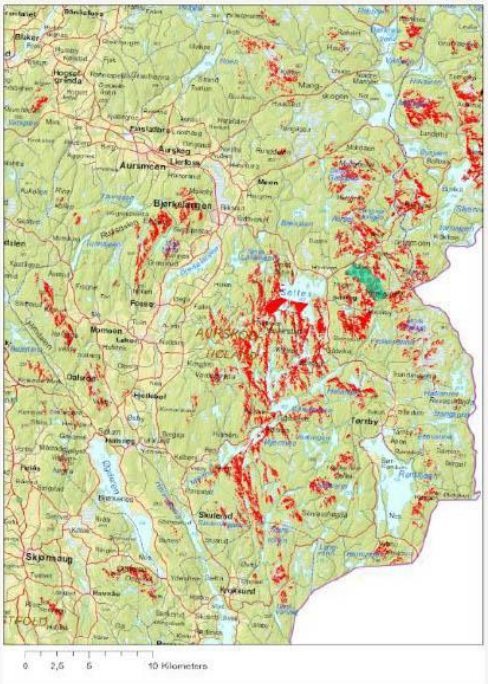


I utbyggingsplanene vil høyden på vindturbinene, målt fra bakken til tuppen av vingespissen, variere fra 150 til 250 meter.

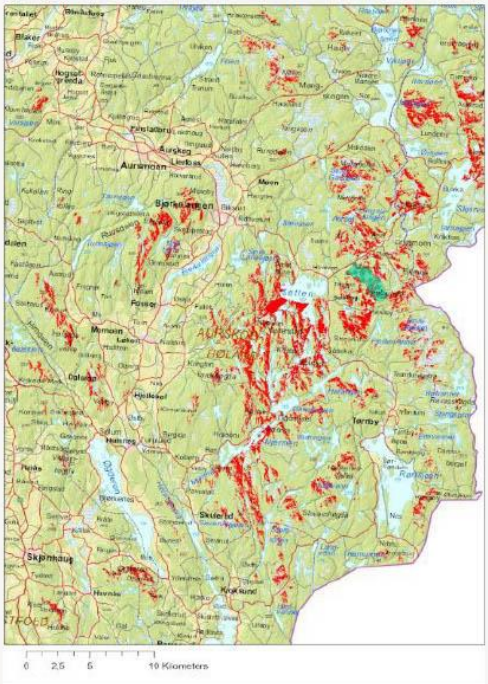
Nå viser vi først synlighetskart for Aurskog -Høland kommune, og i neste bilde for hele området hvor turbinene blir synlige fra. De to kartene her viser områder kun i Aurskog-Høland kommune hvor vindturbinene vil være synlige fra hvis hver turbin er 150 og 250 meter høye. Disse områdene er merket rødt og er omtrent like i de to kartene. Høyden på turbinene har nemlig lite å si for hvilke områder turbinene er synlige fra.

Zoom inn på kartene for å se om du kan se vindkraftanlegget fra der du bor.

Synlighets-kart 150 meters turbiner over Aurskog-Høland



Synlighets-kart 250 meters turbiner over Aurskog-Høland



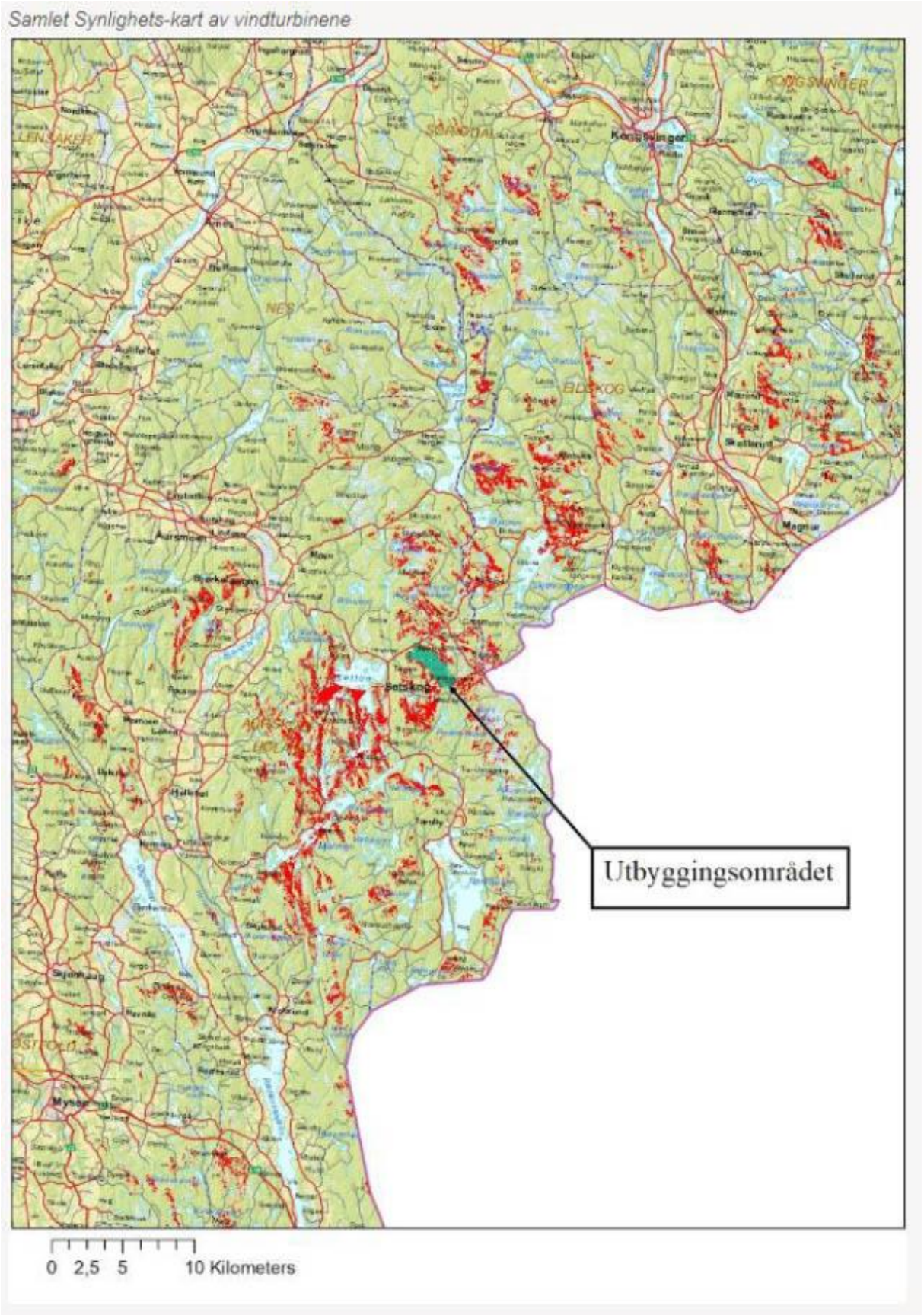
Q16

Vil vindkraftanlegget være synlig der du bor?

- ◯ Ja, jeg bor i et rødt område på kartet
- ◯ Nei, jeg bor ikke i et rødt område på kartet
- ◯ Vet ikke

Egenskap 3) Høyde på vindturbinene – Samlet synlighets-kart av vindturbiner.

Dette kartet viser alle områder hvor vindturbinene vil være synlige fra, også utenfor Aurskog-Høland kommune.


Samlet Synlighets-kart av vindturbinene
Utbyggingsområdet
0 2,5 5 10 Kilometers

Q17

Var synlighetsområdene mindre eller større enn hva du forestilte deg?

- ○ Områdene var større enn jeg forestilte meg
- ○ Områdene var mindre enn jeg forestilte meg
- ○ Områdene var omtrent slik jeg forestilte meg
- ○ Vet ikke

Egenskap 3 - Høyde på vindturbinene

Bildene viser 150 og 250 meters turbiner sett fra innsjøen Setten. Turbinene er mer synlige desto høyere de er.

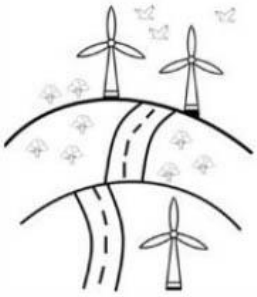
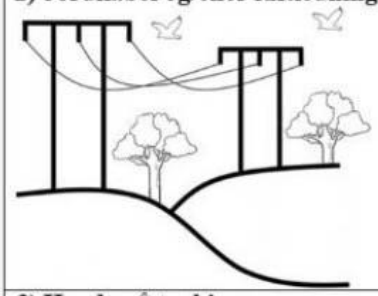
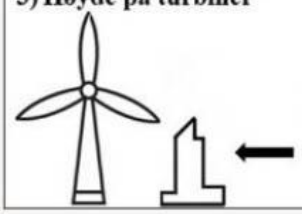
Her er vindturbinene 150 meter høye

Egenskap 3 - Høyde på vindturbinene

Bildene viser 150 og 250 meters turbiner sett fra innsjøen Setten. Turbinene er mer synlige desto høyere de er.

Her er vindturbinene 250 meter høye

Oppsummering av hoved-virkningene av de tre første egenskapene.

Egenskap	Effekter
1) Antall turbiner 	- Negativ påvirkning på natur og dyreliv - Arealbeslag - Støy, lysblink, iskast og skyggekast
2) Jordkabel og/eller luftledning 	- Luftledninger har mer negativ påvirkning på natur og dyreliv - Luftledninger er mer synlige for folk
3) Høyde på turbiner 	- Synlighet - Blinkende rødt lys som kan være forstyrrende

Egenskap 4) Økning i årlig kommunale avgifter

Setten vindkraftanlegg vil føre til økte inntekter for Aurskog-Høland kommune gjennom eiendomsskatt hvert år vindkraftanlegget står der. Kommunen får også inntekter under utbygging fra lokale/regionale aktører.

Om den mest omfattende løsningen bygges ut, vil innbyggere i kommunen slippe økte kommunale avgifter, og økningen blir således 0 kr pr år. Jo mindre omfattende løsning som velges, desto mer må kommunale avgifter økes for å drifte kommunen tilstrekkelig bra i årene som kommer.

Hvis ikke den mest omfattende og lønnsomme utbyggingsplanen blir bygd må kommunen øke årlige kommunale avgifter for å finansiere tapte, men nødvendige, inntekter.

I utbyggingsplanene vil økningen i årlige kommunale avgifter per husholdning variere fra 0 til 4000 kroner.

Q18A

Omtrent hvor mye betaler din husholdning i kommunale avgifter (til blant annet vann; avløp; avfall), per år?

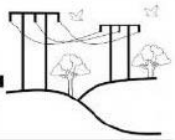
Ca. _____ kr/år

Q18Ax1

☐ Vet ikke

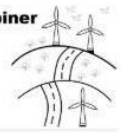
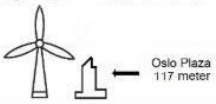
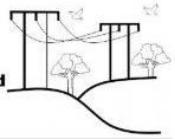
Hvilket alternativ foretrekker du?

Velg det alternativet du foretrekker. «Utbyggingsplan 1» er mest omfattende og lønnsom for kommunen. Med den er det ikke nødvendig å øke årlige kommunale avgifter. På den andre siden vil Utbyggingsplan 1 ha størst påvirkning på landskapet, naturen og rekreasjonsmuligheter i Aurskog-Høland kommune. Husk, dersom du velger mindre omfattende utbyggingsplaner vil du ha mindre penger å bruke.

	Utbyggingsplan 1	Utbyggingsplan 2	Utbyggingsplan 3
Antall vindturbiner 	12 vindturbiner	2 vindturbiner	12 vindturbiner
Høyde på vindturbinene 	250 meter	200 meter	150 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog	Jordkabel i både tettsted og skog	Luftledning i tettsted, jordkabel i skog
Årlig økning i kommunale avgifter 	0 kr	2000 kr	1000 kr
MITT VALG ER:	○	○	○

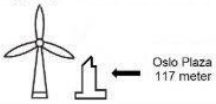
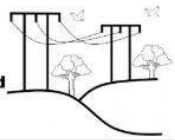
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Utbyggingsplan 1	Utbyggingsplan 2	Utbyggingsplan 3
Antall vindturbiner 	12 vindturbiner	8 vindturbiner	8 vindturbiner
Høyde på vindturbinene 	250 meter	150 meter	250 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog	Jordkabel i tettststed, luft-ledning i skog	Jordkabel i både tettsted og skog
Årlig økning i kommunale avgifter 	0 kr	500 kr	4000 kr
MITT VALG ER:	○	○	○

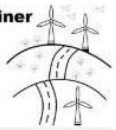
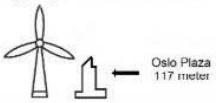
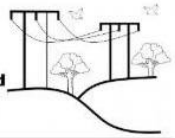
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Utbyggingsplan 1	Utbyggingsplan 2	Utbyggingsplan 3
Antall vindturbiner 	12 vindturbiner	4 vindturbiner	6 vindturbiner
Høyde på vindturbinene 	250 meter	250 meter	150 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog	Jordkabel i både tettsted og skog	Luftledning i tettsted, jordkabel i skog
Årlig økning i kommunale avgifter 	0 kr	500 kr	4000 kr
MITT VALG ER:	○	○	○

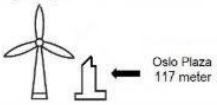
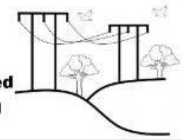
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Utbyggingsplan 1	Utbyggingsplan 2	Utbyggingsplan 3
Antall vindturbiner 	12 vindturbiner	10 vindturbiner	10 vindturbiner
Høyde på vindturbinene 	250 meter	250 meter	150 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog	Luftledning i tettsted, jordkabel i skog	Jordkabel i tettststed, luft-ledning i skog
Årlig økning i kommunale avgifter 	0 kr	1000 kr	2000 kr
MITT VALG ER:	○	○	○

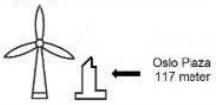
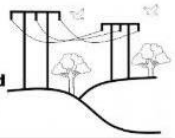
Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Utbyggingsplan 1	Utbyggingsplan 2	Utbyggingsplan 3
Antall vindturbiner 	12 vindturbiner	2 vindturbiner	8 vindturbiner
Høyde på vindturbinene 	250 meter	150 meter	200 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog	Luftledning i både tettsted og skog	Luftledning i tettsted, jordkabel i skog
Årlig økning i kommunale avgifter 	0 kr	500 kr	4000 kr
MITT VALG ER:	○	○	○

Hvilket alternativ foretrekker du?

Velg nedenfor hvilket alternativ du foretrekker

	Utbyggingsplan 1	Utbyggingsplan 2	Utbyggingsplan 3
Antall vindturbiner 	12 vindturbiner	8 vindturbiner	4 vindturbiner
Høyde på vindturbinene 	250 meter	150 meter	250 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog	Luftledning i tettsted, jordkabel i skog	Jordkabel i tettststed, luft-ledning i skog
Årlig økning i kommunale avgifter 	0 kr	500 kr	4000 kr
MITT VALG ER:	○	○	○

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Høyde på vindturbinene

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Økning i årlig kommunale avgifter

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Antall vindturbiner og miljøeffekt

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

Hvor viktig var de ulike egenskapene for valgene du gjorde?

Jordkabel eller luftledning i tettsted og skogområder

Ikke viktig I det hele tatt 1	2	3	4	5	6	Svært viktig 7

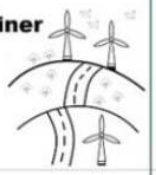
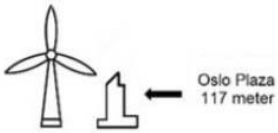
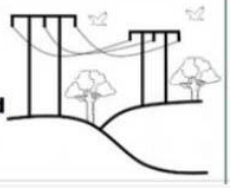
Hvor lett eller vanskelig synes du det var å foreta valgene?

Svært lett 1	2	3	4	5	6	Svært vanskelig 7
○	○	○	○	○	○	○

Hva var den viktigste grunnen til at du valgte «Utbyggingsplan 1» i alle valgsituasjoner?

- ○ Jeg synes ikke de andre alternativene er verdt å betale for
- ○ Staten burde dekke tapte inntekter for kommunen ved en mindre omfattende utbyggingsplan
- ○ Jeg har ikke råd til å betale mer i kommunale avgifter
- ○ Jeg tror ikke vindkraftanlegget vil bli bygd og er derfor ikke villig til å betale noe
- ○ Jeg er ikke bekymret for effektene fra vindkraftanlegget
- ○ For å øke produksjonen av ren energi fra vindkraft i kommunen maksimalt
- ○ Jeg ønsker ikke høyere kommunale avgifter
- ○ Det var det beste alternativet med tanke på klimautfordringene vi står overfor
- ○ Jeg skal flytte og dette er derfor ikke relevant for meg
- ○ Vet ikke
- ○ Annet, vennligst spesifiser:

Se for deg at «Utbyggingsplan 1», slik den står nedenfor, skal bygges . Utbyggingen kan unngås hvis kommunen øker de årlige kommunale avgiftene tilsvarende det vindkraftanlegget ville innbrakt. Da vil områdene Bjørnbassheia og Lembruheia forbli som i dag, og Setten vindkraftanlegg vil ikke bli bygd.

	Utbyggingsplan 1
Antall vindturbiner 	12 vindturbiner
Høyde på vindturbinene 	250 meter
Type kraft-ledning i tettsted og skog 	Luftledning i både tettsted og skog

InfoQ28x1

Tenk på hva det er verdt for deg å unngå effektene av Setten vindkraftanlegg. Hva er det meste, om noe, din husholdning helt sikkert er villig til å betale som en økning i kommunale avgifter per år for å unngå bygging av Utbyggingsplan 1? Husk at det du oppgir at du vil betale er også det du må bruke mindre på andre ting.

Q28x1

Kroner per år:

Kroner per år:

0 50 100 150 200 300 400 500 600 700 900 1100 1300 1500 2000 4000 6000 8000 12000 Mer enn 12000 Vet ikke

Hva er den viktigste årsaken til at du svarte 0 kr i forrige spørsmål?

- ○ Staten burde dekke tapte inntekter for kommunen ved en mindre omfattende utbyggingsplan
- ○ Jeg har ikke råd til å betale mer i kommunale avgifter
- ○ Det var det beste alternativet med tanke på klimautfordringene vi står overfor
- ○ Jeg tror ikke vindkraftanlegget vil bli bygd og er derfor ikke villig til å betale noe
- ○ For å øke produksjonen av ren energi fra vindkraft i kommunen maksimalt
- ○ Vet ikke
- ○ Annet, vennligst spesifiser: [ ]

Tenk tilbake på spørsmålet om økte kommunale avgifter for å unngå Setten vindkraftutbygging. Ville du svart det samme i en normalsituasjon uten utbrudd av corona-virus?

- ○ Ja, ville svart det samme
- ○ Nei, ville svart høyere beløp
- ○ Nei, ville svart lavere beløp
- ○ Vet ikke

Tenk på naturområdene som blir berørt ved utbygging av Setten vindkraftanlegg. Utsagnene nedenfor handler om følelsen av ditt og innbyggerne av Aurskog-Høland kommune sitt eierskap til naturområdene som blir berørt ved utbygging og bruken av disse.

Q29
Hvor enig/uenig er du i følgende påstander?

Naturområdene som blir berørt av vindkraftanlegget er VÅRE

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29
Hvor enig/uenig er du i følgende påstander?

Jeg føler at naturområdene som blir berørt av vindkraftanlegget tilhører OSS

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29
Hvor enig/uenig er du i følgende påstander?

Jeg føler en høy grad av eierskap til naturområdene som blir berørt av vindkraftanlegget

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29

Hvor enig/uenig er du i følgende påstander?

Jeg føler at naturområdene som blir berørt av vindkraftanlegget er VÅRE

Svært uenig 1	2	3	4	5	6	Svært enig 7

Q29

Hvor enig/uenig er du i følgende påstander?

Det er vanskelig for meg å føle eierskap til naturområdene som blir berørt av vindkraftanlegget

Svært uenig 1	2	3	4	5	6	Svært enig 7

Helt til slutt ber vi deg om å oppgi noe bakgrunnsinformasjon om deg selv og husholdningen din

Er du medlem i en frilufts- og/eller miljøorganisasjon?

- ○ Ja, spesifiser: ____
- ○ Nei, men jeg er medlem av Facebook-gruppe om friluftsliv i Aurskog-Høland kommune
- ○ Nei
- ○ Vet ikke

Vil du eller noen i din husholdning bli direkte påvirket ved utbygging av Setten vindkraftanlegg?

- [ ] Ja, vi eier arealer der det er aktuelt å bygge vindkraftanlegget
- [ ] Ja, vi blir påvirket gjennom jobb i turistnæringen
- [ ] Ja, vi bor i nærheten av områder hvor det er aktuelt å bygge vindkraftanlegget
- [ ] Ja, vi disponerer fritidsbolig/hytte i nærheten av områder hvor det er aktuelt å bygge vindkraftanlegget
- [ ] Ja, vi foretar friluftslivsaktiviteter i utbyggingsområdet og/eller områder i nærheten.
- [ ] Ja, vi jobber innen fornybar energi
- ○ Nei
- ○ Vet ikke
- [ ] Annet, vennligst spesifiser:

Hvor sikker eller usikker er du på at resultatene fra denne undersøkelsen vil bli brukt som en del av beslutningsgrunnlaget for kommunen angående en mulig utbygging av Setten vindkraftanlegg?

Svært usikker						Svært sikker
1	2	3	4	5	6	7
○	○	○	○	○	○	○

Q34

Hva er din høyeste fullførte utdanning?

- ○ Grunnskole (7-10 år)
- ○ Videregående skole/gymnas
- ○ Fagbrev
- ○ 3-4 åring universitets/høyskoleutdanning (bachelor/cand.mag.)
- ○ 5-årig universitets/høyskoleutdanning (mastergrad/profesjonsutdanning)
- ○ PhD/doktorgrad
- ○ Vet ikke

Q35

Var du på informasjonsmøtet om Setten Vindkraftanlegg på Setskog?

- ○ Ja
- ○ Nei
- ○ Vet ikke

Q36

Hva var din husholdnings samlede bruttoinntekt (dvs. før skatten er trukket) i 2019?

- ○ 0 – 200 000 NOK
- ○ 200 001 – 400 000 NOK
- ○ 400 001 – 600 000 NOK
- ○ 600 001 – 800 000 NOK
- ○ 800 001 – 1 000 000 NOK
- ○ 1 000 001 – 1 500 000 NOK
- ○ 1 500 001 – 2 000 000 NOK
- ○ 2 000 001 – 3 000 000 NOK
- ○ 3 000 001 – 4 000 000 NOK
- ○ 4 000 001 – 5 000 000 NOK
- ○ Mer enn 5 000 000 NOK, oppgi omtrent hvor mye: _____
- ○ Vet ikke

Q36_2

Hvordan tror du corona-viruset vil påvirke din husholdningsinntekt i 2020 sammenlignet med en normalsituasjon?

- ○ Mye lavere inntekt
- ○ Litt lavere inntekt
- ○ Omtrent samme inntekt
- ○ Litt høyere inntekt
- ○ Mye høyere inntekt

Hvilken yrkesstatus beskriver best din situasjon i dag?

- ○ Ansatt/permittert i offentlig sektor
- ○ Ansatt/permittert i privat sektor
- ○ Selvstendig næringsdrivende
- ○ Pensjonist
- ○ Student
- ○ Uføretrygd
- ○ Annet: Vennligst spesifiser:

Tusen takk for hjelpen! Vi vil presisere at endringen i kommunale avgifter er rent hypotetisk. Har du andre kommentarer til undersøkelsen eller en mulig utbygging av Setten Vindkraftanlegg kan du skrive her:

Norges miljø- og biovitenskapelige universitet
Noregs miljø- og biovitskapelege universitet
Norwegian University of Life Sciences

Postboks 5003
NO-1432 Ås
Norway