



DOES THE LOCAL EMBEDDEDNESS OF ENERGY PRODUCTION CONTRIBUTE TO SUSTAINABLE RURAL DEVELOPMENT? SOME EVIDENCE AND PROPOSITIONS CONCERNING THE SPREADING OF WIND ENERGY PARKS IN BELGIUM

Prof. Dr. Serge Schmitz

Chargé de cours en Sciences géographiques
S.Schmitz@ulg.ac.be +32 (0)4 366 56 29

Vincent Vanderheyden

Assistant doctorant en Sciences géographiques
Vincent.Vanderheyden@ulg.ac.be

Adresse professionnelle

Laplec, Université de Liège – Allée du 6 Août, 2 - B-4000 Liège

Summary : Because wind energy is materialised at local level it seems important also to think locally its development. Although the global impact of wind energy is mainly perceived as positive, local concerns have to be coped with. Based on a review of the international literature and on a study of five Belgian cases, the paper underlines the spatial transition of energy production relating to the spreading of wind turbines. It proposes several ways to include the local society in the wind energy development.

Résumé : Parce que l'énergie éolienne prend place à l'échelle locale, il semble important de penser aussi son développement à ce niveau. Quand le développement éolien est globalement perçu comme positif, des problèmes apparaissent au niveau local. Basée sur une revue de la littérature et sur cinq études de cas en Belgique, la communication souligne la transition spatiale de la production d'énergie suite à la multiplication des sites éoliens. Elle propose des pistes afin de mieux inclure la société locale dans le développement éolien.

Keywords : Wind energy, Local/global, Governance, Spatial transition, Local development, Belgium

Mots clés : Energie éolienne, Local/global, Gouvernance, Transition spatiale, Développement local, Belgique

Does the local embeddedness of energy production contribute to sustainable rural development? Some evidence and propositions concerning the spreading of wind energy parks in Belgium

I. INTRODUCTION

The recent increase of raw material and energy prices, the scarcity of fossil energy, the dependence on its importation, and the awareness of the global warming, stimulated policy makers to promote renewable energy. These energies fit within the sustainable development framework in which (i) the economic, (ii) the social, and (iii) environmental needs of the society should be well balanced. Wind energy projects seem to contribute to the three aspects of sustainable development. European and national policy makers therefore promote them. Nevertheless, experiences in various European countries show that the development of onshore wind energy projects is not unanimously perceived as a sustainable development. Oppositions appear in different countries, become structured and develop smart argumentation regarding the wind energy policy. The perception of a wind energy project is strongly dependent on the surrounding environment and on the development of a social attitude in favour of wind farms. In a former paper (Schmitz et al, 2011), we analysed the mishmash of pro- and contra- information dealing with physical annoyances, economic arguments, symbolic arguments, and type of decision-making process and its impact on the development of social attitudes. Because wind energy is necessary materialised at a local level, it seems important also to think locally about its development. Although the global impact of wind energy is mainly perceived as positive, local concerns have to be coped with, especially in a highly dense area like Western Europe.

From a rural perspective, the spreading of wind energy parks is the comeback of energy production in the rural system after fifty years of concentration of energy production in towns, in nuclear power stations, and in large hydropower units. It could be an opportunity to a diversification of rural economy. Nevertheless, few wind energy actors are really based in the countryside. Wind farms could be (once again) a (miss) use of the countryside based on space consumption without embeddedness in local society (Gueorgieva-Faye, 2006).

The aim of the paper is to suggest and to analyse several ways to include the local society to a wind energy parks development. How is it possible to embed more deeply a wind energy project in the

local rural system? The paper is based both on a review of the international literature, especially the examination of the “Energy Policy” journal and on the analysis of five Belgian case studies, (Houyet, Kruikeke-Beveren, Kortrijk, Lombardsijde-Middelkerke, Metet) (Van Rompaey, A et al., 2009). For each case, the project leaders, civil servants, and politicians possibly involved at the local level have been interviewed, the media were covered, and about fifteen residents have been interviewed per case. In the case of protest, both activists who joined the protest and ‘regular’ residents (randomly chosen) have been interviewed. In the case of cooperatives, residents who became shareholders alongside ‘regular’ residents including opponents were interviewed. Interviews tried to reconstruct the history of the project from the respondent’s point of view.

II. WIND ENERGY, SPATIAL TRANSITION, AND SOCIO ECOLOGICAL TRANSITION

While the strategy 2020 of Europe targets “a reduction in EU greenhouse gas emissions of at least 20% below 1990 levels, 20% of EU energy consumption to come from renewable resources, a 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency” (http://ec.europa.eu/clima/policies/eu/package_en.htm), this strategy targets also a higher employment rate, social inclusion and well being. To be consistent, the achievement of one target should not neglect the other goals. It seems really important that wind energy parks development (as well as other renewable energy development) is accompanied by a smart growth at all levels, including on the local level, with a special care to inhabitant’s well being. Wind turbines present, especially at a local level, annoyances that may disturb inhabitants. Indeed, the reactions against wind turbines are more complex than Nimbyism. Authors (Elthan et al., 2008, Dan van der Horst, 2007, Warren et al., 2005) have discussed the concept of Nimbyism in arguing the poor explanation given by this concept to grasp the reaction to local wind energy parks. Several authors underline that Nimbyism has become an insult to make inhabitants feel guilty of refusing the progress of a socio-ecological transition. Because wind

turbines are often perceived as materially intrusive in the neighbourhood (Devine-Wright, 2005, Wolsink, 2007) in regard to their landscape signature due to their vertical dimension (often more than 100m), their dynamic aspects, their “flickering” shadows, and their lights during the night, in regards also of their noise (Elthan et al., 2008) that, though is very low, may disturb neighbours in remote areas.

The spreading of wind energy parks is indeed a spatial transition (Pasqualetti, 2000). First, it reduces the distance between supply and demand. Coal or petroleum production too causes a lot of local disturbances where they are produced, but these disturbances are mainly far away from the place where the energy is consumed. With wind energy parks and the urbanisation of the countryside, the production and the consumption get closer. Second, wind energy is both relatively concentrated in space due to the limited spatial flexibility and dispersed in the country. The localisation of wind turbines is determined firstly by wind conditions, secondly by several constraints as airplane routes, electricity networks, bird migration corridors, cultural and natural heritage protection and other planning issues. Because the wind cannot be relocated, the localisation of wind turbines is restricted to specific areas. Nevertheless, in Western Europe, due to high population density, the size of wind farms is quite small (up to 20 WT in Belgium in 2010), and wind energy development requires different places spread out in the country. This spatial transition leads to a redistribution of economical, ecological and social costs and benefits in the space both at regional level and at international level. It requires looking forward at the balance between the global and the local. Although wind energy seems to have global environmental advantages; annoyances at local level could be prejudicial.

European, national and regional authorities support wind energy not only because of their environmental impact. They also support it because it could be a great advantage to develop the knowhow and the related employments as well as to be less dependent on fossil fuel energy sources that are mainly located outside of Europe and. They actively support the production in assuring a minimum price (feed-in-tariffs like in Germany) for the electricity produced from renewable energy sources or they oblige the suppliers to deliver a minimum share of electricity produced from renewable energy (Renewable obligation or green certificates like in Belgium). Moreover, the general image of wind turbines is mainly positive. Wind turbines are green. “Producing no global warming, wind power floods no canyons, demands no water,

contaminates no soil, and leaves no permanent and dangerous waste” (Pasqualetti, 2000, 382) Wind turbines are also linked with the ideas of high technology, future and responsibility. It explains the presence of wind turbines in folders and websites of so many regions, companies, and research centres. Nevertheless, the (over)use of this symbolic in communication with local dwellers fails often by underestimating the local concerns and the opportunity to make inhabitants actors of this new development in their neighbourhood. To take really part of the socio-ecological transition, wind energy development has to be accompanied by efforts concerning education and increase of environmental awareness. The subsidiary principle requires that the best level take the decision. In the case of wind turbines a better networking between the different levels should improve the integrated development including the social well-being and the environmental aspects.

The financial issues should also be discussed. Wind energy development requires important investments and is financially supported by states. It will also generate profits. Who will receive financial advantages of wind turbines? Is it acceptable that only the wind energy producer and the land owners of the field where the turbine is erected share the economic benefits? In other words, to whom do the wind and the scenery belong?

III. HOW LOCAL WIND FARMS COULD CONTRIBUTE TO A « BETTER BALANCED » DEVELOPMENT?

Three main streams could be proposed to allow wind energy parks to contribute to a better balanced development. The first solutions are simple and do not require an in depth socio-ecological transition. They are based on technical and economical solutions, or on a more participatory debate. The second way proposes -as we have studied in two cases in Belgium- that inhabitants become shareholders. The third one suggests local (and associative) entrepreneurship. Of course these three streams are not mutually exclusive.

1 Simple ways

In order to better balance the costs and the benefits of wind energy parks, a first stream of solutions may try to directly reduce the local costs or/and to increase local benefits. Research in design and landscape studies may help to reduce the perceived visual impact of wind turbines. Up to date technological and maintenance will help, especially when the park will become aged, to reduce noise. All reasonable technical improvements must indeed be incorporate to mitigate impacts (Pasqualetti, 2001).

For instance, it was clear in the case of Middelkerke that a lack of visual homogeneity caused by a different design of the wind turbines – erected in several phases - was not well perceived by the dwellers. A special attention can also be paid to the type of landscape where the wind farm must be set. In a dominant position in hilly landscapes, they could be seen as oppressive while they emphasize the vertical scale of flat landscapes. (Antrop, 2004) At a local scale, the arrangement of the turbines within the park plays a huge role. As a wind turbine cannot be hidden, an arrangement in line with landscape features decreases their intrusive aspect.

Collecting the dwellers’ advice may also help to know what is relevant for them and help to design the project with this information. Because “people’s viewpoints are critically influenced by the nature of the planning and development process: the earlier, more open and participatory the process, the greater the likelihood of public support” (Warren et al., 2005) As for many planning projects, wind farms projects will be less likely to meet opposition if the public has been collaboratively involved from an early stage (McLaren Loring, 2007, Graham et al., 2009) Nevertheless, attention has to be paid that much participation, especially information or consultation meetings, process will help the networking of opponents.

A favourable way to increase the local benefits is to try to employ local or at least regional people for the construction and the maintenance of wind turbines. Even if the erection of the turbine requires a technological knowhow, other parts of the work - such as new paths or earthworks – or maintenance could be done by locals. Energy producers may also decide to give compensation for local annoyances or emphasize new practical aspects of the wind park. Some equipment could present new opportunities to inhabitants (Breuker, Wolsink, 2007) like the construction of new paths to access to the wind turbines that may also serve as bike path. According to the five study cases in Belgium, a cut on electricity prices would be welcome. Nevertheless, attention has to be paid that this kind of compensation could have an opposite effect making people suspicious or reducing the value of the free good will (Frey & Oberholzer-Gee, 1997, Jones, Eiser, 2009)).

2 Inhabitants as shareholders

An interesting solution is to propose the inhabitant to become shareholders of the wind turbines. Of course, this requires explaining clearly the interests and risks to take part in the investments. Developers also have to find a way to include as

much as possible inhabitants in proposing an affordable share. In Houyet in Belgium, they proposed to the children to become shareholder of one wind turbine. Pupils - or parents in their name - could buy a 100€share to become an owner of the children’s wind turbine. For another wind turbine, the same developers proposed to save 5€per week during a year to become a shareholder. As shareholding could be seen by some people as unaffordable, this practice increases the access to it. In spite of it, cultural barriers have to be overcome because being a shareholder – independently of the price - can be seen by some people as “not for their social condition”, as it was the case in Kruibeke-Beveren.

Maruyama et al (2007) have listed the costs and profits for citizen, developer, local society and financiers including inhabitants in the capital. Based on three case studies in Hokkaido, Japan, they proposed the following table (Tab.1). The new aspects related to the shareholding of inhabitants are in bold.

Table 1: Interest in wind power projects

Actor	Cost	Profit	Citizen	Investment risk	Dividend
	Cost	Profit	Citizen	Investment risk	Dividend
Profit	Citizen	Investment risk	Dividend		
	Citizen	Investment risk	Dividend		
Citizen	Investment risk	Dividend			
	Investment risk	Dividend			
		Dividend			
			Social participation		
Sense of ownership	Developer	Business risk			
	Developer	Business risk			
	Developer	Business risk			
		Business risk			
			Social responsibility		
Complementary fund raising	Income of selling electricity				
	Income of selling electricity				
		Realisation of the mission	Local society		
			Environmental burden	Construction demand	
			Local society	Environmental burden	Construction demand
			Local society	Environmental burden	Construction demand
			Environmental burden	Construction demand	Construction demand
			Construction demand	Fixed property tax	
				Human exchange	
Tourism (?)	Financiers	Investment risk			
	Financiers	Investment risk			
	Financiers	Investment risk			
		Investment risk			
Fund raising	Loan interest	Source: Maruyama et al, 2007 (slightly modified)			

Loan interest □ □ *Source: Maruyama et al, 2007 (slightly modified)*

□ *Source: Maruyama et al, 2007 (slightly modified)*
Source: Maruyama et al, 2007 (slightly modified)

Of course, European culture is slightly different; nevertheless the interviews both in Flanders and Walloon part of Belgium corroborate this information. For instance, wind turbines could become the pride of the local society, and several events such as a barbecue are organised within the shareholder at the foot of the wind turbines. In a Belgian rural society where common places are lacking in the settlements (in order to replace the church and the football ground) (Schmitz, 2007) wind turbines could become the new place of the community. Nevertheless, the opportunity of tourism development is more relative, as much as there are few wind farms in a region, it can be seen as a new attraction that is worth the trip, but with the multiplication of wind farms, tourist attractiveness can decrease.

3Local entrepreneurship

Besides shareholding, a way to integrate local society and citizens in the dynamic could be that the local society becomes local developer. Usually, the actors dealing with wind energy that, as has been said before, is necessary materialised at local level belong to several spatial levels and few have connexion to the rural society. In our case studies as well as in the literature (Wolsink, 2000), local resistance to wind farm project is strongly dependant of the people who are planning to build the turbines. In Houyet, the developers were from a “neo-rural” community, yet living for a long time in the area and known for their social dynamism. For some “old-rural” inhabitants, they are still seen as foreigners, eccentrics and therefore untrustworthy. In Mettet, Albert Frère - the richest Belgian businessman - held a big part of the financial support of the project. Some people felt that he was doing a hostile takeover of their neighbourhood through the official developers. The resistance to wind energy project seems stronger when the developers are outsiders and linked to the financial world.

Theoretically and practically, Land owners, farmers, local authorities, citizen’s associations may for instance support the development of local wind energy park (Devine-Wright, 2005). Nevertheless, depending of the developer, the share of benefits and costs will change. Farmers could for instance find a way of diversification of their activity in an

agricultural sector challenged by the international concurrence. “While hosting wind turbines can provide a much-needed boost in income to farmers struggling to maintain their livelihood, the lease payments made to farmers by commercial wind project developers (are) typically pale in comparison to the amount of income the farmer could earn if he instead owned the turbine himself, or in conjunction with other members of his local community” (Welsch Galluzzo, 2005) In Germany, the feed in tariff system has encouraged a lot of farmers and other householders to build wind turbines. The small project developments cause however problems in regards of rationalisation of both wind energy development and planning (Breukers, Wolsink, 2007). In Belgium, some developers help citizens associations to develop their own wind farms. In Belgium, local authorities were late to take the wind energy opportunities to become actor and not only a receptor of the wind development. This is a pity because the share of the benefits for the local society could be more important. In 2007, some municipalities of both Flanders and Wallonia, between Brussels and Liege decided to think together about the opportunity to develop a shared wind farm project, to overcome anarchic development. They stroke a partnership with private companies (in particular electricity producers and the Belgian Railway Company). Ever though this initiative is now frozen due to complex urban planning issues in this part of Belgium (density of population, a lot of infrastructures...), these communes opened a new way of wind energy development in Belgium with a strong bottom-up perspective.

Nevertheless, developing wind turbines require technological knowledge, and the ability to negotiate with authorities to get subsidies and permits, and with electricity suppliers to sell the electricity. Such skills are not so common for citizens associations. Few citizens could really grasp the complexity of wind energy challenge combining financial, technological, environmental, political, and legal dimensions. Therefore, the providing by the regional or national authorities of a wind energy facilitator as it is the case in both Flanders and Wallonia could be a very good support and a good investment at regional level.

CONCLUSION

Wind energy development (as well as other renewable energy development such as photovoltaic) contributes to a spatial redistribution of energy production. With Pasqualetti, it may be spoken of a spatial transition. This transition implies redistributions of costs and benefits not so favourable to localities where wind energy is

produced. The paper suggests three main streams of solutions to better balance the wind farms spreading in embedding wind energy projects in the local society. If the recommendations of the first main stream are based on relatively traditional ways, shareholdings and local entrepreneurs are still to be developed and analysed. These last ways present, theoretically and in the first experiences,

good prospects as well as some barriers that the paper has both underlined. These ways may also require the socio-ecological transition pointed by the Europe 2020 strategy to increase the awareness of locals to future challenges that Europe has to face. These ways are finally also an (re)appropriation of the electricity production as well as the countryside by the locals.

Bibliography

Antrop M., 2004. "Eoliennes et paysage", *Les Cahiers de l'urbanisme*, 52: 8-14.

Devine-Wright P., 2005. "Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy", *Wind Energy*, 8: 125-139.

Eltham D. C., Harrison G. P., Allena S. J., 2008. "Change in public attitudes towards a Cornish wind farm: Implications for planning", *Energy Policy*, 36: 23-33.

Graham J. B., Stephenson J. R., Smith I. J., 2009. "Public perceptions of wind energy developments: Case studies from New Zealand", *Energy Policy*, 37: 3348-335

Gueorguieva-Faye D., 2006. "Le problème de l'acceptation des éoliennes dans les campagnes françaises : deux exemples de la proximité géographique", *Développement durable et territoire (en ligne)*, dossier 7, mis en ligne le 18 mai 2006, URL : <http://developpementdurable.revues.org/2705>

Jones Ch. R., Eiser R. J., 2009. "Identifying predictors of attitudes towards local onshore wind development with reference to an English case study", *Energy Policy*, 37 : 4604-4614

Maruyama Y., Nishikido M., Iidac T., 2007. *The rise of community wind power in Japan: Enhanced acceptance through social innovation*, *Energy Policy*, 35: 2761-2769

McLaren Loring J., 2007. "Wind energy planning in England, Wales and Denmark: Factors influencing project success", *Energy Policy*, 35: 2648-2660.

Pasqualetti M., 2000. "Morality, space, and the power of wind-energy landscapes", *The geographical review*, 90/3: 381-394.

Schmitz S., 2007. "Les nouvelles places des villages ardennais : une utopie politique wallonne ? ", *Enquêtes rurales, hors série* : 45-56.

Schmitz S., Vanderheyden V., Vanden Broucke S., Loopmans M., 2011. "Multi-scale information and social attitudes towards wind energy parks in the Belgian Countryside", *Horizon in Geography*, (Submitted).

Van der Horst D., 2007. "NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies", *Energy Policy*, 35: 2705-2714.

Van Rompaey A., Schmitz S., Kesteloot C., Peeters K., Moens B., Van Hemelrijk H., Vanderheyden V., Loopmans M. and Vanden Broucke S., 2009. *Landscape capacity and social attitudes towards wind energy projects in Belgium. Final Report*. Brussels: Belgian Science Policy. 84p. (Research Programme Science for a Sustainable Development)

Warren Ch. R., Lumsden C., O'Dowd S. & V., Birnie R. V., 2005. "'Green on Green': Public Perceptions of Wind Power in Scotland and Ireland", *Journal of Environmental Planning and Management*, 48/6: 853-875.

Welsch Galluzzo, T., 2005. "Small Packages, Big Benefits: Economic Advantages of Local Wind Projects", *Policy Brief of the Iowa Policy Project*.

Wolsink M., 2000. "Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support", *Renewable Energy*, 21: 49 - 64.