Master ‘s Thesis

Social Acceptance of Wind Power in France

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Abstract

As more and more wind farms are commissioned in France, social acceptance seems a rising issue during the planning process. The present work aims at outlining the social factors of success or failure of a wind farm project. The study was undertaken by the use of interviews with a pro and anti wind federation, interviews with people living close to a wind farm and a poll conducted in a city surrounded by many wind farms. The results show that the acceptance of wind power has decreased over the last three years in France and decreases as the proposed wind farms gets closer to people's household. On the other hand, the planning process could be improved by involving the public earlier in the process in order to take into account their concerns and requests. It would ease the planning process and could avoid costly trials.

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0. Preface

This Master's Thesis is part of the fourth semester of the Master of Science in Sustainable Energy Planning and Management at Aalborg University. The Master's Thesis was an opportunity to apply all the theories and methodologies amassed during the studies and apply them to a specific problem.
The report has been written in the respect of the supervisor and the external examiner attached to this Master's Thesis.

Several sources are used to write the report. They are referenced in the report with the Chicago method; the sources will be shown like this: (Author, year of publication). The bibliography is presented at the end of the report. Nonetheless, when a reference applies to a whole paragraph, the source will be mentioned only at the end of the paragraph to facilitate the reading.

I would like to benefit from the preface to deeply thank Thomas Sørensen for supervising the Master's Thesis. Thank you for the many comments, advice and for your time.

1. Introduction

The EU is taking the lead to reduce carbon emissions. Renewable means for electricity generation can decrease the CO_2 emissions as the electricity generation sector accounts for 33.26 % of the EU carbon emissions (European Commission - Directorate General for Energy and Transport 2010). Hence, a goal was set up in 2009 for renewable energy. Indeed, 20 % of the energy should be produced by renewable means by 2020 (European Union 2009). Currently, wind power accounts for 5.3 % of the electricity generation (EWEA 2011). Many experts agree on the fact that wind power could be a powerful leverage to meet the 2020 target ((Klessmanna, et al. 2011), (Roquesa, Hirouxb and Saguanb 2010), (EWEA 2011)).

On the other hand, as more and more wind farms are commissioned, social acceptance is becoming an increasing hindrance during the planning phase of wind farms (Wüstenhagena, Wolsinkb and Bürer 2007). Between 2010 and 2011 the number of MW commissioned have dropped of about 35 % from 1200 MW in 2010 to 875 MW in 2011 (batiactu 2012).The arguments generally presented by the opponents to projects is the visual impact on the landscape, the acoustic impact on the surroundings of the wind farms and the potential harm to wildlife and in particular birds (Ladenburg 2008). The landscape seems to be the most problematic point. Wind farms are becoming "*one of the most distinct energy landscapes in the world"* (Pasqualetti 2011).
This issue is quite challenging as people in general are in favor of wind power as a concept but not as real facilities (Wolsink 2000). In other words, people are in general in favor of wind power but are not in favor of wind farms. On the other hand, developers in general take general support of projects as granted as people are in majority in favor of wind power (Wolsink 2000).
Hence, the majority of the projects (80 %) are brought to court in France (Fayein, Albrecht and Dumont 2011) even though 75 % of the cases are dismissed (batiactu 2012).

This master thesis aims at outlining and trying to understand some key characteristics about social acceptance. Hence, the research question to be answered in this study is:
What are the key social factors for the success or failure of a wind farm project in France?

The pitfall in this project is to limit the scope and try to find which factors facilitate the development of wind power. In that way, a subjective stance on what is "right" and what is "wrong" is taken. Trying to find ways to overcome the local resistance to wind farms projects is way too restrictive and excludes the value of objectors' arguments (Aitken 2010).
That is why a methodology involving polls and interviews both with anti and prowind is used in the project. The section hereinafter is devoted to the presentation of the different chapters of this report.

The first chapter presents both the history of the development of wind power in France and the planning process in France. The aim is to have a general background from the early developments of wind power in France and to understand how the planning process is conducted.
The next chapter focuses on the theories and their applications for the analysis. After introducing the theories applied, the research methodology is explained.
The analysis chapter deals with the interviews conducted with the antiwind federation, the prowind federation and two people living close to a wind farm. A poll is also made in a city surrounded by many wind farms.
The final chapter draws a conclusion from the analysis and is intended to answer to the research question.

2. Background

The background is intended to give some general information to the reader about both the history of wind power in France (which started in the mid 90's) and the planning process in France.

2.1. History of wind power in France

In 1996, the French government decided to implement a plan in order to develop wind power and a wind industry in France as the overall installed capacity of wind power in 1996 was 2.9 MW (Jolivet 2006). The final objective was to install a total wind power capacity between 250 and 500 MW by 2005; projects should have a capacity comprised between 1.5 and 8 MW per wind farm (Jolivet 2006). Different governmental stakeholders were involved: Ministry of Industry, Ministry of Investment, Ministry of Research and the French Agency for the Environment and Energy Preservation (ADEME). EDF (which was at that time both the TSO and an electric producer) together with the ADEME managed a call for proposals which took place between 1996 and 2005. The applications were assessed on different criteria: the proposed purchase price of electricity, the industrial and economic soundness of the projects, the location and the potential in terms of environmental friendly technology development (Jolivet 2006). The selected projects would be able to have a 15 years purchase obligation contract at an average purchase price of 0.05 €/kWh.
Although this plan fostered the construction of 700 MW of wind power in France (Figure 1), Denmark built about 3 400 MW (Danish Energy Agency 2011) during the same time.

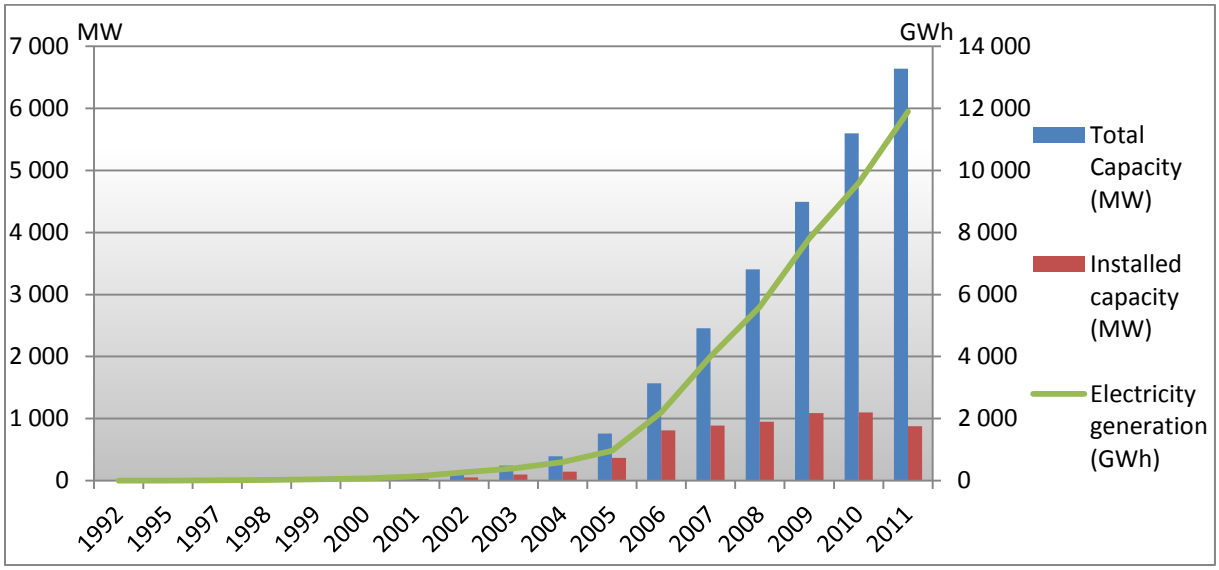

Figure 1: Wind power in France between 1992 and 2004.
Adapted from (ADEME 2005) & (France Energie Eolienne 2011) & (Enerzine 2012) & (Syndicat des énergies renouvelables 2011)

After this plan, the foundations for a wind power industry in France were established. The call for proposals ended and a different policy was implemented: fixed feed-in tariff (the same for every wind farm). 5 900 MW was installed between the end of the EOLE 2005 plan and 2011 and the total installed capacity is now over 6 000 MW.

2.2. Planning Process

The whole planning process can be seen in Figure 2. Several authorities are contacted during the whole process (up to 36 according to (EWEA 2010)). Hence, the project development can be very long: between 4 to 7 years according to the wind power lobby. In case the project is brought to court, there is an additional 2 to 4 years.

2.1.1. Pre-feasibility Studies

The first part aims at designing the framework for the Environmental Impact Assessment (EIA). The objective is to gather some elements about the potential impact of the project on the surroundings.

The second part of this step is devoted to a technical pre analysis concerning the road access, the connection to the grid and the wind resource. The studies are rather brief and aim at excluding some projects (for instance projects with an impossible road access for the transport of the different elements of the aerogenerator).

Afterwards, the first contacts with landowners and with political representatives are made. The goal is to start the land agreements' process.

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.2. Feasibility studies

This step aims at conducting some very specific studies related to the acoustics, the landscape. These studies are then included in the EIA (next section).
Then, a wind resource assessment is conducted by installing a met mast. The average duration of the wind resource assessment is 12 months (New York State Energy Research and Development Authority 2010).

In addition, an economic analysis is conducted in order to prepare the business plan.

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.3. Design studies

The EIA report is written at this stage. It should gather all the feasibilities studies conducted during the previous steps. A more comprehensive description of the EIA report is presented in section 2.1.8.
A report regarding the impact with Natura 2000 areas must also accompany the EIA.

The agreement with land owners are also finalized during this step.

Different state organizations are also contacted during this step although it is not mandatory (but highly recommended).

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.4. Administrative Process

During this step, several permits are requested: construction permit, forest clearing (if necessary), protected species exemption, electrical permit.
Besides, a grid connection request is sent to the TSO or DSO.

On the other hand, it is during this phase that the public inquiry and the consultation of the Local Commission of Nature, Landscape and Sites are conducted. Then, the environmental authority delivers a general opinion about the proposed project. Sometimes, the urbanism plan needs to be reviewed to incorporate the proposed wind farm.

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.5. Construction and commissioning

The wind farm is constructed. At the same time, measures to compensate, reduce and suppress the impacts due to the construction of the wind farm are taken. Besides, the environmental construction monitoring starts. Finally, the wind farm is commissioned.

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.6. Operation and dismantling

During the operation of the wind farm, an environmental monitoring is conducted. It aims at evaluating the effect of the compensation measures taken. Once the wind farm has reached the end of the lifespan, the wind farm is dismantled and the site restored. The foundations are removed but not the cables. After the dismantling, an environmental monitoring regarding the site restoration is conducted.

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

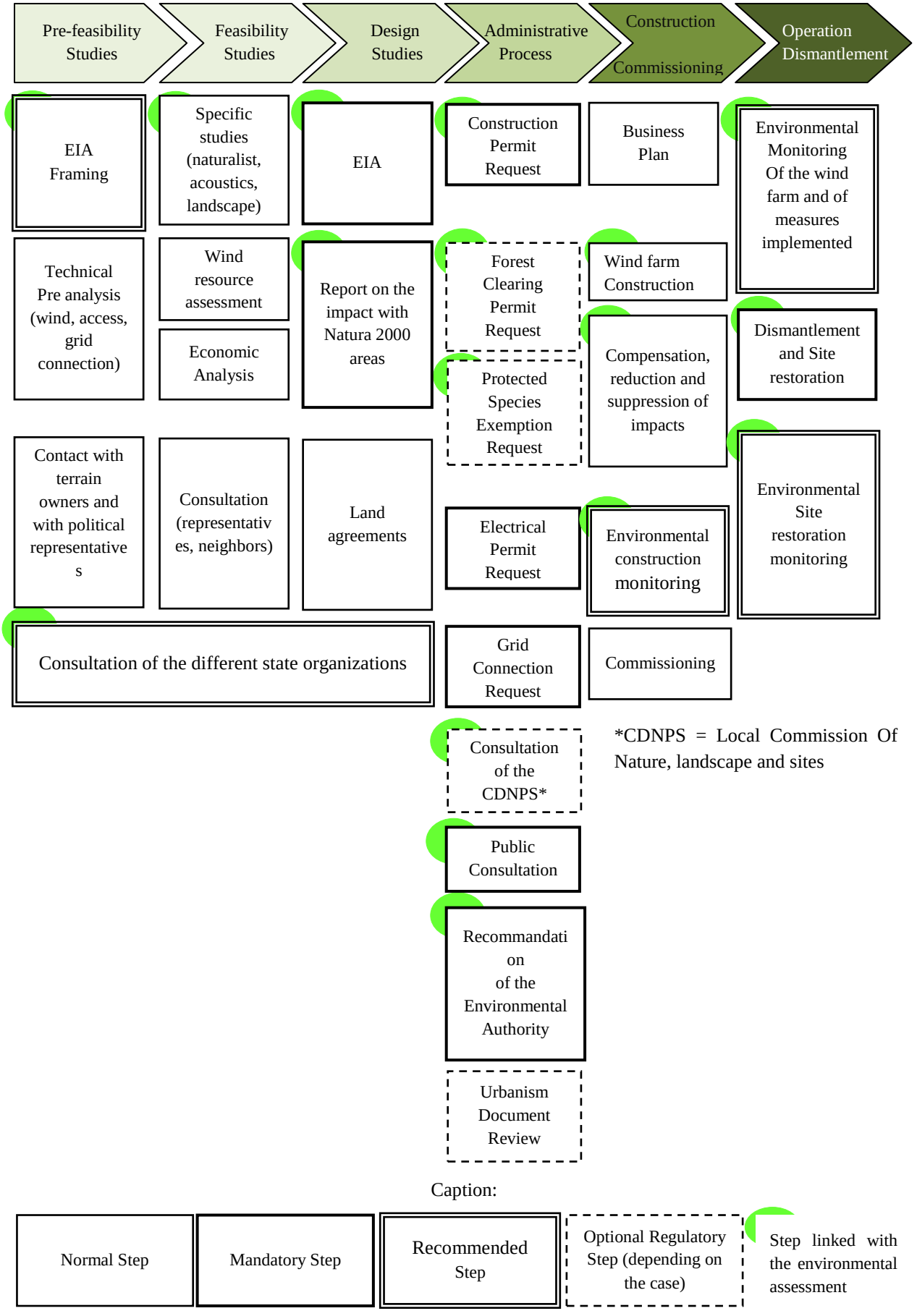

Figure 2: Planning process in France. Translated and adapted from (Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.7. Interference with radars (meteorological, civil aviation)

For wind turbines higher than 50 m (hub height), the General Directorate for the Civil Aviation is consulted. Wind turbines can indeed interfere with aircraft detection radars. There are three types of radar. The primary type is based on the reflection of the wave on any obstacles encountered; wind turbines cannot be erected within an area between 0 and 15 km around the radar. The second type is based on the transponder of aircrafts. The transponder receives the identification questions of the radar and sends an 'answer' to them. Aerogenerators cannot be built within and area comprised between 0 and 15 km around the radar. The third type is VHF Omnidirectional Range radar located on country-side airports. The International Civil Aviation Organization (ICAO) has set some recommendations that are followed in France for these radars: no wind farm can be located between 0 and 5 km, one maximum between 5 and 10 and 5 maximum between 10 and 15 km.

The meteorological services (Meteo France) are also consulted as Meteo France operates meteorological radars and wind turbines interfere with the measures of these radars. Hence, no wind turbines can be erected in an area comprised between 0 and 10 km around the meteorological radars.

(Fayein, Albrecht and Dumont 2011)

2.1.8. Environmental Impact Assessment

The environmental impact assessment has 3 objectives:

- Design a project with the least environmental impact: the developer demonstrates how the environmental issues have been taken into account during the planning process.
- Help the administrative authority in its decision as the EIA presents the general background of the project (on the environmental aspect).
- Inform and involve the public in the decision making process: the active and continuous participation of the public is indeed of major importance to design an exemplary project.

The environmental impact assessment presents:

1. A comprehensive description of the project with information about the size. Moreover, there should be a physical description about the entire projects and about technical requirements in terms of utilization of the soil both during the construction phase and the operation phase.

2. An analysis of the initial state of the surroundings of the project susceptible to be impacted by the project including the population, the fauna and the flora, the natural habitats, the biological equilibrium, the climatic factors, the cultural and archeological heritage, the soil, the air, the sound, the natural, agricultural, forest, marine and leisure spaces and the interaction between these elements.

3. An analysis of the negative and positive effects, direct or indirect, temporary (including during the construction phase) and permanent, at a short, medium or long scale of the project on the environment (described in the second point) and on the energy consumption, on health, public safety, hygiene, and the entire interaction between these effects.

4. An analysis of the cumulative effects of the projects with other documented projects.

5. A brief presentation of the alternatives and the reasons why this project was chosen.

6. The elements that allow evaluating the compatibility of the project with the soil affectation defined in the urbanism regional plan.

7. The measures planned by the developer to avoid the negative effects of the project on the environment or human health and to reduce the inevitable effects. The measures planned to compensate the project should also be documented. If it is not possible to compensate these effects, the developer should prove it. The presentation should include the rough estimation of the costs, the expected effects of these measures and how a regular assessment of these measures can be introduced.

8. A comprehensive presentation of the methodology used to assess the initial state and to evaluate the expected effects on the environment. When there are many methods available, a comprehensive argumentation should be included.

9. A presentation of all the problems (technical and/or scientific) encountered during the environmental impact assessment

10. The names, academic and professional background of the authors or the people who were involved in the EIA.

As these documents can be read by the public, a non technical summary of the EIA is also included. The whole EIA is accessible to the public during the public inquiry phase.

(Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

2.1.9. Public inquiry

The public consultation should not last less than 15 days. During the public inquiry, the public can write comments about the project on a consultation book that will be used to assess the project. Eight days before this public inquiry, the competent authority informs the public about the place and opening hours of the consultation. This should also be documented in at least two local newspapers and on the website of the competent authority. Once the public inquiry is over, the developer should write a report which summarizes the different comments and questions of the public. This document is validated by the competent authority before the document is publically released. Then, this summary document is published on the website of the competent authority. Moreover, there is a national website which gathers all the EIA conducted (http://www.fichier-etudesimpact.developpement-durable.gouv.fr/). It should include for every project the identity of the developer, the name and location of the project, the approval or refusal date of the project and the authority that has taken the decision.

(Fayein, Albrecht and Dumont 2011)

2.1.10. Approval or refusal decision

The approval or refusal decision should mention the measures planned by the developer to minimize or suppress the effect of the project on the environment, public health, how a continuous assessment of the measures taken can be made.
The follow up of the project includes a presentation of the results of the measures taken, documented in at least one report. The aim is to check the efficiency degree and the durability of the measures on the assessment period. Once these reports are given, the authority can decide whether or not these measures need to be continued.

At the end of the process, the minister in charge of energy delivers a certification that authorizes the wind farm to operate.

Once the construction permit is granted, antiwind association or potential neighbors of the wind farm often contest in court the permit.

(Fayein, Albrecht and Dumont 2011)

2.1.11. Involvement of the public during the process

The public is involved at different stages of the process (Table 1).

Table 1: Involvement and information of the public. Translated from (Ministère de l'Écologie, de l'Énergie, du Développement durable et de la Mer 2010)

Step of the project	Target	Involvement means
Project's Design	Local municipality, neighbors, economic stakeholders	Monitoring committee Local information committee Public meetings Website Visit of wind farms Informative Brochures
Administrative phase being processed	Neighbors, associations, local economic stakeholders	Public Consultation (mandatory): Report available in the municipalities
Wind farm construction	Neighbors, local municipalities, press	Ceremony around the lay of the foundation stone
Wind farm operation	Neighbors, local municipalities	Information about the wind farm Presentation of the environmental monitoring Organization of technical visits Notice Boards

As it can be seen in Table 1, the public is involved and informed many times during the process.

During the project's design, the public can be informed and involved in different ways. Public meetings are sometimes organized by the developer in order to present the proposed projects. The public is invited to ask questions to the developer. Besides, an informative brochure intended to the public is edited by the developer. It presents in brief the proposed project. Some developers publish several brochures during the planning process to communicate on the different steps of the project. Visits of existing wind farms are sometimes organized by developers. The objective is to show what a real wind turbine is. Indeed, the public has in general very practical concerns with wind farms: noise and landscape change. Some developers also create a website in order to keep informed the public.

When the project is being processed by the different administrations, the public is involved with the public consultation. This step is mandatory in opposition to the project's design phase in which the public does not have to be informed. After the public consultation, it is possible to read the public consultation summary report in the municipalities where the consultation was held.

In general, at the beginning of the wind farm construction, a ceremony is given for the lay of the foundation stone.

During the operation phase, notice boards are sometimes installed to inform the public about a specific wind farm (for example the notice board of Plouyé's wind farm in Figure 3). Besides, technical visits can be organized by the operator of the wind farm.

Figure 3: Notice Board for the Plouyé wind farm (4 NM48 of 750 kW). (Trugarez 2006)

Although the public in informed and involved at different steps of a project, according to (Fayein, Albrecht and Dumont 2011), the public inquiry is way too late in the planning process of a wind farm to take into account the concerns of the public.

2.1.12. Reasons of construction permits refusal

Fayein and his colleagues have identified the reasons for construction permits refusals. On 1 320 construction permit requests, 644 were refused (about 47 %). The main reason is the potential damage to the sites and landscape. Also, another major reason is the co-visibility of the planned wind farm with a protected historical monument. On the other hand, in some cases, the project presented was incompatible with radar constraints.

In a minority of the refusal decision, the reason was an insufficient environmental impact assessment. (Fayein, Albrecht and Dumont 2011).

3. Theories

The theories chapter aims at explaining the general concepts used in the analysis, i.e. interviews and polls.

3.1. Interviews

Interviews are part of the qualitative research, a vast field which is often criticized for being nonscientific. The interviews are generally used to collect information in order to understand the feeling of the participants regarding phenomena or events. Interviews can potentially address certain types of assumptions (Berg 1995). Indeed, talking to people is a powerful tool to collect the thoughts, feelings, views and experience of the respondent. (Legard, Keegan and Kit 2003). The following sections will present the different types of interviews, questions and the interview process. Two sources were used to write the following sections: (Berg 1995) and (Legard, Keegan and Kit 2003). The references will not be repeated throughout the different paragraphs.

3.1.1. The different types of interviews

- Standardized Interviews
  In this type of interviews, the questions are prepared and scheduled from the first to the very last one. The interviewer, prior to conducting the interviews, prepares a list of questions he plans to ask to the interviewee. In a standardized interview, the list of questions has to be carefully prepared in order to cover all the points on which the researcher wishes to obtain information. The main asset with standardized interviews is that they allow the researcher to have a good basis of comparison between the answers given by different persons interviewed. Indeed, as the list of questions is prepared and scheduled before the interview, the questions are the same if asked to different respondents.

- Unstandardized Interviews
  Unstandardized interviews are the exact opposite of standardized interviews. Almost none of the questions are scheduled and prepared. The researchers makes the assumption that he does not know what are all the questions necessary to cover the points on which the researcher wants to have some data input. The interviewer needs to have a proactive attitude during the interview to ask relevant questions depending on the answers given by the interviewee. Unstandardized interviews are used when the researcher do not know much about the 'background' of the interviewees, that is, the lifestyles, religious and ethnic cultures or customs of the respondents. As the researcher does not prepare a list of questions, the interview can go in an unexpected direction.

- Semistandardized interviews
  Semistandardized interviews blends both the attributes of the standardized and unstandardized interviews, that is the rigidity of standardized interviews and the flexibility of unstandardized interviews. The researcher prepares a list of questions he intends to ask during the interview and the planned order. The aim is to collect answers beyond what the researcher can expect with the standardized interview. Indeed, the interviewer, depending on the answers given by the interviewee, can ask additional questions, in order to obtain more details.

3.1.2. Interview stages

The following paragraphs apply mostly to standardized and semistandardized interviews. Indeed, in unstandardized interviews, questions are not prepared and scheduled whereas this step is of major importance in standardized and semistandardized interviews.

Prior to preparing and scheduling any questions, the researcher needs to outline what he wants to obtain from the interview. In other words, the researcher must be sure that interviews can provide relevant input data regarding his research objective. This step is done in all the three different types of interviews (standardized, semistandardized and unstandardized).

Then, the researcher needs to choose the persons he would like to interview. This step must be conducted before scheduling and preparing the questions, as the questions wording should fit to the public the researcher wants to interview. In other words, the questions asked should be easily understandable by the respondents and the researcher needs to adapt the questions wording to the level of language of the respondents. Some scientists advise to choose the level of language of the least sophisticated of all the interviewees so that the questions are clearly understood by all the respondents. Some others think that this can lead to negative responses of the most sophisticated of the respondents. Thus, it is important to adopt a compromise between the least and the most sophisticated respondents.

The next step is to define different categories on which the researcher would like to have some input data. Following the definition of categories, the researcher prepares relevant questions in each of the categories outlined. The researcher must think about the potential unexpected issues and subjects rose during the interview by the respondent. The researcher must prepare some questions on subject that can be potentially arising during the interview even though the questions might eventually not be asked.
Once the questions are prepared, the researcher needs to define the order of the questions he would like to ask. The question sequencing is of major importance it may change significantly the results. If the interview is conducted according to a standardized interview, the researcher will respect the order he has defined. On the contrary, the order of the questions may change if conducted as a semistandardized interview; depending on the answers given by the respondent, the order may change in order to explore further a point raised spontaneously by the respondent.

Then, the interview stage in itself is conducted. It is probably the hardest stage. Indeed, the interviewer's role is not to sit and listen to the respondent talking. For Legard and his colleagues, the role of an interviewer is a role of facilitator; the interviewer encourages, facilitates the respondents to answer to the questions. Hence, the interviewer needs to have a really active role during the interview in order to manage the whole process. He must make sure that not only all the scheduled questions are covered within the time limitation of the interview but also that the subject are covered with the exploration, penetration and explanation expected. Legard advises to use an audio recorder so that the interviewer does not write during the interview but the researcher needs to have an explicit approval. By recording the interview, the interviewer can focus on the answers given by the respondents.
On the other hand, some people will not be cooperative during the process of the interview. Berg qualifies this type of attitude as evasion tactics. Evasion tactics occur when the respondents are uncomfortable with a question and do not want to answer to it. When faced to this situation, the interviewer should try to motivate the interviewee to answer and to express truly their feelings, point of view or experience. Indeed, the risk is that the respondent can lie in order to overcome the uncomfortable situation of the question.

But let us now briefly present the different interview steps.

- The arrival
  The first minutes are crucial to establish a good rapport with the interviewee. The interviewer makes the conversation avoiding the research topic. It is easier to establish a good rapport when the interview is a face-to-face interview rather than a phone interview.

- Presenting the research
  The second step is to introduce the research topic. The interviewer explains to the respondents why the interview is conducted and how can his answers help the researcher.

- Conducting the interview
  The interviewer begins with unessential questions (see section 0 for more details). The aim is to collect background information that can help to understand the answers given by the respondents.
  Then, the interviewer goes from a question to another as scheduled during the preparation. If a standardized interview is conducted, only the questions prepared will be asked. On the contrary, if a semistandardized interview is conducted, the interviewer reacts on the answers given by the respondent.
  The interviewer should not comment any of the answers given by the respondents. Indeed, this could lead the respondent to refrain his thoughts, feelings and point of view in the following questions.

- After the interview
  The interviewer thanks the interviewee for his time and answers to the questions that the interviewee can have regarding the research, how the data will be used, etc.

The final step is to analyze the data provided by the respondents during the interviews. The researcher needs to extract all the relevant information collected during the interviews.

3.1.3. Different types of questions

Different types of questions exist. This section aims at exploring the difference between the main types of questions.

- Essential Questions
  Essential questions aim at obtaining information about the central focus of the study. These questions can be asked altogether or asked separately throughout the whole interview.

- Extra Questions
  This type of questions is used in order to check the consistency and reliability of the answers of a respondent on a specific subject. Extra questions are in fact essential questions with a different wording.

- Throw-Away Questions
  Often used at the beginning of an interview, throw-away questions are unessential questions used to create a rapport between the interviewer and respondents. Throw-away questions can be placed at the middle of the interview for a change in focus or to 'cool out' the respondents when sensitive questions are asked. Although the answers given by the subjects are not essential, these questions are essential in the process of the interview as they create a rapport with the respondent and that they change the pace of an interview.

- Probing Questions
  Probing questions are a way to obtain additional details about answers previously made by the respondent. Their aim is to go deeper in the answers given by the respondents.

3.2. Polls

3.2.1. Definition

According to the ESOMAR and WAPOR organizations (European Society for Opinion and Market Research/ World Association for Public Opinion Research 2009), an opinion poll is "*a scientific and representative survey designed to measure the views of a specific group*".

3.2.2. The choice of samples

The key to have a good poll is to have a good sample. By good poll, the accuracy in representing as close as possible the opinion of a population is meant. A scientific poll involves paying careful attention to the choice of the sample. Indeed, in order to represent the best the group that the pollster wants to study, it is of major importance to have precise criteria concerning the sample. For instance, if in the group that the pollster wants to study, there are 20 % of people aged between 50 and 60, the sample should also include the same share of people in this age bracket. Hence, choosing randomly the people to include in the sample or having a sample self-selected does not give a proper representation of the population that is chosen for the study.

According to ESOMAR and WAPOR, it is better to have a good sample of a thousand respondents rather than a random sample of one million people. A historical example of a big sample giving poor results can be found in the ESOMAR and WAPOR guide (European Society for Opinion and Market Research/ World Association for Public Opinion Research 2009). In 1936, an American magazine sent ten million postcards to their readers to ask them who they would vote for the presidential election. They received 2.3 million answers. The answers showed that Franklin Roosevelt's opponents would be winning the election. The election did not show the same results. The problem was that they were too few readers from the working-class; hence this group of population was under-represented in the sample the magazine had although the sample was relatively big.

Two methods are used to have a sample that truly represents the population studied. The first method involves random selection of the people to include. The data base used in this method simply gives phone numbers. This method gives poor results as randomly choosing the respondents does not necessarily gives a sample truly representative of the studied population.

The second method is the quota method. In this case, the data base also includes some characteristics about the people in the data base (gender, age, social category etc.). Then, the pollster chooses the respondents to call in order to fulfill the different quotas. (European Society for Opinion and Market Research/ World Association for Public Opinion Research 2009).

Tending to a representative sample can sometimes be time-consuming and relatively expensive for polling organizations. Hence, polling companies generally use some tricks in order to change an unrepresentative sample into a representative one. For instance, if a representative sample should include 110 people of a certain demographic group and that the fieldwork only gives a sample with 100 people (of this same demographic group), the poll company will weigh the answers given by this group in order to represent the whole group in the study.

3.2.3. Margin of error

Although a poll tend to represent as precise as possible the opinion of a certain group, there is still a margin of error. With a sample of 1 000 people, the usual margin of error is 3 % and with 2 000 people, the margin is 2 %. (European Society for Opinion and Market Research/ World Association for Public Opinion Research 2009). Let us imagine a country in which 50 % of the people would have a view and 50 % would have the opposite view. With the margin of error, the survey can record between 47 and 53 % of opinion with a sample of 1 000 people, between 48 and 52 % with the sample of 2000 people.

3.2.4. Question wording and order

The way the questions are asked and the order also influence the final result of the poll. The ESOMAR and WAPOR organizations give a few examples in which the results can be biased due to the wording of the question:

"*There seem to be fewer policemen on the streets and a lot of people around here are concerned about rising crime, do you think that the police in this area are overstretched?*" In the case in point, the wording of the questions leads to biased answers as the question gives information about the surroundings of the respondent. Indeed, the respondent can be influenced to follow the "group" i.e. to follow what the majority of the people seems to think.

Also, the method used to conduct a poll can influence the results (European Society for Opinion and Market Research/ World Association for Public Opinion Research 2009). In other words, if the poll is conducted by face to face interviews or by phone can change the results; results can also be different if the respondent himself complete the answers (web-based poll or email poll) or if the respondent are asked by someone. If the questions are in relation to really personal subjects, the people might on purpose or not give different answers; they might feel judged if the poll is conducted with face to face interviews by the pollster. On the other hand, if the respondent himself complete the poll (by email, web or by post), the respondent might not feel this potential judgment and might give different answers. This can be linked to the theory of planned behavior. Heerwegh and Loosveldt used the theory of planned behavior to explain the intention to participate in a web-based poll (Heerwegh and Loosveldt 2009). However, the extrapolation of this theory can be used to explain the difference of answers depending on the way the poll was conducted. The theory of planned behavior postulates "*that a person's attitude towards a behavior is based upon a set of beliefs relating to the behavior*." "*Negative attributes or outcomes are assumed to contribute negatively to the attitude towards the behavior, leading to a decreased intention to perform that behavior. Positive attributes or outcomes are expected to contribute positively to the attitude towards the behavior and consequently positively affect the behavioral intention*."

In our case, if a behavior has negative attributes among society, then the respondent might express a negative point of view when asked about the behavior. The answer can be different if the questions are asked by a computer or by a real person; the theory of planned behavior can probably apply more to the answers given to a human rather than to a machine.

3.2.5. Cooperation

The cooperation of the people is rather important in a poll. Indeed, people give, with their answers, the input data for a survey. Without the cooperation of the people, conducting a poll is impossible.
However, polling organizations are experiencing more and more problem with the survey cooperation (Kim, et al. 2011).
The reasons are multiple: concerns of the respondents regarding confidentiality and pr.ivacy, rise of telemarketers, questions regarding the accuracy of polls, biases of polling organizations (Kim, et al. 2011).

3.2.6. Process

The first step is to choose the poll subject. There can be infinite subjects on whom polls can be conducted: politics, economics, TV, health, renewable energy, etc. Afterwards, the choice of the population which will be studied has to be made. There are many criteria that can be chosen for a sample: geographic location of the respondents, age, social category, etc. For instance, the population studied can range from a small neighborhood to a group of countries.

The second step is to choose the different questions that will be asked. As it was explained in section 3.2.4, the questions wording and orders can have an influence on the results. Hence, a close attention should be paid to the wording and orders of the questions; the aim is to have unbiased answers. To do so, the questions should be neutral and should not lead in a way or another answers given by the respondents.

The third step is the choice of the means of the poll. The poll can be conducted by phone, by face-to-face interviews, by email. This choice is also linked to the sample the poll organization wants to have. For instance, the poll can be conducted by phone if the poll organization has a data base of phone numbers with different characteristics regarding the phone holder (gender, age, location, work, etc.). In this case, it is possible to randomly choose the respondents to include in the survey and to have at the end a sample representing quite well the population to study.

The fourth step is to conduct the poll on itself. This step can be rather long, considering that the answer rate is relatively low, as explained in section 0.

The next step is to treat the data collected during the field work. The aim is to represent the studied population opinion with the sample who answered to the poll. As explained in section 3.2.2, if a certain group of population is underrepresented (or overrepresented), a mathematical treatment is applied to weigh the answers given by this group.

The last step is to represent the results of the poll. The results can be represented with charts or graphs. The results can also be analyzed but it is not mandatory; some poll organizations simply release poll results without any analysis.

4. Methodology

The methodology chapter aims at presenting the methodology used for both the interviews and the polls.

4.1. Interviews

4.1.1. Federations

The interviews are conducted using the semistandardized type. This type of interview is chosen because it gives the structure and the flexibility necessary to obtain the more information. The prepared list of questions gives a common structure to both interviews and also allows asking questions not prepared depending on the answers given by the interviewees. The aim of the different questions is to understand what are the motivations to fight against (or for) wind power. In other words, the objective is to grasp the motivations for their opinions.

1) Have you ever lived in a place next to a wind farm? If yes, how was your experience with it?

2) What are your thoughts about wind power?

3) Do you think wind turbines are dangerous?

4) Do you think wind turbines are noisy?

5) Do you think wind turbines can cause health problems?

6) Do you think wind turbines damage landscape and wildlife?

7) Do you think wind power can curtail carbon emissions?

8) What are for you the factors of success or failure of a wind farm project?

9) How would you judge the public participation during a process? Do you think the public participation could be improved?

10) Have you ever been involved as a public during a planning process (during the public consultation or during a presentation of the project by the developer)?

11) Do you think that the local community can benefit in some way from a wind farm (from taxes, tourism, jobs etc.)?

4.1.2. Neighbors

It is planned to interview two neighbors living in the vicinity of a wind farm. The semistandardized interview is used as well for the same reasons as for the federations.

1) What are your thoughts about wind power?

2) Do you think wind turbines are noisy?

3) Do you think wind turbines damage landscape and wildlife?

4) How would you judge the public participation during a process?

5) Were you involved in the public consultation of a wind farm?

6) How would you judge the public participation during a process? Do you think the public participation could be improved?

4.2. Polls

The poll is conducted in Lacaune-les-Bains, a small city of about 2 700 inhabitants (Wikipedia 2012) located in the south of France in a region with about 340 MW of installed wind power in April 2011 (Syndicat des Energies Renouvelables 2011).

Hence, the poll might give a good picture of the opinions of a population located nearby several wind farms. It was shown in the theory chapter that it is of major importance to choose a good sample in order to represent as closely as possible the opinion of the population scrutinized. Unfortunately, it was not possible to access to a data base of the people living in this region. Hence, it was not possible to have a repartition of the people (age, socioeconomic category etc.). These data bases are not publically released and it was not possible to have an access to them. Hence it is decided, instead of choosing a sample, to directly ask questions to people and also to ask who they were (job, age, etc.). Some of the people did not accept to give some personal information.

The following questions were asked (translated in French) to all the people who accept to answer to the poll:

1) Are you in favor of the development of renewable energy in France?

2) According to you, which renewable energy should be developed in priority in France?

3) According to you, who should contribute financially to the development of renewable energy?

4) Up to what percentage would you be willing to pay more to utilize electricity from renewable means?

5) Would you be willing to invest in renewable energy projects?

6) Do you own any equipment which allows you to use renewable energy for your own energy consumption?

7) Do you have a good, neutral or bad opinion of wind power?

8) Are you very, little or not at all in favor of the installation of wind turbines in France?

9) Do you think that wind power will be part of future energy mixes?

10) Do you think that wind power can curtail carbon emissions?

11) Do you think that wind turbines can be dangerous?

12) Do you think that wind turbines are noisy?

13) Up to what percentage would you be willing to pay more to utilize electricity from wind power?

14) Would you accept a wind farm nearby your house (less than 1km)?

15) Why would not you accept a wind farm nearby your house?

16) Would you be willing to invest in wind farm projects nearby your house? Do you think that investing in a wind farm would make you more accept wind farms?

The order of the question was not established randomly. Indeed, there is a kind of intellectual progress with the different questions. For instance, the first aims at knowing if the people are in favor of the development of renewable energies. Then, the natural question that comes is which kind of renewable they think should be development in priority in France.

5. Analysis

5.1. Interviews

5.1.1. Antiwind Federation: Vent de Colère

First, an antiwind federation called Fédération Environnement Durable (literally Sustainable Environment Federation) was contacted by email. In this email, I asked if I could have an interview with a spokesman. As I did not have an answer after a week, I decided to call them directly. The president of the federation, Jean-Louis Buttré answered to the phone call. I explained the purpose of the project and why it was important in this project to have their point of view on the question. Jean-Louis Buttré answered that he could not answer favorably to my request as he feared that I could be paid by the wind energy industry to get some key information about their fight. He then explained that they were fighting against the wind industry and that it was not possible for them to trust anybody. Indeed, any argument can potentially be used by the wind energy industry against them.

It was then decided to contact another antiwind federation, Vent de Colère. Vent de Colère (literally Wind of Anger) is a French federation which gathers about 800 antiwind associations in France. Most of these associations are local and were created in order to fight against a specific wind farm project. Vent de Colère provides tools for associations to fight against wind farm projects. For example, the federation gives to associations a document explaining when and how to stop a wind farm project. At each stage of the planning process it is explained how to slow down or stop the planning process. On their website, it is possible to find many articles on technical subjects (e.g. how a wind farm is erected), but also articles about the potential damage of wind farms (noise, flicker, damage to health, bats and birds). The website has different pictures and videos of wind farm catching fires.
Besides, one can find different articles from climate skeptics. For instance, there is an article with the following title: "Global warming: hoax and falsification" (traduced from French). The article was written by Bernard Beauzamy (Beauzamy 2006), a PhD holder from the famous Ecole Polytechnique. The following quotation is extracted from the article:
"*Wind are generated partly because of a temperature difference of the atmosphere (hence, by the thermal energy of the sun) and partly because of the rotation of the Earth. Use them to produce electricity cools down the Earth and slows down the rotation: this is not renewable*."

It was not possible to set a face to face interview so a phone interview with the president of the federation was conducted instead. At the very beginning of the conversation, Mr. Bruguier said that the interview should be very short. Then, it was proposed to call him later but the president said that he would be busy as the federation was waiting for the decision of justice concerning the offshore feed-in tariff that the federation had brought to court. Although a list of question was prepared, it was nearly impossible to ask them.

He first said that the situation was not so good lately. At the time of the interview, the result for the call for tenders for offshore wind farms was known. Moreover, the association had been to court in order to make cancel the feed-in tariff planed for the offshore wind farms. The association was waiting for the result that could come within a week.

Then he said that the major reason of their fight against wind power is that the environmental result is not so good. Indeed, the capacity factor of wind farms does not exceed 20 %. In other words, wind

farms are not producing 80 % of the time. But at the same time, the consumption should equal the production at any time. Hence, it is necessary to use other means of production which are most of the time thermal plants which are very polluting. More wind power obviously means more thermal plants.

On the other hand, wind farm operators are given green certificates. These certificates can be sold to polluting companies in order to improve their CO_2 emissions balance and decrease the CO_2 tax they pay (if they exceed the quote which was given to them). At the same time, in Germany, the construction of 30 coal power plants was granted. It will be possible to build these power plants thanks to the green certificates of the French wind farms. He considers that it is a shame in the first destination of tourism to damage the landscape so that polluting power plants can be built.

On the economic side, the result is not so bright as well. The CSPE has increased by 23 % over the last 4 years mainly due to the increased wind power installed capacity. The CSPE is the part paid by the consumers on their electricity to finance the feed-in tariff. Indeed, the feed-in tariff both for electricity produced from PV plants and wind farms are higher than the electricity price sold by EDF. This CSPE allows financing the difference between the feed-in tariff and the regular price of the electricity.
According to the Mr. Bruguier, the CSPE now represents 10 % of the high load price (06:30-22:30) and 14 % of the low load price (22:30-06:30). The target for 2020 is a total wind power installed capacity of 19 000 MW. There are currently 6 000 MW installed in France. The additional 13 000 MW will dramatically increase the CSPE (he thinks between 30 and 50 %). He cited the example of Germany where wind power represents a supplementary cost of between 110 and 120 € per year for each family.

At the end of the interview I asked him if there were any renewable energy that is supported by the association. He answered me that the association is in favor of all type of renewable energy except industrial wind power (but he is not against small wind power) and ground PV. They are especially in favor of micro hydro power.

5.1.2. Prowind Federation: Planète Eolienne

Benoit Praderie is the president of a prowind association named Planète Eolienne (literally Wind Power Planet). He used to be the managing director of the French subsidiary of the German-based company which develops and operates wind farms, ABO Wind. He is now the managing director of a company in the photovoltaic business.

Planète Eolienne is a federation gathering all the local associations promoting wind power. Their aim is to coordinate the action of the different associations, to provide general information about wind power. They claim on their website to fight against every misinformation on wind power.

It was not possible to conduct a face to face interview. Hence, a phone interview was conducted. The following paragraphs are the transcript of the interview.

What do you think about wind power?
He was rather surprised by this question. First he did not exactly what to answer. Then, I reformulated my question, explaining exactly what I was expecting as an answer. He told me that renewable energy was used since a very long time by mankind; for instance, the sun was used to dry meat. They were used as Men needed energy to do faster and better than before: for example, water was used to power wind mills. Hence, renewable energy are part of our history and will be part of our future.

Have you ever lived close to a wind farm?
Mr. Praderie lived an uncommon experience. He wanted to know what were experiencing the people living close to a wind farm. To do so, he rented a camping-car and lived in the middle of a wind farm for a week with his wife and two children. He did not find the wind turbines noisy, although he was living in a place with very thin "walls". His wife and children were not disturbed by the noise of the wind turbines as well.
He does not deny that wind turbines can be noisy under certain circumstances. Still, he did not experience any kind of disturbances due to the wind turbines.
He thinks that noise is a rather psychological factor: if someone wants to hear a noise, he will hear it.
He says that 70 % of the wind farms in Germany are owned by private investors; he claims that German people want to hear the noise of the wind turbines because it means that the wind turbines are producing and that money is coming.

Do you think that wind turbines can be dangerous?
He thinks that this question is a bit tricky. Indeed, by even asking the question, it implies that there can be a problem of danger with wind turbines. He thinks that there can be the same kind of answers if one is asked if electric pylons are dangerous.
Then he answered to the question in itself by asking a question: compared to what is it dangerous? There are some wind turbines that have fallen but there are also some electric masts which have fallen. Hence, wind turbines are not more dangerous than anything else.

Do you think that wind turbines damage the landscape?
He thinks that this question is extremely subjective. He answered by asking some questions: are hydro dams nice, are buildings nice, is a grain elevator pretty? He added that since the beginning of mankind, Men have added to the nature different types of construction that potentially can be considered to damage the landscape. But he thinks that those constructions are part of the evolution of man.

Then he gave a few figures: a wind turbine seen from 10 km measures 10 mm and a wind turbine seen from 20 km measures 20 mm.

Do you think that wind turbines can harm birds and bats?
Of course, it is not a good idea to put a wind farm in the middle of a migration corridor. Still, a wind farm was installed close to the Gibraltar Detroit. It was reported 1 bird killed for every three wind turbines per year in Tarifa wind farm. He considered that it is not a lot and he asked how many birds are killed by windows and highways. It is not because of some bird killed that highways are not built.

Do you think that the community can benefit from a wind farm?
Yes and no at the same time
Yes because, taxes coming from the wind farm are spread in the whole area around the wind farm.
No because people are not associated in the investment process as private investors. Hence, people do not benefit directly from wind farms except for the people who rent their land.

What do you think about the new legal framework named ICPE in France?
It is again a way to limit the development of wind power in France. The name of ICPE in itself (literally in English Facilities Categorized for the Protection of the Environment) supposes that the facility is dangerous like for instance refinery. He considers that wind turbines are not dangerous and would not need to be part of this legal framework. He also asked if hydro dams are also part of the ICPE framework.
He thinks that this new legal framework will add another two years to the development of projects.
Moreover, with this new framework wind turbines will be regularly inspected (every two years in principle) and at each inspection, the facility can be closed down by the inspector. Hence, it adds some juridical risk and because of it, the interest rate for the loan for the project will increase.
Then he asked why there are so many hurdles to wind power in France. He compares the situation in France to Texas. Indeed, in this conservative state, there are between five to ten times as much wind turbines as in France. He thinks that they are so many hurdles because of some conservative people who are against wind power but would not be bothered with installing oil wells in France.
He thinks that the goal of Denmark which is to have 50 % of renewable energy by 2050 is not a political goal but a goal of a good manager. Indeed, oil is expected to be more and more expensive and he thinks that it is necessary to be independent from fossil fuels.
For him it is important to take the problem upside down. Considering the variability of the production, how to recreate an energy balance.
He said that they are three types of wind in France: the one of the Channel, the one from the Atlantic Ocean and the one from the Mediterranean Sea. With 1000 MW of wind power installed, there is always at least 300 MW produced. Hence, he thinks that it is possible to utilize wind power for the base load. Moreover, he considers that nuclear power cannot be used to answer to the demand as the production can vary very slowly.
He also thinks that wind power costs around 1.5 M€/ MW compared to 4.5 M€/ MW for the latest nuclear power plant.

He advises to look where the people from antiwind power association come from. For instance, he said that the two leaders of the FED and Vent de Colère federation come from the nuclear and chemical industry (in reality, one was a managing VP of the pharmacologic industry and the other worked in the chemical industry).

He also wonders what are they ideal electrical mix. They are against wind power but are they in favor of nuclear power.

Do you think that wind power can curtail CO_2 emissions?
Of course! Compared to thermal plant, wind power has a far better CO_2 emissions balance.
Then I talked about intermittency of wind power. For him this word was created by antiwind in order to misinform the public. He thinks that the production is variable but not intermittent. Moreover, it is possible to forecast at least 48 hours before the production of a wind farm.

What are for you the factors of success or failure of a wind farm project?
For the failure of a project, it can be bad chance. For instance, if there is someone who has a vacation house and does not want a wind farm and that he knows some people who are the good spots.
For the success of a project, he thinks that we have a lot to learn from the Northern Europe with their community projects. Indeed when the public is a shareholder of a project, it will be easier for him to accept the project as he will have a financial interest in it.

Do you think that the public is enough associated during the planning process?
No because the opportunity to be in favor of a project is not given to the public because they cannot be associated economically to the project. He also added that he had sometimes been hesitating to give information to the public. In fact, he thinks that the more the public is informed on a project, the more information can raise concern in the public.

5.1.3. Interview of Thierry Blanc

Mr. Blanc lives in a valley in a small village in the south of France. The wind farm occupies one slope of the valley and he lives on the other side of the valley. He lives at about 1.5 km of Montjoyer and Rochefort wind farm which was commissioned in 2004.

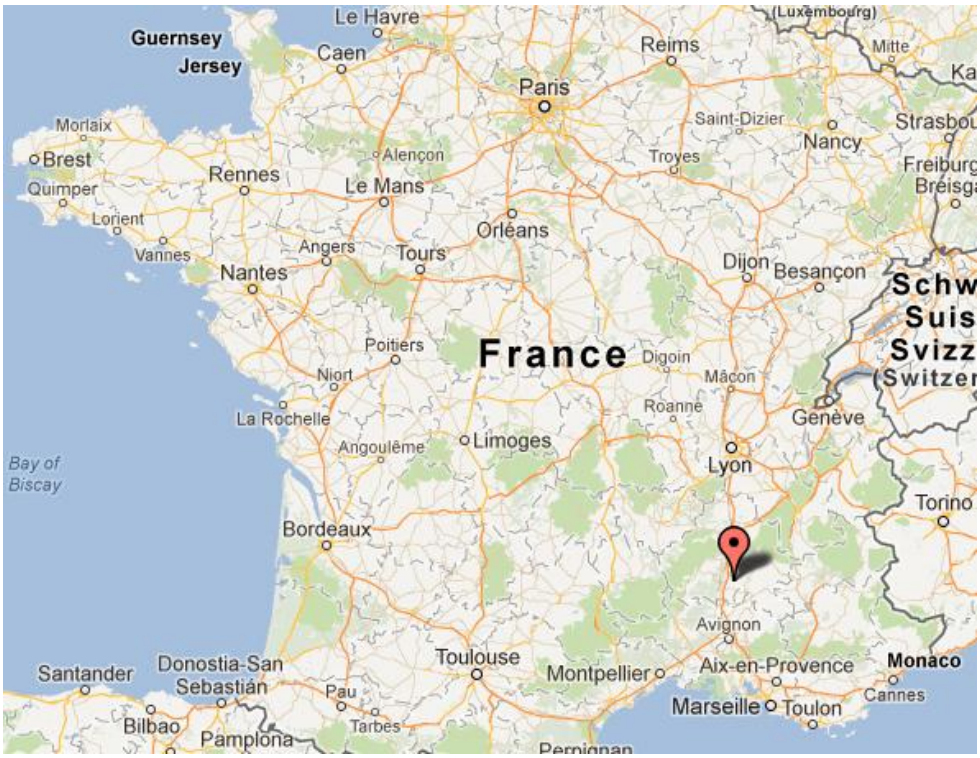

Figure 4: Location of Montjoyer (The Wind Power 2012)

There are 23 Jeumont J48 of 750 kW and the wind farm has a total capacity of 17 MW (The Wind Power 2012). Jeumont was a French manufacturer who sold almost 100 J48 (La Voix du Nord 2005). Jeumont stopped the production in 2005 and Rochefort was the last wind farm equipped with their aerogenerators (La Voix du Nord 2005). The turbines are installed on public lands so no rent is given to landowners.

Mr. Blanc has a neutral opinion about the aesthetics of a wind turbine but he thinks that as there are several touristic sites nearby the wind farm, the location is not very good. He considers that there are no problems to install wind turbines in industrial areas. Wind farms in industrial areas are not disturbing people as nobody sleeps in these industrial areas. He is not disturbed by the flashlights of the wind turbines, but one of his neighbors complains about it especially during the night.

He has never heard of reports of bird kills due to the wind farm.

Mr. Blanc hears as much the wind turbines as if he was at the bottom of them. He thinks that the particular topography of the valley facilitates the propagation of the sound. He hears more noise when there is a lot of wind but there is not so much difference because if there is less wind, the noise of the wind itself is more important. He thinks that if the wind farm had been erected on the plateau, 200 m further of their actual location, the turbines would have generated less noise. He cannot open the windows as there is too much noise outside. Besides, his sleep is disturbed due to the noise of the wind turbines.

Three wind turbines have caught fire. The number 11 has caught fire only a few days after the commissioning on December 22nd 2004 and the number 9 and 16 have caught fire on September 19th 2010 (Le Dauphiné 2010).

Figure 5: One of the wind turbines which caught fire (Vents Libres sur Nos Collines 2010)

The population was concerned when the first wind turbine caught fire and was completely destroyed. The tourism has decreased since the installation of the wind farm. Mr. Blanc was a bit happy when the wind farms were destroyed as there is less noise since. On the other hand, he regrets that the destroyed wind turbines have not been dismounted so far and that it is still possible to find some fragments of them nearby their original location. He has written to the mayor of the village on this issue but has never received any answers.

Mr. Blanc did not attend or take part to the public consultation organized during the planning phase. He was working at that time and had not so much time for it. During the public consultation, the developer ensured that the wind farm would not generate noise that would disturb the population. Besides, the developer presented the potential economic revenues for the municipality. Mr. Blanc told me that most of the town councilors were living on the other side of the valley and were not disturbed by the sight or the noise of the wind turbines. During the whole planning phase, the population did not have support from antiwind associations.
Mr. Blanc thinks that the local population was not enough associated during the planning phase and that there are too much top-down decisions. The economic criterion is the only characteristic that drives projects. The local population has been fooled during the planning phase. After the installation of the wind farm, a village in the same region has heavily fought against a wind farm project and they have won their fight. If another wind farm was to be plan in his neighboring area, he would oppose to it and would be involved in the public consultation.

He says that his house is now devaluated of 50 % due to the wind farm. He does not want to move in because he has invested a lot of money and time in his house (insulation, heat pumps and solar panels).

I asked him if he would prefer many small wind turbines or fewer bigger turbines. He answered that he would expect the bigger turbines to be even noisier so he would prefer many small wind turbines.

Mr. Blanc is in favor of the development of renewable energies. He is in particular in favor of the installation of wave power plants and current power plants. He thinks that PV is too expensive and that too much energy is utilize to manufacture the panels. He likes the idea of the cooperative projects where many people can invest in a wind farm; but he would not invest if he does not like the location of the wind farm. He is in favor of the development of offshore wind farms. He thinks that it does not damage the landscape and does not prevent people from sleeping. Mr. Blanc has himself invested in renewable energies. He is equipped with solar panels on his roof which provides heating and hot water. Besides, his house is correctly insulated and he has a heat pump (ground-air). He would be willing to pay between 10 and 20 % more on his electricity bill in order to utilize electricity produced from renewable means

He told me that he does not oppose to wind power but to the location of the wind farm in itself. He thinks that wind power is a good thing but only if it is installed at the right place. He does not want to be categorized as a Not In My Backyard people as he thinks that the wind farm should not be located in a neighboring village; instead, the wind farm should be located in an industrial area.
Besides, the electricity produced by wind farms is negligible. In fact he considers that there are many drawbacks linked to for a small benefit. Basically, the money used to finance the wind farm should have been used for another renewable energy project.

5.1.4. Interview of Joseph Simon

Joseph Simon lives next to Plouarzel wind farm (< 2 km). The Plouarzel wind farm is located in Brittany, next to the sea (1.5 km from the sea) in Plouarzel (3 500 inhabitants (INSEE 2011)).

Figure 6: Location of Plouarzel (The Wind Power 2012)

There are 9 aerogenerators (5 G47 of 660 kW and 4 G52 of 850 kW) commissioned in 2000 by La Compagnie du Vent (a subsidiary of GDF SUEZ, the second largest electricity company in France) (The Wind Power 2012). The total capacity of the wind farm is 6.7 MW (The Wind Power 2012).
The development started in 1992 but due to justice procedures, the wind farm started to produce in 2000.
The closest house is located at about 500 m of the wind farm.
At the time of the planning phase, Mr. Simon was the assistant of the mayor of the village of Plouarzel. He was also cultivating some crops on his lands and had some cows. He is now retired.

It is important to notice that in the 70's, the development phase of a nuclear power plant started. The nuclear power plant should have been built next to the village Mr. Simon lives in. The local population strongly opposed to the proposed power plant. In 1981, when a new president was elected, the project was called off.

Three public meeting were organized by the developer. In these public meetings, the developer presented its project and showed models. The great majority of the people living in Plouazrel did not oppose to the wind farm. Only a few people who were not living in the region, tried to convince the local population that it was not a good idea but they were not listened to nor followed. Mr. Simon thinks that antiwind people are ridiculous. He does not understand their fight which is for him against progress. Besides, he thinks that the people who are against wind farms were also against the proposed nuclear power plant. He told me that those people are against everything.

When the wind farm was commissioned, some inhabitants experienced problems with TV. La Compagnie du Vent financed the installation of satellite antenna on households where people had problems with TV.

During the planning phase, the project manager from La Compagnie du Vent (literally in English The Wind Company) explained the project. Mr. Simon was easily convinced mainly due to the financial benefits. Indeed, every year, Mr. Simon receives a paycheck from La Compagnie du Vent. He was paid 4 430 € for 3 aerogenerators and a parking lot installed on his lands. The rent is increasing every year of a few percent, in order to counterbalance the inflation. Each aerogenerator occupies about 200 m² of his lands. When the construction started, he had planted wheat on his lands. The company paid for the loss due to the construction of the wind farm.

Once the wind farm was built, people living in other regions, were a bit curious about the wind farm. Indeed, at that time, wind power was not very developed. Antiwind also came to see the wind farm. A lot of visitors still come during summer in order to visit the wind farm.

Mr. Simon does not find the wind farm noisy. He was a farmer and he was working in the lands on which the wind farm is installed and he has never felt disturbed by the noise. It did not bother his animals (mainly cows). Mr. Simon thinks that when it is very windy, you hear more the noise of the wind itself than the wind farm. It is when there is little wind that you hear the most the wind farm. During the night, if you really pay attention, that is if you really listen carefully you can hear the wind farm but it does not prevent him from sleeping. He thinks that if someone cannot sleep because of the noise, it is rather because this person has others problems. Mr. Simon says that a wind farm is less noisy than the motorcycles.

Mr. Simon is not disturbed by the flashlights installed on the top of the wind turbine. For him, it is not worse than the lights installed on transmission lines next to airports.

He has a neutral opinion about the aesthetics of a wind farm. He does not find it ugly or beautiful. He has never found any dead birds at the bottom of the wind turbines.

Overall, he is very happy with the wind farm. He receives some money every year and his lands are used for the common benefit. In other words, his lands are used to produce electricity consumed by everybody.

I asked him if he was concerned by the growing number of wind farms which are installed in his region (Brittany is the fifth region in France in terms of installed capacity with 354 wind turbines scattered in 71 wind farms and with a total capacity of 503 MW in 2011 (Syndicat des Energies Renouvelables 2011)). Besides, Mr. Simon is not against the proposed offshore wind farm that will be built in Brittany. On the other hand, he thinks that nuclear power is heavily criticized but he does not think that wind farms and PV plants can replace them.

5.2. Polls

The sample comprised 22 respondents. The gender, range of age and job can be found in Table 2.

Table 2: Characteristics of the respondents. NO= No Opinion

	M/W	Age	Job
1	W	30-40	Work in a shop
2	M	60-70	Retired
3	W	30-40	Teacher
4	M	60-70	Retired
5	M	50-60	Pharmacist
6	M	NO	NO
7	W	40-50	Waitress
8	M	30-40	Factory worker
9	W	20-30	Unemployed
10	W	50-60	NO
11	M	20-30	Student
12	W	60-70	Retired
13	W	50-60	Work in a shop
14	W	60-70	Retired
15	M	50-60	Farmer
16	M	NO	NO
17	W	NO	NO
18	W	40-50	Nurse
19	W	60-70	Retired
20	M	40-50	Work in a shop
21	M	30-40	Waiter
22	W	60-70	Retired

There are a little bit more female respondents than male (55 % compared to 45 %) as it can be seen on Table 3.

Table 3: Gender of the respondents

Gender	W	M
Number of respondents	12	10
Percentage	55 %	45 %

The 60-70 range of age represents the biggest part of the sample (27 %) as it can be seen on . On the contrary, the 20-30 range represents the smallest share of the sample (9 %). In between, the 30-40, 40-50 and 50-60 range are more or less the same (14 % and 18 %). It is also noticeable that 13 % of the respondents did not want to say in which range they were.

Table 4: Age of the respondents

Age	20-30	30-40	40-50	50-60	60-70	NO
Number of respondents	2	4	3	4	6	3
Percentage	9 %	18 %	14 %	18 %	27 %	14 %

The first question asked if people are in favor of renewable energies. The great majority of the people are in favor of renewable energies (91 %). Only 9 % of the people are not in favor of renewable energies as it can be seen in Table 5.

Table 5: Answers to the first question

Answer	Yes	No
Number of respondents	20	2
Percentage	91 %	9 %

The second question was a more opened question. It was asked which renewable energy should be developed in priority in France. The two respondents who answered "No" to the first question did not have any opinion. Another respondent did not have any opinion on this question. The majority of the people (55 % of the respondents) answered that photovoltaic should be developed in priority in France.

Table 6: Answers to the second question

Answer	Hydro	PV	Wind	No Opinion
Number of respondents	5	12	2	3
Percentage	23 %	55 %	9 %	14 %

It was asked as a third question who should contribute financially to the development of renewable energies. Almost 30 % (27 %) of the respondents did not have any opinion. 41 % of the people think that the State should contribute financially to the development of renewable energies. Only one respondent (i.e. 5 %) answered that consumers should pay for the development of renewable energies.

Table 7: Answers to the third question

Answer	Companies	Consumers	Nobody	State	No Opinion
Number of respondents	5	1	1	9	6
Percentage	23 %	5 %	5 %	41 %	27 %

Then, it was asked to the respondents up to what percentage they were willing to pay more in order to utilize electricity from renewable means. The average figure given by people was 1.69.

It was asked as a fifth question if people would be willing to invest in renewable energy projects (both individual and collective project). The majority of the respondents (73 %) would not invest in a renewable energy project.

Table 8: Answers to the fifth question

Answer	Yes	No
Number of respondents	6	16
Percentage	27 %	73 %

It was then asked if the respondents own any equipment which allows them to use renewable energy for their own consumption. Only one respondent own this kind of equipment (photovoltaic panels).

Table 9: Answers to the sixth question

Answer	Yes	No
Number of respondents	1	21
Percentage	5 %	95 %

Respondents were asked if they have a good, bad or neutral opinion about wind power. It is noticeable that 32 % of the respondents have a neutral opinion about wind power whereas 41 % have a good opinion.

Table 10: Answers to the seventh question

Answer	Good	Bad	Neutral
Number of respondents	9	5	7
Percentage	41 %	23 %	32 %

It was then asked to respondents if they are very, little or not at all in favor of the installation of wind turbines in France. 27 % of the respondents are very and not at all in favor of the installation of wind turbines and 45 % of the respondents are in little favor of it.

Table 11: Answers to the eighth question

Answer	Very	Not	Little
Number of respondents	6	6	10
Percentage	27 %	27 %	45 %

Respondents were asked if they think that wind power will be part of future energy mixes. The great majority of the respondents (91 %) thinks that wind power will be part of futures energy mixes.

Table 12: Answers to the ninth question

Answer	Yes	No
Number of respondents	20	2
Percentage	91 %	9 %

Respondents were asked if they think that wind power can curtail carbon emissions. Most the respondent think that wind power can curtail carbon emissions (77 %).

Table 13: Answers to the tenth question

Answer	Yes	No	No Opinion
Number of respondents	17	4	1
Percentage	77 %	18 %	5 %

Respondents were asked if they think that wind turbines can be dangerous. Only one respondent thinks that wind turbines are dangerous (5 %).

Table 14: Answers to the eleventh question

Answer	Yes	No
Number of respondents	1	21
Percentage	5 %	95 %

It was then asked to the respondents if they would accept a wind farm nearby their house. Most of them would not accept it (59 %).

Table 15: Answers to the twelfth question

Answer	Yes	No
Number of respondents	9	13
Percentage	41 %	59 %

It was then asked up to what percentage respondents would be willing to pay more their electricity in order to utilize electricity produced by wind turbines. All the figures given by the respondents were comprised between 0 and 8 %. In average, a figure of 0.82 % was given.

Table 16: Answers to the fourteenth question

Answer	Yes	No
Number of respondents	2	20
Percentage	9 %	91 %

It was then asked why people would not accept a wind farm nearby their house. 32 % of the people consider that it would be too noisy. 27 % would not like the sight of it and 23 % of the people think that it would because of both of it.

Table 17: Answers to the fifteenth question

Answer	Noise	Noise + Sight	Sight	X	No Opinion
Number of respondents	7	5	6	3	1
Percentage	32 %	23 %	27 %	14 %	5 %

It was finally asked if people would be willing to invest in a wind farm nearby their house. Most of the people would not want to invest in a wind farm (82 %).

Table 18: Answers to the sixteenth question

Answer	Yes	No
Number of respondents	4	18
Percentage	18 %	82 %

Some of the respondents told me during the poll that they are not against wind power but the problem is that they see more and more wind farms installed nearby their houses. Besides, some have the feeling that rural areas are sacrificed to power urban areas. Some wonder why the wind turbines are always installed in the countryside.

Some think that the public is not involved enough during the planning phase. Besides, they point out that it is in general too late when the public is involved to change some major parts of the project. Hence, some of the respondents think that the public consultation is totally pointless.

6. Discussion of the results

6.1. Fact Checking

This section aims at checking the different figures given both by the antiwind and prowind spokesman.

Mr. Praderie claims that the nuclear power plant which is currently being built in Flamanville will cost 4.5 M€/MW. In fact, the nuclear power plant is expected to cost 6 M€/MW (Baudet 2011).

Mr. Praderie stated that a wind turbine seen from 10 km measures 10 mm and a wind turbine seen from 20 km measures 20 mm. Obviously a wind turbine seen far away seems smaller than in real but it was not possible to check the figure given.

It was reported one bird killed for every three wind turbines per year for the Tarifa wind farm (located nearby Gibraltar Detroit). There are 90 wind turbines of 330 kW with a rotor diameter of 33 m at Tarifa (The Wind Power 2011). It was found in the literature that less than a bird is killed per turbine per year (Powlesland 2009). Janss (Janss 1998) gives the figure of 0.03 birds killed per year per turbine. Powlesland, in his papers gives a figure of 700 birds killed per year for the whole wind farm. The studies give different figures and Mr. Praderie probably used Janss as a source for this information.

There is always a third of the capacity running with three different wind regimes. According to the French Renewable Energy Syndicate, there are three different wind regimes but no information is given about the minimum energy produced at any time (Syndicat des Energies Renouvelables 2009).

Mr. Bruguier claims that the capacity factor of wind farms does not exceed 20 % and that 80 % of the time, wind farms are not producing. The second part of the argument is wrong. Indeed, the capacity factor is calculated by using the number of equivalent hours of production on one year. The number of equivalent hours represents the number of hours at which the wind farm would produce at a nominal power. But if the number of equivalent hours is 2 300, it does not mean that during the 6 460 other hours, the wind farm does not produce any kWh. Indeed, there is most of the time some wind even if the wind speed is below the nominal wind speed. Hence, the wind farm is producing some kWh most of the time even if it is not at the nominal power.
Besides, it was calculated a capacity factor of 22 % in 2010 according to the French Renewable Energy Syndicate (Syndicat des Energies Renouvelables 2011).

According to the Mr. Bruguier, the CSPE now represents 10 % of the high load price (06:30-22:30) and 14 % of the low load price (22:30-06:30). This statement is wrong. According to the Cour des Comptes (Cour des Comptes 2011), a public organism in charge of auditing the finance of different public fields, the CSPE cannot represent more than 7 % of the price (high load and low load) paid by the consumer.

He cites the example of Germany where wind power represents a supplementary cost of between 110 and 120 € per year for each family. The figure of 120 € was found in the literature (Lemaître 2011).

6.2. Interviews with federation (pro and antiwind)

The interviews gave a very different point of view, with a prowind and an antiwind federation. Mr. Praderie used to be the managing director of a wind farm developer, ABO Wind. He often was in opposition with Vent de Colère or FED on specific wind farm projects that his company was developing. Mr. Praderie (Planète Eolienne) and Mr. Buttré (FED) or Mr. Bruguier (Vent de Colère) were arguing during public debates for wind farms projects. Hence, both their interviews reveal the arguments that can be used to try to convince the public in a way or another during the planning phase.

The antiwind association points out the mirage of wind power as a cheap and environmental friendly energy. He notes that the consumer pays an increasing part on their electricity bill in order to finance the electricity produced by wind turbines. Besides, the capacity factor is rather low (20-25 %); hence, any additional wind power should be counterbalanced by an additional reserve capacity.

The arguments are completely different for the prowind federation. Prior to discussing the arguments presented, it is noticeable that Mr. Praderie, the president of the prowind federation lived a whole week in the middle of a wind farm with his family. Hence, Mr. Praderie has experienced (even briefly) how it is to live nearby a wind farm. Usually, wind power proponents claim that wind turbines are not noisy without having (for the most of them) living nearby a wind farm. Mr. Praderie has experienced for one week what could be the life of neighbors of wind farms. He did not experience any trouble for sleeping; neither did his family.

Mr. Praderie introduced a relative dimension in different potential drawbacks of wind power: damage to landscape, wildlife endanger, dangerousness of the turbine in itself. For instance, when asked whether wind farms could harm the wildlife, Mr. Praderie, instead of answering, asked if highways are dangerous for wildlife or if windows are dangerous for birds. These answers are rather interesting as the prowind federation did not introduce any relativity in their answers.

All in all, it is noticeable that both the opponent and the proponent of wind power only present the arguments or figures that help their argumentation. It seems that both the opponent and proponent voluntarily "hide" some issues in their argumentation. This issue is highly debatable as eventually, the public does not have a complete and comprehensive piece of information (if they only have the information from one side) and do not have all the elements to make their own point of view on the question. Moreover, it does not help a developer not to give all the elements to the public. Indeed, during the public consultation, an antiwind association can point out that the developer is voluntarily hiding some elements to the public. This may lead to a certain suspicion and eventually lead the public to be against the project.

On the other hand, both the anti and prowind did not show much respect to the party who supports a different position. Besides, both of the parties are not willing to make any kind of compromise. This is a major issue as an efficient and respectful communication is necessary during the planning phase.

6.3. Interviews with neighbors

Mr. Simon and Blanc do not have the same opinion about the wind farms located nearby their houses. Mr. Blanc is quite unhappy whereas Mr. Simon has an overall good experience about it. The main difference between Mr. Blanc and Mr. Simon is that Mr. Simon gets paid for the wind farm whereas Mr. Blanc has to bear the consequences of the wind farm without any financial compensation. Besides, the location of the wind farm is not the same. Mr. Blanc lives in a valley; the wind farm is installed on one slope of the valley while he lives on the other slope. The wind farm located nearby Mr. Simon's house is installed on a plateau. It seems that the major issue for Mr. Blanc is the noise. The particular topography may influence the propagation of the noise generated by the wind farm and renders quite noisy the wind farm although Mr. Blanc lives at about 1.5 km. On the other hand, Mr. Simon does not complain at all about the noise of the wind farm.

On the landscape issue, Mr. Simon does not think that the wind farm damages the landscape. Mr. Blanc thinks that turbines are not ugly but he does not think that they fit well in the region (which has many touristic sites). It is noticeable that Mr. Simon has a neutral opinion about the visual impact of wind farms.

It would have been interesting to have the opinion of two neighbors living nearby the same wind farm, one of them having an overall good experience about it and the other being unhappy about the wind farm.

In the region of Mr. Simon, a controversial nuclear power plant was planned 20-30 years ago; this may have influenced the population in a positive way. Indeed, there was almost no opposition to the project while in general wind farm projects are heavily fought by the local population. On the other hand, the particular location of the wind farm on a valley probably amplifies the noise emitted by the wind farm. Furthermore, the manufacturer of the turbines does not exist anymore and did not sell many wind turbines (almost 100) and three turbines caught fire. Hence, maybe the wind turbines did not have an advanced technology compared to others manufacturers (e.g. Vestas) and so the noise could have been an issue on these wind turbines.
All in all, the perception of a wind farm (noise and visual impact) seems a very particular matter that is influenced by many characteristics. It is difficult to establish general laws or trends explaining in a way or another perception of a wind farm.

6.4. Polls

Although the majority of the respondents (91 %) are in favor of the development of renewable energy, only 9 % of them think that wind power should be developed in priority. Solar energy (PV) is far the most supported energy amongst the respondents (55 %).
In fact, there is a gap between the opinion of the respondents regarding renewable energy and the actual renewable electricity mix. Indeed, the renewable electricity mix is composed in majority by hydro (82 %) and by wind power (11 %) (Syndicat des Energies Renouvelables 2011). Solar energy represents only 0.6 % of the renewable energy mix (Syndicat des Energies Renouvelables 2011). There can be a lack of knowledge about solar energy. Some of the people, when answering that solar energy should be developed in priority in France, told me that they were thinking about rooftop panels (and not ground PV plants). It is possible that some of the respondents do not know that photovoltaic panels are not necessarily installed on roofs. The number of respondents in favor of solar energy could possibly be lower if it was considered by the respondents that the majority of the installed capacity of PV energy comes from large PV plants with an output power of more than 500 kW (rooftops and ground plants) (Syndicat des Energies Renouvelables 2011).

The relatively high difference between the opinion of people about hydro power (23 % of the respondents think that this energy should be developed in priority in France) compared to the high share of hydro power in the renewable electricity mix of France probably comes from the low number of hydro dams which have been commissioned lately (Comité Français des Barrages et Réservoirs 2011) compared to the great body of wind farms and ground photovoltaic plants which have been commissioned lately (Syndicat des Energies Renouvelables 2011). Besides, the installed capacity of wind power and solar energy has been the subject of many articles and subjects in the media compared to hydro power (Jobert and Brugidou 2008).

Respondents answered later in the poll whether they have a good, bad or neutral opinion about wind power. 41 % of the respondents have a good opinion about wind power but only 9 % of them think that wind power should be developed in priority in France. Furthermore, 91 % of the people think that wind power will be part of the future energy mix of France.
Although the majority of the respondents (77 %) think that wind power can curtail carbon emissions and that wind power is not dangerous, 27 % of the respondents are for the installation of wind turbines in France and 27 % of the respondents are against the installation of wind turbines in France. Only 9 % of the people would be willing to accept a wind farm nearby their house (less than 1 km). It seems that wind turbines are perceived noisier if installed nearby the respondent's house. Indeed, 41 % of the respondents think that wind turbines are not noisy but 55 % of the respondents would not accept a wind farm nearby their house due to the expected noise. The public organism promoting the installation and use of renewable energies, ADEME, conducted a poll in 2010 about renewable energy (ADEME 2010). During this poll, there were three questions about wind power. The first asked if people accept the installation of wind turbines in France. It was then asked to the participants of the poll if they would be willing to accept the installation of wind turbines in their region. They finally asked to the participants if they would accept the installation of a wind farm (5 to 10 wind turbines) nearby their house (less than 1 km). The answers to the questions can be found in

Table 19: Results of the poll conducted by ADEME. Adapted from (ADEME 2010)

	For	Against	No Opinion
Installation of wind turbines in France	74 %	25 %	1 %
Installation of wind turbines in your region	70 %	30 %	0 %
Installation of a wind farm nearby your house	54 %	44 %	2 %

It is noticeable the 'for' share decreases while the category gets closer to the respondents' household. In the mean time, the percentage of respondents against the installation of wind turbines increases as the category gets closer to the respondents' household.

In fact, people accept wind power as a general idea but are not willing to see it as actual projects nearby their houses. This attitude is called the Not In My Back Yard syndrome (or NIMBY). Krohn and Damborg (Krohn and Damborg 1999) explain very precisely the NIMBY phenomena:
"*The basic theory is that people support wind energy on an abstract level but object to specific local projects because of the expected consequences concerning primarily noise and visual impact.*"

Another definition given by van der Horst (van der Horst 2007) presents a different approach to the concept: "*certain services are in principle considered as beneficial by the majority of the population, but that proposed facilities to provide these services are in practice often strongly opposed by local residents*".

The results from ADEME are in opposition with results from others studies conducted in the Netherlands (Wolsink 2000) and in Sweden (Ek 2005). In the two mentioned studies, the acceptability of wind farms is not related to the distance. Nonetheless, Wolsink (Wolsink 2005) bases his argumentation on the absence of link between the distance and the acceptance of wind farms:
"*This viewpoint [the NIMBY-ism] is completely unrealistic in its simplicity and, moreover, it is illegitimate because it attributes motives to people that can only be confirmed by investigation.*"
In the case in point, the conclusions of Wolsink are not entirely true as the ADEME's study clearly points out with a thorough and rigorous investigation that there is a link between the distance and the acceptability of wind farms. This result is maybe specific to France and cannot be extended to the Netherlands and Sweden. In other words, the NIMBY concept is maybe specific to some countries. In these countries, people tend to oppose wind power when it should become a reality in their vicinity. On the contrary, in some other countries (e.g. Sweden, the Netherlands) the NIMBY syndrome does not exist among the population.

The ADEME's poll was conducted in 2010, 2009 and 2008. The same questions as presented hereinafter were asked to respondents. Table 20 presents the evolution of the answers.

Table 20: Evolution of the 'Proponents' share. Adapted from (ADEME 2010)

	2010	2009	2008	Evolution 2008/2010
Installation of wind turbines in France	74 %	77 %	83 %	- 9 %
Installation of wind turbines in your region	70 %	72 %	76 %	- 6 %
Installation of a wind farm nearby your house	54 %	53 %	62 %	- 8 %

The results show that people are fewer and fewer in favor of the installation of wind turbines at a national, local or even nearby their household. At a national level there is a difference of almost 10 % between 2010 and 2008. It would be interesting to have the figures of 2011 and 2012 but ADEME did

not conduct any studies in 2011 and have not conducted any polls so far in 2012. These results raise an issue: why did the acceptability of wind power in France decrease of almost 9 % in France? In the mean time, the installed capacity has risen from 3 400 MW in 2008 to 5 600 MW in 2010 (as in Figure 7).

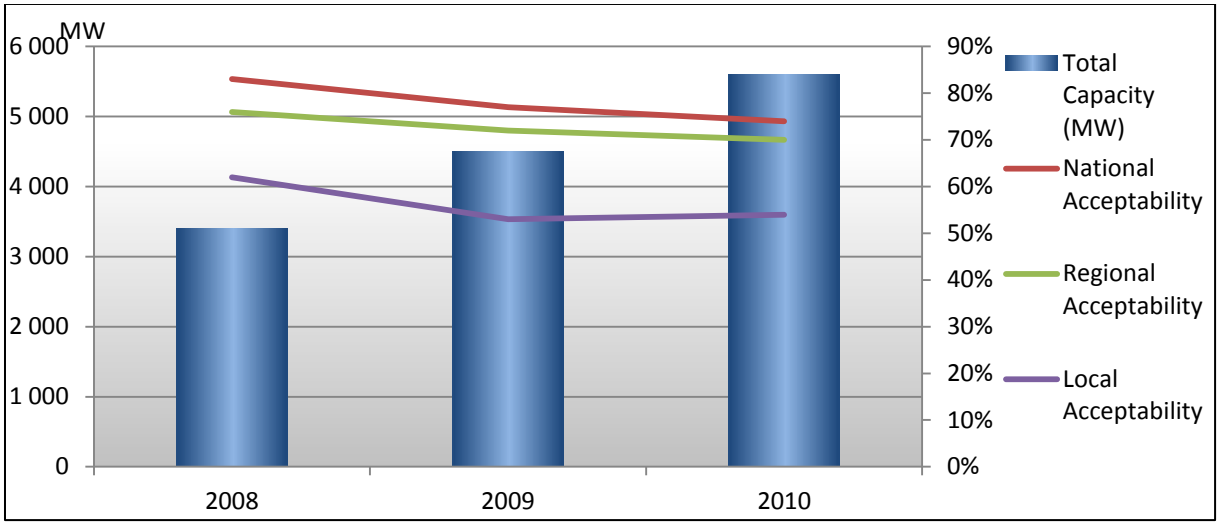

Figure 7: Comparison between the evolution of the wind power installed capacity and the acceptability of wind power in France.
Adapted from (ADEME 2010), (France Energie Eolienne 2011) & (Syndicat des énergies renouvelables 2011)

Is the decreasing acceptability of wind power in France linked to the increasing installed capacity of wind power in France? It is hard to establish a link of cause and effect between the two. In its study, ADEME does not explain the decreasing acceptability of wind power in France. In other countries, the same studies were conducted (i.e. the study of the impact of the distance on the acceptability of wind farms). In the USA, a study showed that the people living the closest to a wind farm were the ones who had the most negative perceptions about it (Swofford and Slattery 2010). In Denmark, no link was reported between negative perceptions and distance to the wind farm. The contrary was found: the people living the closest to a wind farm were the ones who had the more positive perceptions to it (Swofford and Slattery 2010). In the UK, no link was found but some people living very close to a wind farm expressed their pride in the wind farm (Devine-Wright 2005).

During the same time, the biggest wind turbine output power has risen since the early 80's as it can be seen in Figure 8. The major reason for producing wind turbines with an increased output power is the expected drop in the costs (WindFacts 2012).

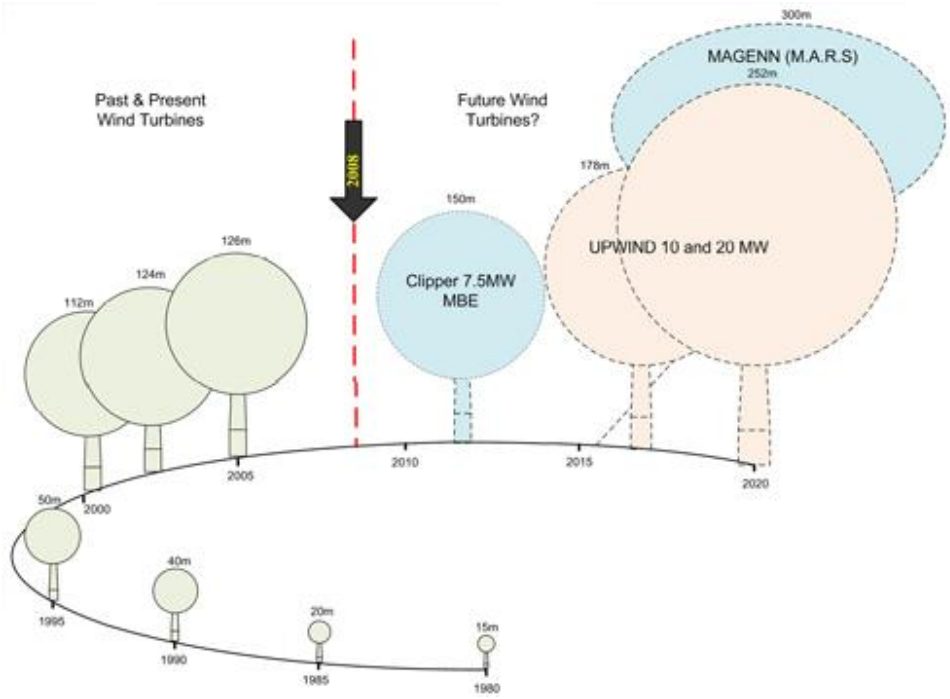

Figure 8: Growth of the output power of commercial wind turbines (WindFacts 2012)

Consequently, the output power of the wind turbines and the hub height has increased in France as it can be seen in Figure 9.

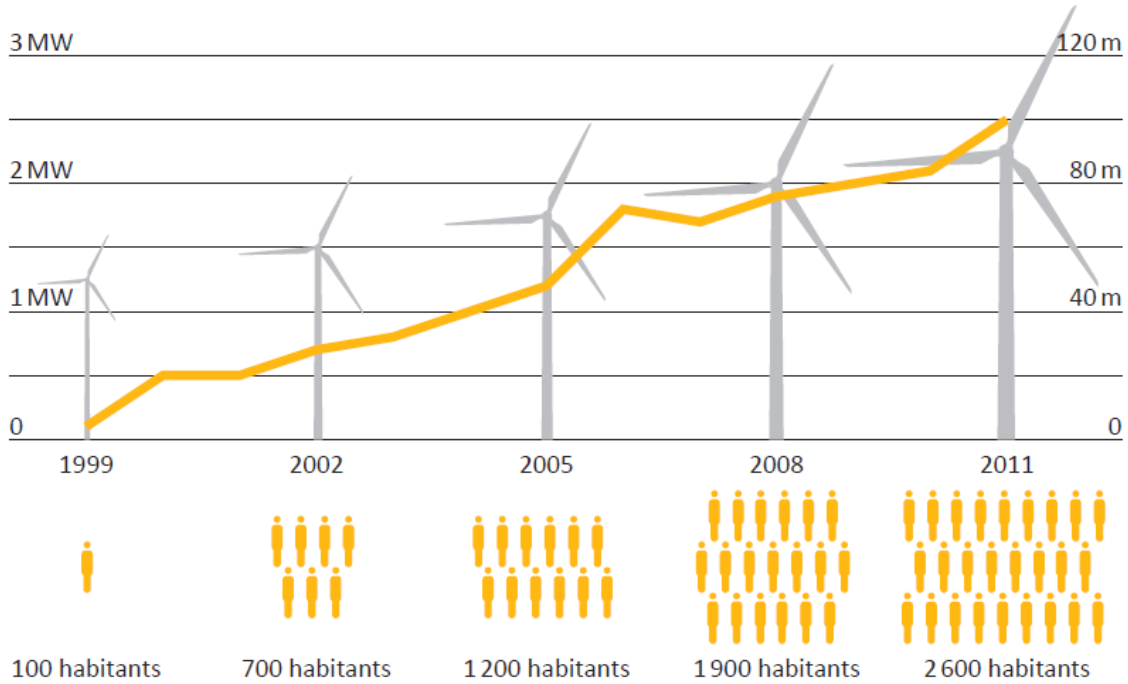

Figure 9: Evolution of the average output power and of the hub height of wind turbines in France (Syndicat des Energies Renouvelables 2011)
The figure also presents the number of inhabitants that can be powered by a single wind turbines

In fact, in almost 10 years, the average hub height has increased from 20 m to almost 100 m. The average hub height is expected to increase. Fo instance one of the biggest onshore wind turbine is the E126 (7.5 MW) manufactured by ENERCON; the hub height of the turbine is 135 m (ENERCON 2011) and the total height 198 m (Renewable Energy World 2009).

The augmenting size, hub height and output power may explain the increasing opposition of the local inhabitants to proposed wind farms. Indeed, the size of the turbine was one of the major arguments of the antiwind federation's president. Besides, for antiwind, the higher a wind turbine is, the more damage it does to the landscape.

At the same time, the literature is unclear about this issue. Devine-Wright (Devine-Wright 2005) reported consistent results showing that bigger wind farms are more negatively perceived than smaller wind farms. If was found in Ireland that (Sustainable Energy Ireland 2003) "*smaller numbers of large turbines were considered preferable to larger numbers of smaller turbine*". There is a tendency to develop large wind farms. Devine-Wright (Devine-Wright 2005) compares the development of large wind farms with the development of traditional centralized fossil fuels power plants. In the development of large fossil fuels plants, the priority was given on the economic and technical efficiency rather than on the involvement and the possible benefit to the surrounding community (Devine-Wright 2005). In the case of the development of wind farms, it is maybe this approach (centralized approach) that people are rejecting rather than the wind turbines in themselves.

It is noticeable in the poll conducted in Lacaune that the majority of the respondents think that people should not contribute financially to the development of renewable energy. Indeed, only 5 % of the respondents consider that consumers should financially contribute to the development of renewable energy. 68 % of the respondents consider that it should be the state, companies or even nobody who should contribute to the development of renewable energy. The answers to this question are confirmed by the answers given when asked up to what percentage would be willing to pay more the consumers to utilize electricity produced by renewable means. The average figure given by the respondents is 1.69 % which is low. The figure is even lower (0.82 %) if it is asked to the respondents up to what percentage they would be willing to pay more to utilize electricity produced by wind farms. Besides, the majority of the respondents (73 %) would not consider investing in renewable energy projects or in private equipment. Only one respondent has invested in renewable energy (he invested in photovoltaic panels installed on his roof).
In fact, respondents support the general idea of developing renewable energy in France but they are neither willing to pay more nor to invest directly in projects to achieve this goal.

The issue of the landscape
Even if some similarities can be found between a landscape surrounding transmission lines and a landscape surrounding wind farms, there are major differences. First of all, transmission lines cross extensive and continuous land areas (Soini, et al. 2011). Besides, transmission lines have been installed in the landscape since many years whereas wind farms are present in the landscape only since a couple of decades. Hence, the opposition to transmission lines is limited due to the established feature of them (Soini, et al. 2011).
On the one hand, a study conducted in Ireland reported that there is a better acceptance of wind farms in terms of visual impact than mobile phone masts, electricity pylons, and fossil fuel plants (Devine-Wright 2005).

On the other hand, the study conducted by Devine (Devine-Wright 2005) shows that there is the same level of acceptance of the public whatever the type of landscape is concerned. In other words, there is no preference of the public for wind farms in terms of landscape even though if it is reported that the public consider 'more beautiful' bogland landscapes compared to 'urban/industrial' landscapes.

The various results found during the interviews, the polls and a review of the literature on the subject show that public perception is a concept far more complicated than one can assume. A large number of factors can influence the perception of a wind farm. Devine-Wright has reported in Table 21 the main factors that can influence the public perception of wind farm.

Table 21: Factors affecting public perceptions of wind farms (Devine-Wright 2005)

Category	Aspect
Physical	Turbine Color
	Turbine size
	Turbine acoustics
	Farm size and shape
Contextual	Proximity to turbines
	Landscape context
Political and institutional	Energy policy support
	Political self-efficacy
	Institutional capacity
	Public participation and consultation
Socio-economic	Shareholding
Social and communicative	Social influence processes (media, social networks, trust)
Symbolic and ideological	Representations of wind turbines
Local	Place and identity processes
	Local or community benefit and control
	NIMBYism
Personal	Previous Experience and Knowledge

The perception of each of the factors presented hereinbefore probably varies from place to place, region to region, country to country. Indeed, for some of these factors, it was shown completely different results depending on the region where the study was conducted. For instance, the influence of the distance to a wind farm on perception of a wind farm (negative, neutral or positive perception) is different in Denmark or the United States. Maybe, the results of the same research conducted in different countries are influenced by specific cultural differences among people of different countries. Unfortunately, the literature on France is rather poor on the subject so it was not possible to carry a comprehensive review on the subject.

Nonetheless, Devine reported that the involvement of the community in wind farms can have a positive impact on the perception. The next section aims at presenting an example of a project where the local community owns some shares in a wind farm.

6.5. Cooperative wind farm: Le Haut des Ailes

6.5.1. Presentation of the wind farm

Le Haut des Ailes is a wind farm developed, constructed, and operated by Erelia, a subsidiary of GDF SUEZ. The wind farm is constituted of 22 wind turbines of 2 MW each (REpower MM82) (Erelia 2012). The 44 MW wind farm required an investment of 50 M€ (Erelia 2012). Le Haut des Ailes was commissioned in 2005.

Le Haut des Ailes was the first cooperative wind farm installed in France (Wind-Works 2006).

6.5.2. Investment and rents

The investment was made with a loan to a bank (80 % of the overall investment) and with equity (20 %) (Wind-Works 2006).

The FIDEME, a public organism financing sustainable projects (energy and environmental projects), provided 10 % of the total investment and the remaining 10 % were funded by local investors (99 investors). It was not possible to have more than 99 investors as the French regulation forbids having more than100 shareholders in a company (Droit des Sociétés 2011). Private investors financed between 1 000 to 30 000 € each (Wind-Works 2006).

The wind farm provides around 2 000 €/MW for each of the 40 landowners who rent their lands for the wind farm. Basically, 10 % of the gross revenue is given to the landowners (Wind-Works 2006). During the planning phase, all the different landowners were kept informed on how much all of them would earn for the rent of their lands. The information was not publically available, but freely accessible to the different landowners.

All in all, the project enables the redistribution of 200 000 € to the local community (taxes, rents, dividends) (Wind-Works 2006).

6.5.3. Development

The development only took 18 months which is really compared to the usual 3 years necessary to develop a project (ADEME 2005).
During the planning phase, the local community was closely involved. Erelia organized many different public meeting to present and explain the project to the local inhabitants. A committee gathering 40 people (neighbors, farmers, landowners, local politicians) was created. The aim was to collect the opinion of the people on different subjects (e.g. the route of the access roads) (Erelia 2012). Furthermore, Erelia established a charter of agreements presenting how the local communities would benefit from the project but also how the project could be sustainable (Wind-Works 2006).

An effective communication together with the involvement of the people in the projects enabled to easily develop the project. Indeed, during the planning phase, there was almost nobody opposing to the project although the project impacted 50 municipalities (Erelia 2012).

6.6. Improving the planning process

There seems to be a problem with the planning process and especially with the public consultation. Some of the respondents of the poll expressed the fact that they have the feeling that the public consultation is pointless as projects are already planned when the public consultation is conducted. This assertion is supported by Nadaï (Nadaï 2007) which identified the planning process as too closed to provide room for open participation: "*the question remains open whether or not the new policy scheme might provide the right balance between territorial planning and room for open participation"*. Even the EWEA, a prowind organism, recommends to "*improving the involvement of the local community and the NGOs in the approval process*" (EWEA 2010). On the other hand, some authors such as Jobert and his colleagues (Jobert, Laborgne and Mimler 2007) identified as a major criterion the quality of communication during the planning process. A poor communication between the population and the developer leads to more opposition of the public to the project.

Hence, the first way to improve the planning process is to improve the communication. A good communication clearly facilitates the social acceptance of the project.

On the other hand, as it can be seen on Figure 2, the public is consulted during the administrative process, i.e. during the 4th step; basically the public is consulted after the feasibility studies and design studies. It is often too late to take into account the issues raised during the public consultation. The exact location of the turbines and all the expected characteristics of the project (e.g. turbine type, hub height) are often already decided before the public consultation. Besides, the construction permit is often requested and obtained before the public consultation. Only minor changes can be made without requesting new permits (e.g. construction permit request).

Maybe the public should be consulted before, during the pre-feasibility studies. By associating the public early in the planning process, it would allow taking into account the concerns the public might raise during it. It would be easier for the public to listen to the information given by the developer as the project would not be already planned. In both cases, it would be better to associate the public earlier in the process. If the project is accepted by the population, it would ease the planning phase as the public would be informed early in the process and would less oppose to it. If the project is not accepted by the local population, the developer would maybe not go through the feasibility studies and invest a significant amount of time and money in the project. Furthermore, costly trials could be avoided. Moreover, if the public consultation was conducted well before in the planning process, it could improve communication between developers and local population as the project would not have involved investing a significant amount of money (as the project would not be at all planned). This assumption is supported by one issue raised by Mr. Blanc during the interview. He had the feeling that the local population was not enough associated during the planning phase and that there are too much top-down decisions. By associating the local population from the early developments of a project, there is the opportunity to really involve the local community and to take into account the concerns they may raise during public meetings. Furthermore, the local population would probably more feel that the decision is made with a bottom-up approach as they would have been associated from the early developments.

The abovementioned elements combined with the literature can lead to outlining the key factors of success and failure of a project. This will be done in the next section.

6.7. Factors of success or failure of a project

The table hereinafter summarizes the different factors of success or failure of a project reviewed in the literature by Jobert and his colleagues.

Table 22: Factors of success or failure of a project. Adapted from (Jobert, Laborgne and Mimler 2007) & (Aitken, Wind power and community benefits: Challenges and opportunities 2010)

Category	Criterion	Question
Site	Geography, visual impact	How does the wind park fit into the landscape? How visible is it to the local inhabitants? Does this aspect come up in the local discussion process, and if so, how?
	Former use and perception of the territory	Was the site used by the local population? For which activities? What impact will the wind park have on those activities?
	Ownership and territory	Communal or private
	Local Economy	Role of tourism, economic situation, possible or presumed impacts
Project Management	Local integration of the developers	Are the developers from outside or inside the region? Do they have contacts there? What type of developers are they?
	Information, participation	When and how are the public informed of and integrated into the planning?
	Trust	Can the developer create trust during the planning phase with the local community?
	Fairness	Is the planning process fair?
	Creation of a network of support	Can the developer create a network of local actors in support of the project, and if so, how?
	Ownership of the park, financial participation	Is financial participation offered to the local population? Does the commune own the park of part of it?

Both the interviews and the polls outlined additional criteria presented in Table 23.

Table 23: Factors of success or failure of a project identified during the polls and the interviews

Category	Criterion	Question
Site	Former facilities planned in the region	Was there any facilities (power plant, polluting industry) previously planned in the region?
	Geography	Are there many wind farms already located around the proposed wind farms?
	Tourism	Does the region have many touristic sites? Is there any historical heritage in the region?
Project Management	Involvement of associations (pro or anti wind)	Does a pro or anti wind participate during the planning phase?

The first criterion (i.e. former facilities planned in the region) was raised by Mr. Simon. In the region, a controversial nuclear power plant was planned and finally cancelled. This may have influenced consequently the local population in favor of the wind farm. More generally, a previous project of power plants (thermal, nuclear) can influence a project in a favorable way; a previous project of wind farms can influence in disfavor of the proposed wind farm if the planning process does not involve enough the population or if the local population experienced some problems during the operation of

the wind farm (e.g. the proposed wind farm after Montjoyer experienced some noise and fire problems as explained p. 33).

The numbers of wind farm can affect the perception of wind farms and wind power. This was expressed during the poll conducted in Lacaune. Some inhabitants raised the issue that they were seeing more and more wind turbines in their region and that they had the feeling that they would be 'invaded' by them as more wind farms are planned and built.

Concerning tourism, Mr. Blanc expressed the fact that as he lives in a touristic region with a historical heritage, it is not a good idea to install wind turbines.

Finally, if a pro or anti wind association participate in the public consultation or during the planning phase, it can influence in a way or another the planning phase. For instance, Vent de Colère and Fédération Environnement Durable provide powerful tools to local antiwind associations to fight proposed wind farms at each of the stages of the planning process. They explain on their website how to slow down or stop the planning process at each stage of the planning process. They also take directly part in the planning process by informing the public with public meetings they organize.

7. Limitations

The main limit of the project is generated by the relatively low accuracy of the poll. The low accuracy comes from a sample which is not chosen properly. In this study, the sample is chosen randomly by asking to people in the street to answer to the poll. Hence, the sample chosen does not represent faithfully the population studied (i.e. the population of Lacaune-les-Bains). A proper sample would have involved having access to a general data base of the population. This data base is not freely accessible to the public.
Nevertheless, the use of the studies conducted by the ADEME and the use of literature counterbalance the low accuracy of the poll.

On the other hand, it was not possible to have a complete conversation with the antiwind federation. Hence, it was not possible to understand thoroughly their motivation and arguments to fight against wind power.

8. Conclusion

This study aimed at outlining the factors of success or failure of wind farm projects in France. The work focused on the factors that may influence the social acceptance of a project. The study was undertaken by the use of interviews with prowind and antiwind federation, interviews with neighbors of wind farms but also with a poll conducted in a city surrounded by many wind farms.

The results showed that the respondents are less in favor of wind power than the general population of France. Besides, the population has a tendency to be in favor of wind power but the acceptance has decreased since 2008. The dropping acceptance might be explained by the fact that during the same time the installed capacity has risen of 60 %. Finally, the acceptance decreases as the wind farm gets closer to people's house. In other words, the acceptance decreases as proposed wind farms gets closer to people's household.

In addition, the interviews conducted with the federations and the neighbors have given some valuable output. Some interviewees and respondents of the poll consider that the public is not involved enough during the planning process. They also think that the public consultation is pointless as projects are already planned when the public consultation is conducted. Hence, the planning process could be improved in order to associate the local population from the early beginnings of the planning process. The public could play a more active role during the planning process while the developer could avoid investing a significant amount of money (for the development) for nothing and could avoid costly trials.

All in all, the public acceptance seems a complex subject on which it is rather difficult to establish general laws. Each project is in itself unique and different factors can lead to the success or failure of the planning process. It was found in the literature different factors of success or failure for the outcome of a project. The interviews and polls outlined additional factors such as geography (if the wind farm is surrounded by many wind farms), involvement of associations in the planning process (did pro or antiwind associations take part in the planning process), former facilities (were there any industrial facilities planned in the region during the past). All the above-mentioned factors can influence in a way or another the outcome of the planning process.

The study only focused on onshore wind power. 3 000 MW are expected to be built on the French coast by 2020 (Sun & Wind Energy 2012). Offshore wind farms represent a new challenge both on the technical and planning aspect. What will be the planning process like and offshore wind farms are they going to be accepted by the local populations concerned by the offshore wind farms?

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