CROWDFUNDING WIND FARMS IN CHAMPAGNE BERRICHONNE: TOWARDS ACCEPTABILITY OF FACILITIES?

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Abstract

The challenges posed energy are at the heart of contemporary energy policies. Energy efficiency and reducing greenhouse gases are causing new directives essential in a Europe dominated by oil and, to varying degrees, by nuclear. In this context, rural territories are at the heart of this issue to move towards the energy transition. The changes in rural areas also crystallize societal tensions in terms of acceptability. The installation of wind farms generates tensions and even conflicts of use. It is in this context that new forms of wind energy development are realized, including Champagne Berrichonne. Citizens are associated with development through the establishment of a participatory financing of wind farms, which implies the establishment of new forms of governance and management of wind farms.

Introduction

Energy issues are at the *heart* of contemporary energy policies. Energy efficiency and the reduction of greenhouse gases are at the origin of new indispensable directives in a Europe dominated by hydrocarbons and, to varying degrees, by nuclear power. Wind energy is at the *heart* of these environmental and energy policies. It is now the greenest energy installed in the country (if hydroelectricity is not taken into account), either in terms of power generation and installed capacity. The installed capacity in January 2016 was 10,308 MW (source: France Energie Eolienne). France has set a target of achieving an installed wind power of 19,000 MW by 2020.
In this context, rural territories are at the *heart* of this problem to move towards energy transition. For twenty years now, there has been a functional change in these spaces, with the emergence of new energy functions thanks notably to the development of wind energy. This functional change, starting with wind, also guarantees the countryside a part of their development, thanks to the economic spin-offs for local authorities.

Changes in rural areas also crystallize societal tensions in terms of acceptability. Despite the economic benefits achieved, in spite of the environmental challenges generally accepted by all, the installation of wind farms generates tensions and even conflicts of use at all levels: both with decision-making bodies and citizens whose environmental concerns are reflected in the facts by a rejection of these facilities. It is in this context that new forms of wind development take shape, notably in Champagne Berrichonne (north of the department of Indre, France). Citizens are involved in development through the implementation of participatory financing for wind farms and through information provided throughout development. The objective of the study is to understand how these forms of public participation (information meetings, participatory financing) can contribute to the acceptability of wind energy in Champagne Berrichonne. The study will first focus on the definition of the social acceptability of wind energy, in order to understand what are the ins and outs. The wind turbine in Champagne Berrichonne will then be presented, with an analysis of the opposition to the projects

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carried out, before studying an atypical project that has been accepted by the population (Saint-Georges-sur-Arnon) where the majority of wind developments are usually rejected. This case study will put forward one of the solutions to make acceptable the wind projects with the association of the citizens in the phases of development.

1. Social acceptability of wind turbines : factors and definition

Wind development is one of the main avenues in France for a successful energy transition. The sector benefits from a relatively favorable administrative framework, with a simplification of the projects and the purchase prices of the high electricity produced, in order to enable actors of wind energy to develop it. For example, the State has set a target of 19,000 MW of land-based wind power to be developed by 2020. Nevertheless, despite favorable national and regional political will, wind development faces local tensions and conflicts related to the social acceptability of wind power. These tensions represent a brake on the development objectives set by the State, as projects are longer and more difficult to carry out. In March 2017, France had an installed wind power capacity of 12,141 MW (Source: Renewable Energies Union) and the target of 19,000 MW for 2020 would be difficult to achieve. This is why it is important to look at the acceptability of wind energy, in order to understand what are the obstacles to the development of this energy and which solutions are needed. It is necessary to first define the local acceptability of wind energy before considering wind energy development and its brakes in the area studied (Champagne Berrichonne).

A bibliographic work was carried out in order to define the social acceptability of wind power. In a 2009 paper, Fortin et al. (Wolsink, Devine Wright, Jobert, Loring, Nadaï, Van der Horst). These factors are shown in the table below:

Dimensions	Factors
Wind power	Initial Attitude
	Institutional frame
Project	Impacts
	Spin off
	Origin and local control
Decisional process	Legitimacy of the process
	Equity of the decision
Characteristic of social environment	Building institutional capital

Table 1: Factors making up the acceptability of wind power. Source : Côté G. (al), 2009.

Initially, there is a discrepancy between the initial perception of the habitants on wind power in general and the perception at the local level when a project is developed near the habitants. This discrepancy between the general and the local is regularly repeated in different studies. A survey carried out by ADEME in 2010 tends to confirm this hypothesis. 74% of the panel questioned favored the installation of wind turbines in France, indicating a relatively good acceptability of wind energy in general. On the other hand, this rate is only 54% for the installation of wind turbines (between 5 and 10 wind

turbines) within one kilometer of the respondents' place of residence. Locally, acceptability is less strong. This survey concerns a hypothetical installation of wind turbines locally, and not on "real" projects.
Nevertheless, it is important to indicate that the mentalities seem to evolve with the appearance of a local development of the wind energy and the possibility for the citizens concerned to have wind turbines near their home. This discrepancy between the initial perception of the wind energy by the habitants and the perception at the local level was also highlighted in the works of Nadaï and Labussière (2010). This gap is one of three major issues put forward by the authors which will determine the acceptability of wind energy. Wind energy tends to be "approved in principle, as an environmental policy, wind power can be challenged in its project phase, at the level of a landscape policy". In general, the population will be favorable to the installation of wind turbine but not in its territory. There is also a need to consider the scale of acceptance of wind energy: the relationship to this technology will be different between a very large scale for a wind turbine installed 500 meters from a dwelling (minimum distance defined by the law between a dwelling and a wind turbine in France), on a large and medium scale, in the territory of the population (which may be larger or smaller than administrative territories, such as municipalities), and on a small scale. Wind farm is located in another region. Scale plays are important to take into account. This energy modifies landscapes on a large scale because of the size of wind turbines, which in some cases reach 180 meters in height and impacts on local biodiversity (even if impacts on the local environment remain measured). Conversely, on a small scale, the interest of wind turbines will be perceived in a different way since the negative impacts are not felt, it is the environmental benefits of wind power that will be perceived.

The institutional framework (or rather the absence of an institutional framework) is also a factor that can explain the unacceptability of wind projects (Jobert, 2006). One of the remarks made on wind power is that its development is considered as anarchic, especially by opponents. The French wind energy development is framed by the regional wind patterns (SRE). The SRE is an annex to the Regional Climate Air Energy Plan (SRCAE), introduced in 2010 by the Grenelle II law. It is the only scheme currently in place to set up zones for French regions to be respected by development companies or other actors (citizens, inter-municipalities, etc.) in order to benefit from the purchase price, as well as the potentiality of reception of these spaces in terms of power (MW). Thus, once the project is located in a favorable zone of the SRE, each actor can develop the type of project desired on a territory (number of wind turbines, size, shape, etc.), with little concern for the level of wind development on the neighboring municipalities, which can lead to wind turbines. This is particularly the case in Champagne Berrichonne, where many wind farms are in operation and where development dynamics are strong, which leads to a form of wind anarchism in the territory insofar as each project is developed independently from the others. In addition, SREs are sometimes sued by anti-wind energy associations because of the lack of environmental assessments. For example, the SRCAE (and therefore the SRE) of Auvergne and Pays-de-la-Loire were cancelled by the courts in 2016 (March and May).

Moreover, the purchase prices fixed by the State are also criticized. Currently, EDF is obliged to purchase the electricity produced by the wind farms to the amount of 8.2-euro cents for one KW (for the parks located in the favorable zones of the SREs). This tariff is deemed too high by a number of people (notably the wind power opposition

associations), as well as by the Energy Regulatory Commission (CRE) in a 2014 report on profitability and Cost of renewables. The CRE states that the profitability of certain wind farms is too high, and recommends to "adapt the duration of support to the lifetime of wind farms on land". This excessive profitability is pointed out by the opponents in particular, which indicate that wind development is first economic before being ecological in the design of projects by companies, and that the habitants pay the extra costs via the CSPE. It should be noted, however, that all wind farms don't have an excessive profitability, and that a high purchase price has facilitated the development of the sector according to the State.

Potential impacts perceived by the population are also a factor of acceptability. Wolsink stressed that the potential impacts of wind turbines on the physical and social environment can lead to a change in the opinion of the habitants, who become opposed to the projects. These impacts were taken up by Fortin et al. (2009), and are grouped into three main categories: impacts on the landscape (including the type of project, large or small), economic spin-offs (whether for the territory or for the habitants) and origin and local control of the project. For the latter category, Devine Wright pointed out that projects were all the more accepted as the local population was financially involved. The work of Gross (2007) shows that when the project is carried out without informing the public or the participation of the habitants is not realized or carried out inadequately, the acceptability of the projects tends to be low or non-existent. This result is confirmed by Loring (2006), which shows that public participation in decision-making "is seen as a way to address the concerns of residents and reduce conflict". It appears that significant public participation is a means of making projects acceptable. Nevertheless, according to Fortin et al. (2009), "participatory schemes can influence these interactions and the perception of stakeholders, but they do not determine it".

Loring (2006) argued that when wind-neutral players are structured in a network, such as associates, there is less acceptability for a wind energy project, as opposed to a stable network supporting a project, acceptability is not necessarily greater (at least the project is not more likely to succeed).

These elements are taken into account in the accepted definition of social acceptability, which was formulated by Fortin, Fournis and Beaudry in a study of 2013: "social acceptability is defined as a process of political evaluation, a project that interacts with a number of actors involved at different scales and from which are gradually constructed institutional arrangements and rules recognized as legitimate because they are coherent with the vision of the territory and the development model privileged by the actors concerned." The authors have taken up the factors that make up the social acceptability of wind power, to which they added the concept of legitimacy in decision-making. The rest of the study will rely on this definition and the factors that compose it to deal with the acceptability of wind energy in a French rural territory, Champagne Berrichonne.

2. Wind power in Champagne Berrichonne : an important objection on projects by the population

2.1. Champagne Berrichonne, territorial and landscape context

The Champagne Berrichonne is a natural region located in the Centre Val-de-Loire region. This area is mainly rural, the largest town being Issoudun (12,000 habitants). A part of this territory is studied within the framework of research, it is an administrative level, the community of communes of Pays d'Issoudun, which comprises 24 communes distributed between the departments of Indre (21 communes) and Cher (3 communes). The territory is mainly marked at the landscape level by agriculture. Cereal farming is one of the most pronounced agricultural activities in this area, which has shaped the landscape, which is typical of an open field. Only four communes of the EPCI have a different technical and economic orientation from cereal farming, with the practice of polyculture and poly-breeding (Reuilly, Reboursin, Guilly and Chezal-Benoît). Agricultural activity concerns only a few assets (1.8%), although this is structuring within the territory, especially at the landscape and historical level. This functional perception of the landscape is reinforced by a weak presence of other types of activities in the local economic fabric. Only "base" activities (banks, small shops) are present. The population of the community of communes tend to migrate towards the poles like Issoudun, Châteauroux and Bourges, which concentrate economic activities.
The community of communes of Pays d'Issoudun is essentially a rural space that has experienced a demographic crisis, with an aging population. Agriculture also experienced a crisis with declining assets and farms. This space is typical of the fragile (French ?) countryside and is quite affected by the abondonment of agricultural land.
Nevertheless, in recent years, Champagne Berrichonne has undergone a functional transformation of its spaces, with a new economic activity that has shaped the landscape: the development of renewable energies, notably with wind energy and solar photovoltaic. Since 2009, the landscape has evolved with the installation of the first wind turbines in the territory. This wind development has continued quite significantly in northern Champagne Berrichonne: nowadays a true agroenergy landscape is visible. This landscape change is reinforced by the appearance of solar panels, whether on certain roofs or in the field of solar panels installed in Issoudun, and which is close to the wind turbines of Saint-Georges-sur-Arnon.

Figure 1 : Photos n ° 1 and 2: Agroenergy landscape in Champagne-Berrichonne (Saint-Georges-sur-Arnon and Issoudun). (Photo : Romain Garcia, 2016)

The two photos above show the presence of this agro-energetic landscape, marked by the presence of two types of renewable energy: wind energy, here in Saint-Georges-sur-Arnon, which gives a verticality to a relatively flat landscape, and solar photovoltaic, in Issoudun. The two "parks", wind and solar, are close since they are separated only from a departmental road. The landscape integration of wind turbines is an important issue. Indeed, in an openfield landscape like the one in Champagne Berrichonne, wind turbines tend to be visible. This visibility in the landscape is an element that is likely to increase the opposition, since in this type of landscape a large number of villages can be impacted by this visual and thus lead to a multiplication of people who can oppose.
The wind development started in the early 2000s was reflected in 2009 with the appearance of the first wind turbines in Champagne Berrichonne. Since then, this development has intensified, the parks are numerous, as is the opposition.

2.2. A major wind energy densification creating opposition

All the communes of the studied area (north of Champagne Berrichonne) are located in a favorable zone of the Regional Wind Energy Plan (SRE). These favorable zones are determined by the State services, and in which it is allowed to develop wind projects. For this territory, the SRE recommends that project holders verify the state of the wind development in order to avoid excessive densification which can lead to cumulative effects. The target set in the SRE in terms of wind power to be achieved is 180 MW (indicative target).
In the northern part of Champagne Berrichonne, by counting the planned and installed wind turbines of the studied communes and those of the neighboring communes (Indre and communes bordering the Cher), a total of 73 wind turbines are exploited[8].

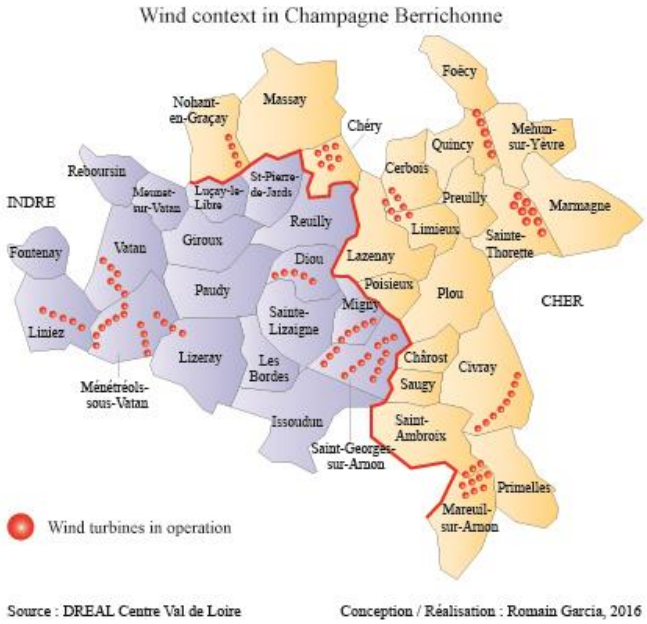

Figure 2 : Map n °1. Context of wind energy in Champagne Berrichonne in 2016.

[8] The wind farms studied are located in a wind densification area. A numerical target for wind development has been defined by the State services for this territory. Champagne Berrichonne must reach a total of 180 MW by 2020 in order to fulfill the objective (at the national level, the set of cumulative objectives must reach 19,000 MW of installed wind power for 2020, compared to around 14,000 MW in 2017).

Three wind projects will be presented in the community of communes of Pays d'Issoudun in order to address qualitatively the factors of opposition and support for wind power, and then the opposition will be quantified in a second time. The first is the one of Saint-Georges-sur-Arnon and Migny. This is an extension of an operating park consisting of 19 wind turbines (5 in Migny, 14 in Saint-Georges-sur-Arnon). The project consists of 11 new wind turbines, nine will be located in Saint-Georges-sur-Arnon and two in Migny.

The wind turbines will have a nominal power of 2.4 MW and a total height at the blade tip of 149.4 meters. The project was officially launched in June 2013 through an information process in both municipalities. Public meetings were organized to present the project (the preliminary studies were carried out upstream) and an exhibition with panels was held in order to answer to the questions of the population. According to the investigating commissioners, "the meeting is well invested by the local population" (report of public inquiry, Pierrots wind project, 2015). These elements are important, especially in terms of acceptability. Indeed, there was very little opposition during the public inquiry phase, which was also the case during the development of the first park. It was developed in four years and eight months, which is a relatively short term compared to wind development in the rest of the region (6 to 10 years and over). The public inquiry for this new project was carried out between June and October 2015. The files are currently being studied by the various departments of the State.

The second wind project studied in Champagne Berrichonne is Saint-Pierre-de-Jards, and is composed of eight wind turbines. There are no windmills in the town, but it is surrounded by parks located in two neighboring communes: Nohant-en-Graçay (4 machines) and Chéry (7 machines). The project, developed by NEOEN, is made up of higher wind turbines than those located in the region, with a height of 175 meters and a unit power of 3,075 MW (compared with an average wind turbine of 150 meters). Studies began in 2010, the company then met with elected officials and residents in 2012. The project plans to install wind turbines to the west of the municipality.

The public inquiry took place between September and October 2014. Contrary to the Saint-Georges-sur-Arnon project, the opposition was important to this project. Indeed, during the public inquiry, of the 50 people who voted, 39 were unfavorable to the project. The main complaints of the habitants during the public inquiry were about the potential impacts of wind turbines on health (23% of the opinions expressed), a project poorly designed by the development company (20% Of the opinions expressed) and a certain fear of the future of the municipality with the presence of wind turbines (16% of the opinions). Two petitions against the project were made by the Vent Contraire association, the first gathered 26 signatures (petition on paper that circulated during the public inquiry), the second circulated on the internet and collected 584 signatures. The Board of Inquiry issued a negative opinion on the application to operate the wind farm. The file is being studied in the State authorities. In addition, the city council voted against the development of this wind project.

An interview was held with the mayor of the commune of Saint-Pierre-de-Jards in order to obtain additional information on the progress of the project. At the beginning of the interview, the mayor declared himself unfavorable to wind power and the installation of wind turbines in his commune, which can "skew" certain answers given by the elected representative (subjectivity of the opinions expressed). Several elements were pointed out by the mayor, in particular in the process of evaluation of the project by the State services, which he said did not correspond to the opinions and perceptions issued locally within

the municipality. During the public inquiry, the opponents spoke more broadly than the persons in favor and, moreover, the Commission of Inquiry had given an unfavorable opinion on the authorization to operate the wind farm. The prefecture has disregarded this unfavorable opinion: "We put unfavorable opinions, we write, we make a gracious appeal to the Prefect, if the Prefect does not answer you, it means that he sits on it and then he ignores you completely. [...] I think that it is a great contempt from the administration, the high administration "(Mayor of Saint-Pierre-de-Jards, interview carried out on May 12, 2015). Here one finds one of the factors of social acceptability analyzed above, the institutional framework deemed failing by the mayor.

The wind power intensification of the territory is also a point of inacceptance for the mayor of the municipality. The wind farms in operation are numerous in this zone of Champagne Berrichonne, as indicated on the map n °1. It is the landscape impact that is put forward by the mayor: "it destroys completely a landscape; well, it is true that it is a landscape that needs verticality, but the verticality that we need this is not particularly wind turbines, okay for a few ones but that's all "(mayor of Saint-Pierre-de-Jards, interview of 12 May 2015). These landscaping impacts and the massive presence of wind turbines within the territory are perceived as a constraint to the development of the municipality by the mayor, with, according to him, a non-renewal of the population, new residents not wishing to settle in the municipality because of the projects developed, which represents a major problem for this commune of 113 habitants of which nearly 25% are more than 75 years. The impacts highlighted by the Mayor of Saint-Pierre-de-Jards, notably the impacts on the living environment, are another cause of non-acceptability.
Other complaints about wind power have also been put forward by the mayor, but will not be dealt with in this part, since they appear secondary (these grievances are important, but for the sake of brevity, will not be analyzed here, they are nevertheless found in the quantitative analysis of the factors of opposition to the wind energy that intervenes later).

The third project presented is the project of Ménétréols-sous-Vatan. It is an extension of an existing wind farm, as in Saint-Georges-sur-Arnon, where it is planned to add seven new machines to the existing twelve (plus an additional wind turbine authorized to be installed). The opposition to this extension is important, which marks a significant difference with the extension of the Saint-Georges-sur-Arnon wind farm. The project, developed by the company WPD, counts 7 turbines of 2MW of unit power, with heights varying from 130 to 150 meters.
The project began in 2013, the development company met with owner-operators on the potential wind turbine location, and then launched the preliminary studies. Presentations to various public actors took place in 2014: sub-prefecture of Issoudun, municipal council, community of communes. WPD also met the Vent Contraire association, which opposes the projects developed in Champagne Berrichonne. Meetings continued in 2015 (DREAL, DDT, community of municipalities), and at the end of the studies applications for building permits and authorizations to operate were submitted between June and September 2015. A public office took place in February 2015 and the public inquiry was held between November and December 2016. The estimated investment for the development of the wind power project (study, construction, operation) is estimated at 22.4 million euros, in which 25% are covered by the development company's own funds (WPD) and 75% via a bank loan.
An interview was also conducted with the Mayor of Ménétréols-sous-Vatan. He declared

himself in favor of wind power, but expressed some criticism towards the development of this energy, notably in Champagne Berrichonne: "Wind turbines must be put in, but there are places like here or like in Beauce where there are enough now [...]. I am in favor of wind turbines but not in favor of doing anything anywhere" (Mayor of Ménétréols-sous-Vatan, interview carried out on December 23, 2015). In economic terms, the mayor spoke about the economic benefits associated with wind farms and acknowledged that despite the low spin-offs for municipalities (most of the taxes being collected by the EPCI, the department and the region), it nevertheless allowed small rural villages to have additional funding : "previously we had big benefits with the professional tax, now that there is the IFR we have fewer benefits but we still have something, it gives a great boost to the commune anyway"(Mayor of Ménétréols-sous-Vatan, interview conducted on December 23, 2015). It is an essential element for the survival of these rural areas, which have no other economic activities that allow them to collect taxes and which had to face for several years the reductions of State's allocations. However, this can be qualified by the fact that the contribution perceived by "fragile" rural municipalities via wind power does not allow them to carry out development projects. With the successive waves of decentralization, it was the communities of communes that took over in terms of territorial development. Although wind power does not allow municipalities to develop themselves economically, communities of municipalities, on the other hand, are largely beneficiaries of the spin-offs.

In spite of the will of the municipal council and the mayor to continue the wind development on the commune, a fairly strong opposition mobilized. The Vent Contraire association (an association that opposed the Saint-Pierre-de-Jards project) took action against this extension of the existing park. The points criticized by the association are on the one hand on the densification deemed too important: "A new promoter wants to build seven new wind turbines in our village, while we are already surrounded by five wind turbine lines, twenty-seven machines, and by more than one hundred and fifty others within a radius of 20 km. Enough is enough !" (Vent Contraire association, November 2016) and on the negative impacts on the population and the living environment: "A consultation of the citizens was requested and refused by the town hall of Ménétréols-sous-Vatan. The territory has been classified as a Strong Vigilance Zone for visual saturation, density, known nuisance. [...] The noise generated by the wind turbines has been observed by recognized measures, especially during the night. "(Vent Contraire association, November 2016). The two arguments put forward here by the Vent Contraire association refers, on the one hand, to wind energy densification, considered to be anarchic and too important, which can be compared to the lack of institutional framework (wind development is not, according to the association, framed by the services of the State, which leads to a fragmentation and a densification deemed too strong). On the other hand, the second factor of acceptability are the potential impacts of wind turbines, notably on the living environment (noise and visual).

To complete the analysis of the opposition to wind energy in Champagne Berrichonne, public inquiry reports were studied and analyzed in order to identify the habitants' grievances against wind power. Wind farms are subject to an operating license of the ICPE type (installations classified for environmental protection) provided when wind turbines have a height of more than 50 m, as well as wind farms with more than 20 MW of power. An administrative procedure is being carried out, which plans a public inquiry to cover all municipalities within a radius of 6 km around the location of the machines. During the public inquiry, the public can consult the files relating to the project, and make

oral or written observations. The observations, favorable, neutral or unfavorable, are recorded in a register by the investigating commissioners (grouped together in a commission of inquiry). These registers were analyzed for projects in Champagne Berrichonne in order to quantify the reasons for opposition to wind energy in this zone. Three projects are taken into account, 328 negative opinions on the projects were issued by 259 people, while 49 favorable people issued 49 opinions.

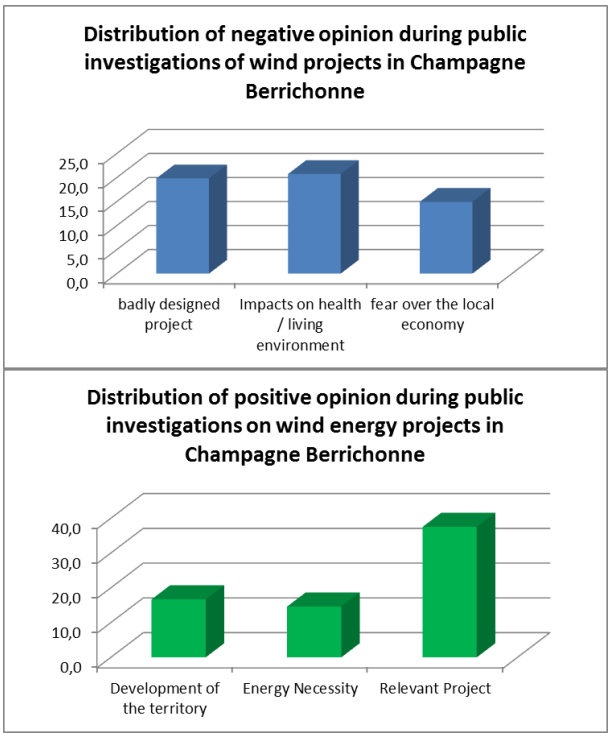

Figure 3 and 4: Distribution of negative and positive opinion during public investigations of wind projects in Champagne Berrichonne.

The landscaping impacts are barely mentioned because of the landscape character of the territory, which is not perceived aesthetically by the habitants, although they are attached to it.

The positive opinions on the projects included in this quantitative analysis focus on the possible economic development of the territory, the need to carry out the energy transition and the relevance of the projects. This last argument (the project deemed relevant) is the one that comes most often from the favorable ones, indicating that the project seems legitimate. It is interesting to note that the legitimacy of projects is a key element for opponents and people in favor of wind power.

Opposition to wind power projects is relatively high in Champagne Berrichonne, with grievances centered on the potential impacts of projects, the lack of an institutional framework and projects that are not recognized as legitimate by the unfavorable. However, Saint-Georges-sur-Arnon seems to escape this trend. To understand the acceptability of the wind projects studied in Champagne Berrichonne, interviews were conducted with the mayors of the three municipalities concerned (Saint-Pierre-de-Jards, Ménétréols-sous-Vatan and Saint-Georges-sur-Arnon), as well as only with inhabitants

of these territories. The interviews were conducted between June 2015 and June 2016. These are sociological interviews that were conducted (twelve interviews with the inhabitants make up the sample, eight were selected for analysis). The interviews were recorded, transcribed in full and analyzed to highlight the reasons for support or opposition to wind projects, as well as their sociological determinants.

3. Saint-Georges-sur-Arnon, an atypical case of a participative project accepted by citizens

3.1. Little opposition to the project, but some grievances from the habitants

The Saint-Georges-sur-Arnon wind farm did not encounter opposition during its development, which is also the case for its expansion of eleven wind turbines, which is ongoing. To understand why this development was carried out without opposition from the habitants unlike the rest of the projects carried out in Champagne Berrichonne, interviews were conducted with the mayor, as well as with residents. These interviews made it possible to obtain an image of their perception of wind energy in their commune. These interviews were carried out between 2015 and 2016, during the development of the second project. The habitants thus had a first experience of the wind energy, and live near the first wind turbines installed in 2009.

An interview was held with the Mayor of Saint-Georges-sur-Arnon on June 9, 2015. He is a key player in local wind energy development by getting involved locally in some projects (by contributing in surveys Public) or by conducting lectures on wind energy in Saint-Georges-sur-Arnon. The municipality was one of the first in Indre to start wind energy development, driven by the mayor who, upstream from the development of projects (the first resulted in the installation of 19 wind turbines in 2009), realized important public information with the municipal team and the wind energy development company (according to the mayor): "we did not let the developer do his project alone; every three months, we had an information meeting here, progress report, on the 14th of July, there was a stand, in the wishes of the mayor there were explanations, there were photos, there were pictures, there were also visits, etc. "(J. Pallas, Mayor of Saint-Georges-sur-Arnon, June 2015). Information and consultation seem to have been carried out effectively within the commune, which is one of the factors that may explain the weak opposition to the development of the wind farm between 2005 and 2009. The concerns of the municipal council, which were legitimate insofar as no wind turbines were located in the department, were dissipated by a visit to a wind farm. According to the mayor, the primary motivation of the municipal council for this wind power development is to contribute to the protection rather than to the economic development induced by the taxes paid by the operating company to local authorities: “ We became aware, well, we answered the question about why a wind farm in Saint-Georges? [...] there is a global warming, [...] we must do something, and we ask the states to make the climate plan, the famous *three times twenty*. [...] And so we educated our people, we [told] them why there will be a wind farm in Saint-Georges "(J. Pallas, Mayor of Saint-Georges-sur-Arnon, June 2015). Awareness of the impacts of human activities on the environment, translated at the State level through the implementation of various recommendations, directives and laws,

is reflected at the local level by the implementation of renewable energies, like wind power here. In the case of France, there are no obligations for local and regional authorities (municipalities and communities of communes) to develop renewable energies on their territory. This development is chosen by the territories, notably through deliberations that are taken by the municipalities and EPCI to give their approval or not to the development of the projects. In the case of Saint-Georges-sur-Arnon, this development was chosen by the elected officials. Nevertheless, this process was carried out following an upstream meeting with the Nordex development company (developer of the two projects in the municipality) which proposed to the municipal council the possibility of setting up a wind farm on the territory. The municipality is more generally involved in the contribution to fulfill the objective of "3 times 20"[9], with the setting up of an eco-district or the carrying out of energy audits.

The will of the Saint-Georges-sur-Arnon municipal council to contribute to limiting global warming has resulted in the support of the project promoter, as well as the association of the habitants through phases of information and consultation, which allowed the habitants to dispel their fears.

Interviews with habitants were carried out to understand their perception of wind power, and in particular on the first park in operation and its extension. Since the sample is small, it is not a question of making an exhaustive list of the opinions gathered but only of illustrating the main positive and negative points that emerge from the survey. The habitants we encountered had a more nuanced opinion on the wind energy. Indeed, most recognize that it is necessary to develop renewable energies, but have doubts about the capacity of the wind energy sector to respond to the electrical issues of the territory "anyway we will never be using wind energy only" (a resident of Saint -Georges-sur-Arnon, June 2015), another inhabitant of the commune mentioning "I do not think that electricity production by wind turbines is the thing that will save the industries and then the economy in general. In any case they are subjected to the wind, what will happen if there is no more wind? "(An inhabitant of Saint-Georges-sur-Arnon, December 2015). The perceived impacts of the wind turbines according to the habitants questioned relate to the distances between the wind turbines and the houses, judged sometimes too weak "I am not against the wind turbines but I am totally against their installation near the dwellings. The French regulations impose a minimum distance of 500 meters between the installation of a wind turbine and a house. This distance, judged sometimes too low by the habitants, is linked to another impact perceived by the latter: the potential noise of a machine too close to the houses: "Anyway they must not be too close to the houses because it is true that when there is wind we can already hear them a little bit "(a resident of Saint-Georges-sur-Arnon, June 2015). These first elements indicate that the population, although favorable to wind, expresses doubts about the technology (electricity production in particular) and its potential impacts (distance and noise). On the other hand, as far as the visual and potential impacts on the landscape are concerned, very few elements have been mentioned on this theme, we encountered judging the landscape as an element to be protected (non-aesthetic landscape according to the habitants, even if they are attached to it). Other doubts and fears were emitted by the habitants encountered, but do not seem to play an important role in their perception of wind energy.

[9] The "three times twenty" refers to the objectives set in the climate change package, defined in 2007 by the European Union. These objectives are to reduce greenhouse gas emissions by 20% compared to 1990, improve energy efficiency by 20% and have a renewable energy share of 20% in energy production.

On the other hand, it is important to consider the perception of the habitants encountered in regard with the process of information and consultation which, according to the mayor of the commune, were essential elements in the acceptability of the projects developed.

3.2. Information and consultation, the main negative point of wind energy development in Saint-Georges-sur-Arnon

The habitants we interviewed had a different opinion than the mayor on the process of information and consultation. It turns out that, according to them, although there was an information process carried out by the municipality and by the wind energy development company, they were not "associated" to the project development process, "We were told all of a sudden that there was going to be a project, we heard about it here but really the population was not concerted", another inhabitant putting forward the difficult to get information "We really have to seek the information and that's the whole problem I think people do not make the effort to move" (a resident of Saint-Georges-sur-Arnon, June 2015). These two examples (other habitants have issued these same elements, but are not present to avoid overloading the analysis) illustrate the difficulty of obtaining information on the projects according to the habitants. Meanwhile, attendance at meetings is often low or moderate, but it appears that many people are not interested in wind energy, which may explains this low participation. During the public inquiry about the second wind project, only 18 people participated (12 favorable, 3 unfavorable and 3 neutral), for a total population of 576 habitants, representing a 3.1% participation. However, information procedures (exhibition, meeting, communal information) have been carried out and, even if they are considered as insufficient by certain habitants, is more important than in the other projects studied, where very often no information was provided (Such as exhibitions or public meetings), which marks a significant difference with the Saint-Georges-sur-Arnon wind energy projects, which have benefited from information that can be described as important.

Beyond the information obtained about the project, the consultation with the habitants and their participation is problematic. One the one hand, participation is relatively low in the various meetings and public inquiries and, on the other hand, there does not seem to have been a real integration of the habitants in the process of development of the project, which does not allow a total appropriation of this last. Information is not enough to have an acceptability of the project, it seems that the participation of the public, at least the public interested in the wind energy, is paramount to the process of acceptance. There was little involvement of the public upstream. On the other hand, downstream participation in the wind farm in operation was made possible by the purchase by local players (public and private, through the creation of a mixed economy company, SEMER 36) of five wind farms, whose capital has been opened to citizens. Thus, they can invest in the wind farm on their commune. To date, 33 people have invested in this park for a total of 100,000 euros (source: https://je-souscris.energie-partagee.org/decouvrir-nos-projets/detail/semer-des-tilleuls). This investment by the various players in the wind farm allowed additional spin-offs in the region (the "basic" spin-offs of a park are the various taxes paid by the operating company to local authorities). Indeed, the profits realized by the SEMER 36 are reinvested for a part in the local economy, which allowed to finance several developments in the municipality (EcoQuartier, renovation of the cultural house) or to reduce the local taxation. The commune of Saint-Georges-sur-Arnon has also seen

its population increase since the early 1990s, a trend that continued after the installation of the 19 wind turbines in 2009, indicating that the presence of wind turbines had no negative impact on the demographic level.

Information and participation appear to be two key elements for the acceptability of wind projects. Indeed, if we refer to the definition of the social acceptability of wind energy, the authors indicated the importance for a project to meet the expectations from the habitants in order to construct the elements "recognized as legitimate" by the different actors (here, it includes the habitants, the local elected representatives and the project development society). In this way, it is necessary to determine how effective consultation should be carried out.

4. Public participation and crowdfounding in wind energy development : local remedy for the acceptability of this sector ?

Consultation is a way to make a wind energy project acceptable, and to involve all stakeholders in the project. Consultation emerged following a combination of several factors: the appearance of local conflicts about infrastructure projects, the difficulty of defining the general interest due to conflicting views on the interest of infrastructures. Faced with these problems, the conceptual framework for development has evolved, with the emergence of the concept of sustainability in 1987 in the Brundtland report and then in 1992 in Rio, and with a legal framework that was established on the theme of consultation. It brings together "processes and procedures that go through, or aim to, involve the public, civil society actors or institutional actors in decision-making processes on sustainable development. Included in its scope are consultations, public inquiries, joint instructions, public debates, citizen conferences, negotiations associated with decision-making processes, electronic discussion devices, etc. "(Mermet, 2008).
The dialogue is supposed to involve all the stakeholders in decision-making on a subject that concerns them. It can thus make appear oppositions during its course, whose origins which were defined by the ADEME:

- "conflict based on uncertainties (potential impacts of policy or project, such as risks);
- the procedural conflict (calling into question the absence of transparency, of dialogue, etc.);
- substantial conflict (questioning the nature of the project, political choices, etc.);
- structural conflict (challenge of the legitimacy of decision-makers, expertise, definition of the general interest ...) ".

We find the characteristics of these conflicts in wind energy projects, the uncertainties about the risks of wind turbines on health for example, the questioning of an "industrial" project in the territory, or the challenge of the legitimacy of decision makers, when for a wind farm the mayor is also a farmer on the studied area and receives income from wind turbines .... These arguments, whether well founded or not, are frequent in some public meetings or in other types of consultation.

In its study, ADEME highlights the emergence of new players who increasingly take part in these exercises of participation in public life: "the positive evolution of the educational level of the French, leading to a more frequent speaking to the detriment of populations with lower educational or socio-economic resources who tend to exclude themselves from dialogue ". Changing patterns of work, structuring in association, and increasingly easy access to information are all factors that lead citizens to have an opinion on the subject and to express it in public. This consultation is necessary to make the tensions and oppositions appear but also the possible supports to the project, in order to take them into account in a better way thereafter. "Conflicting events are stages of coordination between actors and a way to reintegrate new players into decision-making mechanisms and construction of territorial development projects" (Torre et al., 2010, p.3). It is therefore essential to take into account all opinions, including those of opponents, in order to make the project acceptable, or at least to mitigate "negative noise". Concertation must take place as soon as possible in a project, in particular under the Aarhus Convention. Nevertheless, the reasons for opposition can vary according to the progress of the project, so there are no rules in terms of time to achieve it and get the best result. Opinions can change on wind power, between a global perception of wind power, when one does not have machines "at home", and a local perception, when the impacts of a project are palpable. Depending on the stage of the project, it will be perceived differently by the population, hence the need to carry out a consultation in several stages. On the contrary, solidarity and the presence of common objectives abolish physical distances, in particular for the networks of pros and anti-windmills. That is, a common battle for or against a subject (wind turbines, for example) erases distances and brings people closer together. Civil society plays an important role in the acceptability of wind farms, either individually or collectively, and organized through associations. On the other hand, these same opponents, especially city dwellers, are often fervent defenders of the environment, rejections of Co2 ... hence a subcultural ambiguity that makes them reject a "clean" and renewable energy.

To achieve effective consultation, it is necessary to know the people on the territory. S. Le Floch determined three profiles of people, "figures of participation" (Le Floch, 2011). These are the residents, the resident and the citizen, three types of people who will have different interests in the development of wind projects, different representations.

The author puts forward a paradox in the information to the public: on the one hand, he is considered as a layman, that is to say he must be informed about the project and the sector. On the other hand, this desire to inform is faced with a fear: to see the emergence of oppositions, negative reactions to this information, which would hinder the implementation of the wind farm. "Thus, the public is generally perceived as a passive receptacle from which a few reacting individuals are likely to emerge".

Consultation is a way to make wind projects acceptable. This must fulfill several conditions and must not be limited to simple information on the development of wind turbines. It must in fact make the population and put it at the center of the decision-making process so that development is recognized as legitimate by the population concerned.

5. Conclusion

Wind energy development in Champagne Berrichonne is dynamic, and contributes to the objectives set by France in terms of the development of renewable energies. However, the opposition is important, although it is uneven across projects. For example, on conventional projects carried out by a company and where information and public participation processes are reduced, opposition movements are strong, whereas they are reduced when the population is integrated into the project, Either in the establishment of effective and dense information, or in forms of public participation, in particular with participatory financing. However, public participation is insufficient to make wind projects acceptable. Indeed, it is essential to fulfill several conditions, such as the type of project carried out (size, number of wind turbines, distance), the strengthening of local economic benefits, for example. These elements are also specific to each territory, here they are presented for Champagne Berrichonne. It is therefore necessary to know the territory and the population before developing a wind farm to meet these specific expectations.

Wind development, in order to be accepted by the population as a whole, must take account of expectations at the local level (distance, information). However, some expectations on the part of the population are difficult to take into account for wind development companies. For example, the population in Berry Champagne wants to see projects far from their homes, but too much distance between machines and houses leads to a significant reduction in potential areas (they are too small), which significantly reduces The possibilities of developing this type of renewable energy.

Saint-Georges-sur-Arnon is an example where the development of wind farms has been relatively well accepted by the population: machines are far from the residences (more than 800 meters on average), information and consultation have been effective and regular.

Adaptation must therefore be twofold: rural areas must adapt to this new type of electricity production, as well as the sector, in order to meet the challenges of the energy transition.

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Glossary :

ADEME : Agency for the Environment and Energy Management (Agence de l'environnement et de la maîtrise de l'énergie)

DDT : departmental direction of the territories

DREAL : Regional Directorate for the Environment, Planning and Housing (Direction Régionale de l'Environnement, de l'Aménagement et du Logement)

ICPE : classified installation for the protection of the environment (installation classée pour la protection de l'environnement)

IFR : Impôt frfaitaire sur le revenu (flat tax on income)

SEMER : Société d'Economie Mixte Energies Renouvelables (Renewable Energy Mixed Economy Society)

WPD : Wind Power Development