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BELGIUM

The Social and Economic Impact of Rural Wind Farms in the Walloon Region of Belgium

To the Senate Community Affairs Committee of the Australian Parliament

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SUMMARY

Wind energy development in Wallonia is a useless whim mainly because of the fact that the Belgium offshore potential is huge and amply sufficient to respect our international obligations related to renewable energy quota. Moreover Wallonia's great wealth is the solid biomass, which in 2020, on its own, will be able to produce 11% of the estimated electricity demand, whereas our national (Belgian) obligation is 13%! In a densely crowded country like Belgium, wind turbines are a great nuisance for people, bats and birds because it appears to be impossible to respect serious setbacks. Onshore wind energy does not play a significant role in GHG reduction. The actual Belgian onshore oppressiveness index is seven times higher than in France. As the wind turbines are constructed and maintained by foreign companies, the local economic impact is inexistent. So why continue??

To the Senate Community Affairs Committee of the Australian Parliament
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<i>Cette « substituabilité » n'a jamais fait l'objet d'un rapport officiel mais a été étudiée, sous la responsabilité des auteurs, dans une publication faisant partie des rapports finaux consacrés aux « Modes de production et de consommation durables (PADD 2) »</i>	19

1. Introduction

Our organization called VentdeRaison is an NGO operating in Wallonia. Wallonia is a metonym for the “Walloon Region” of Belgium.

Federal and regional responsibility in energy matters

Wallonia is an autonomous French speaking Region of the Belgian Federal state. It makes up 55% of the territory of Belgium and includes about 33% of its population. Like the other two Regions it has its own parliament and government and exercises its functions within the limits defined by the Belgian constitution and special laws. One of them concerns energy politics. Although the national electricity grid remains a federal matter, decentralized electricity generation sources like wind turbines, and biomass are of regional competence. But facing the European Union (EU) regulations, the federal state is responsible. Like all the other European countries, Belgium has to fulfill a threefold commitment in 2020 : GHG reduction by 20% (having regard to the emissions of 1990), energy efficiency improvement by 20%, global renewable energy consumption (heating, electricity, transport), 20%. Recently the federal State had to specify the detailed options to achieve these goals and proposed, a scheme, last November, in which the growth of wind energy is defined as follows

	2015		2016		2017		2018		2019		2020	
	MW	GWh										
Hydroélectricité	122,5	390,7	125,7	399,7	128,9	408,6	132,6	419,1	136,3	429,5	140,0	440,0
Géothermie	0,0	0,0	0,0	0,0	0,0	0,0	3,5	22,3	3,5	25,7	3,5	29,1
Energie solaire	713,1	610,2	827,1	706,4	941,0	802,5	1074,0	914,7	1207,0	1026,8	1340,0	1139,0
Photovoltaïque	713,1	610,2	827,1	706,4	941,0	802,5	1074,0	914,7	1207,0	1026,8	1340,0	1139,0
ECS	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Energie éolienne	2048,6	6084,1	2461,6	7402,5	2874,6	8505,0	3356,4	9286,3	3838,2	9975,7	4320,0	10474,0
Biomasse	1290,2	5952,4	1501,3	6877,1	1712,5	7801,9	1958,8	8880,8	2205,2	9959,6	2451,5	11038,5
Solide (SIOMAB)	1051,7	5145,1	1225,4	5950,5	1399,1	6755,8	1601,7	7695,4	1804,4	8635,0	2007,0	9574,6
Biogaz	223,5	776,8	260,5	897,3	297,5	1017,7	340,7	1138,1	383,8	1298,6	427,0	1439,1
Bioliquides	15,0	30,4	15,5	29,4	15,9	28,4	16,5	27,2	17,0	26,0	17,5	24,8
TOTAL	4174,3	13037,4	4915,6	15385,7	5656,9	17518,0	6525,3	19523,1	7390,1	21417,4	8255,0	23120,6

Belgium also participates in activities relating to the North Seas Countries Offshore Grid Initiative. This initiative has particularly for objective to ensure a coordinated development of infrastructure of network (sea and on earth) taking into account the important development expected of the wind energy in sea in the European Union. The production of electricity from renewable sources from installations located in offshore territory is however subject to the only federal legislation. The Belgian 4320MW wind energy commitment for 2020 is not yet definitively assigned to the federal offshore and the three Regions onshore, but unofficial plans assign 2000MW to Wallonia.

Wind energy oppressiveness

This is of course an impossible goal to achieve given the fact that according to independent university research in environmental planning, a total of 40 windfarms with 5 x 3MW machines (i.e. 600MW) has been defined as a saturation limit and that this limit is actually transgressed.

The main victims of wind energy nuisance are the rural citizens living in the neighborhood of the wind farms. Wind energy oppressiveness may be expressed as the ratio of installed wind energy capacity to the rural population. In this context Belgium has a wind energy oppressiveness seven times as important as that of a big country like France. So it is not astonishing at all that an important part of the rural Walloons are against this wild windfarm development although the major part of the Walloons, due to the high urbanization rate (96%) are in favor of wind energy and do not consider it as harmful.

Belgium's international obligations

VentdeRaison proves that it is possible to fulfill the 2020 Belgian obligations without further onshore development thanks to a more intensive offshore policy and an encouragement of electricity-biomass, the great richness of Wallonia. The table hereafter shows that the authorized north sea concessions and the official biomass development suffice to respect the Belgian European engagements. As the estimated national electricity consumption in 2020 is supposed to reach 100TWh/year, the table shows that the renewable energy consumption of 16000MWh represents even far more than the 13% goal, even with an actual moratorium on onshore development. See more details in Appendix N°1 (in French).

E-RES(*)	2002	2003	2004	2005	2006	extrapolation	2020
	GWh	GWh	GWh	GWh	GWh		GWh
biomass	1169	1339	1535	2114	3002	cfr nationaal plan	11038
onshore	57	88	129	227	363	moratorium	363
hydro	358	247	317	288	359	lineair regression	440
photovoltaic			1	1	2	cfr national plan November 2010	1139
offshore						actual concessions C-Power : 318MW Belwind; 550MW Edelpasco : 216MW Total :1084 MW(**)	3324
Total E-RES	1584	1674	1982	2630	3726		16304

(*) E-RES : renewable energy sources for electricity generation

(**)GREENPEACE *3E North Sea Electricity Grid (R) european potential 68000MW of which 3846MW by Belgium*

Onshore development in Wallonia

Actual onshore development is characterized by the absence of planning and specific legislation. It follows that that anybody, may anywhere, try to run a wind power project. The evidence? The recent decisions taken in respect of recourse for several projects mainly for

reasons of non-respect of landscape heritage. All the same curious to see that none of these refusals had been diagnosed by authors of the studies of impact on the environment. Load factors as miserable as 16% mean that with equal power, any source of electricity generation produces five times as much as wind, for a space 500 times less. A study done in the request of the Federal Science Policy shows that the rate of substitutability ("capacity credit") of wind power installed is only 18% in regard to a legitimate concern of securing the electricity supply. It follows that the replacement of nuclear power (5,8GW) would require 16000 wind turbines of 2MW !

2. European Landscape Convention (Florence)

Like all other European countries Belgium and Wallonia subscribed to this convention whose basic message is that the landscape contributes to the formation of local cultures and that it is a basic component of the European natural and cultural heritage, contributing to human well-being and consolidation of the European identity.

Scope

It is useful to notice the legal texts existing at international level in the field of protection and management of the natural and cultural heritage, regional and spatial planning, local self-government and transfrontier co-operation, in particular the [Convention on the Conservation of European Wildlife and Natural Habitats](#) (Bern, 19 September 1979), the [Convention for the Protection of the Architectural Heritage of Europe](#) (Granada, 3 October 1985), the [European Convention on the Protection of the Archaeological Heritage \(revised\)](#) (Valletta, 16 January 1992), the [European Outline Convention on Transfrontier Co-operation between Territorial Communities or Authorities](#) (Madrid, 21 May 1980) and its additional protocols, the [European Charter of Local Self-government](#) (Strasbourg, 15 October 1985), the Convention on Biological Diversity (Rio, 5 June 1992), the Convention concerning the Protection of the World Cultural and Natural Heritage (Paris, 16 November 1972), and the Convention on Access to Information, Public Participation in Decision-making and Access to Justice on Environmental Matters (Aarhus, 25 June 1998).

Lack of Penal Law Enforcements

Wind Turbine promoters are not at all concerned about this Convention and there is a **lack of internal penal law enforcements**. At a time when Europe needs large amounts of low-cost reliable power, wind produces puny amounts of high-cost unreliable power. Clearly there are more sensible ways to provide clean energy than spending taxpayers' money to destroy the Walloon landscape

Onshore Wind Energy opponents do not understand why in a small and densely populated country like Belgium, one can still go on with the development while our North Sea continental flat has an enormous offshore capacity, a much better producible, non-significant societal nuisance and a cost much less according to the famous 2000-AMPERE Report.

3. Nuisance

Setback

People living close to the rural wind farms often suffer from excessive noise, infrasound harm and stroboscopic effects.

They endure the same problems as in the Netherlands where a major new article was recently published in the *Journal of Sound and Vibration*¹.

G. P. Van den Berg, a physicist at the University of Groningen in the Netherlands², believes that he has at last explained the mystery of why modern onshore wind turbines can cause noise problems for residents **at distances of a mile or more**.

For his article, “Effects of the wind profile at night on wind turbine sound” (*Journal of Sound and Vibration*, 277 (2004), 955–970), Van den Berg measured sound around the Rhede wind-farm (an installation of 17 turbines), on the Dutch/German border.

“Residents living 500 m and more from the park have reacted strongly to the noise; (and) residents up to 1900m distance expressed annoyance”

particularly at night. Yet, conventional wind industry calculations have assumed that turbines would present no noise problem over 500m.

After extensive measurements, Van den Berg discovered that the methods used by wind turbine developers, in the UK and elsewhere, to predict noise are seriously flawed because of their assumption that wind speeds measured at a height of 10 metres are representative of wind speed at the greater heights of modern turbines (often 100 metres and above). The importance of this analysis is further exacerbated when measured at night, when though wind speeds may fall at ground level (to near zero), they remain fast enough at 60 metres (and above) to turn the turbine blades. In fact, his measurements shows, wind speeds at night is up to 2.6 times higher than expected. Even in the day background noise is not good at covering the rhythmical thumping caused by the blade as it passes the tower. Consequently, against expectations, the turbines were turning at night and the noise propagating down into an area at ground level where this was no background noise to mask it, and consequently residents were experiencing sound levels 15dB **higher** than expected.

Though turbines were making as much noise as normal, it was carrying much further, and especially at night when it was particularly troublesome. Fascinatingly, Van den Berg has found that the error is smallest within 400m of the turbine but is much greater at distances up to a mile away. Van den Berg concludes,

¹ www.elsevier.com/locate/jsvi

² Science Shop for Physics, University of Groningen, Nijenborgh 4, 9747 AG Groningen, Netherlands

“The number and severity of noise complaints near the wind park are at least in part explained by the two main findings of this study; actual sound levels are considerably higher than predicted, and wind turbines can produce sound with an impulsive character.”“The relatively high wind speeds at turbine hub height at night also have a distinct advantage; the electric power output is higher than predicted and benefits the operator of the wind turbine.”

Van den Berg also believes that infrasound is very probably a significant feature in the audible noise problem. He has pointed out that although inaudible, the low blade passing of wind turbine blades, frequency modulates clearly audible higher frequency sounds and thus creates periodic sound (with the effect strengthened at night). Further he observes that groups of several turbines can interact to amplify this effect.

The Renewable Energy Foundation (REF) has commissioned G. P. van den Berg to produce further research. CEO Campbell Dunford, commented,

“As Van den Berg has said, we are all very much in favour of renewable energy, but it is extremely important that the truth about any turbine noise problems is made public”.

Noise and infrasound

All the developers in Wallonia are currently proposing putting substantial groups of large turbines within 500m of residential areas. Experiences across Europe suggest that there are problems with turbine noise, and Van den Berg’s recent work offers some possible explanations.

This is important and should be investigated further as a matter of urgency.

A well known (July 2006) report of the UK Noise Association (Stewart, 2006) integrating the results of the First International Congress on Wind Turbine noise (Berlin October 2005), confirms the conclusions of the French Academy of Medicine and recommends :

« It would be prudent that no wind turbines should be sited closer than 1 mile away from the nearest dwellings. This is the distance the Academy of Medicine in Paris is recommending, certainly for the larger turbines and until further studies are carried out. There may even be occasions where, a mile is insufficient depending on the scale and nature of the proposed development»

Nina Pierpont³, a worldly reknown specialist stated before the New York State Legislature Energy Committee on the 7th of March 2006:

« To recapitulate, there is in fact a consistent cluster of symptoms, the Wind Turbine Syndrome, which occurs in a significant number of people in the vicinity of industrial wind turbines. There are specific risks factors for this syndrome, and people with these risk factors include a substantial portion of the population. A

³ Nina Pierpont, MD, PhD (2008). “Wind Turbine Syndrome :A Report on a Natural Experiment”. Santa Fe, NM: K-Selected Books) ~100pp.

setback of 1.5 miles from homes, schools, hospitals, and similar institutions will probably be adequate, in most NY State terrain, to protect people from the adverse health effects of industrial wind turbines. »

In the **Walloon municipality of Estinnes** people living at 1000m suffer from Nina Pierpont 's Wind Turbine Syndrome and are suffering from sleep deprivation, elevated stress levels, headaches, feelings of nausea, acouphens and heart arhythmics.

Even the constructor of the wind farm, ENERCON, a well known German firm, admitted the problem and is still working on a solution avoiding the turbines to have to be completely stopped.

In Wallonia there is no setback-rule although most countries are aware of the problem

Hereafter some references on setbacks:

Town of Allegany (New York) 2,500-foot setback from residential home;

http://www.allegany.org/images/upload/town_allegany_wind_energy_law_adopted_8-28-07.pdf ; Town of Lyme (New York)4,500-foot setback from residential villages

<http://www.acousticecology.org/newsarchive/newsarchiveurban.html>; town of Hartsville (New York) 2,460 feet from a dwelling;

http://concernedcitizens.homestead.com/files/windfarms/Hartsville/Hartsville_Draft_L.L.No_2_2009.2.pdfGeorge W. Kamperman, INCE Bd. Cert. Emeritus Kamperman Associates, Inc. george@kamperman.com Richard R. James, INCE E-Coustic Solutions rickjames@e-coustic.com

Simple guidelines for siting wind turbines to prevent health risks 1 km (3,280 feet) or more

setbackwww.windaction.org/?module=uploads&func=download&fileId=1650 ;French

Academy of Medicine 1.5 km (.9-mile) setback kirbymtn.blogspot.com/2006/03/french-academy-of-medicine-warns-of.html ;Trempealeau County (Wisconsin) 1-mile setback

betterplan.squarespace.com/the-trempealeau-county-wind-ord/ ;National Wind Watch

1-mile setback; www.wind-watch.org/press-070402.php; U.K. Noise Association (UKNA)

1-mile setback; U.K. Noise Association: 1 mile setback needed for wind turbines

kirbymtn.blogspot.com/2006/08/uk-noise-association-1-mile-setback.html ;Beech Ridge

Wind Farm (West Virginia)1 to 4 miles setback;[www.beechridgewind.com/Docs/1-25-](http://www.beechridgewind.com/Docs/1-25-06_Beech_Ridge_Wind_Fa_Sheet.pdf)

[06_Beech_Ridge_Wind_Fa_Sheet.pdf](http://www.beechridgewind.com/Docs/1-25-06_Beech_Ridge_Wind_Fa_Sheet.pdf) ;Fayette County (Pennsylvania) Deal reached in wind

turbine dispute 6,000-foot (1.1 mile) setback; www.windaction.org/news/16447;

www.pittsburghlive.com/x/pittsburghtrib/news/fayette/s_573705.html;Noise Radiation from

Wind Turbines Installed New Homes: Effects on Health 2 km (1.2 mile) setback

www.windturbinehealthhumanrights.com/wtnhhr_june2007.pdf Location, Location,

Location: An investigation into wind farms and noise by the UK Noise Association (UKNA)

1 to 1.5 mile setback:www.windaction.org/documents/4281

The conclusion is simple : no wind turbines closer than 1500m from dwellings.

4. Real Estate Devaluation

UK

The British Parliament (House of Lords) reports (4th Report 2007-2008) regarding economic aspects of renewable energy that the tremendous impact of giant wind energy turbines on the market value of houses near to a wind farm has been sufficiently proven by the experts in the field and that it is not surprising that families are fiercely opposed to the location of wind turbines near their homes

« However, to-day giants have a huge impact on value as is evidenced by property experts active in the residential market, for example:

(i) Valuation. April 2008, of "The Farm House", Grays Farm, North Drove, Spalding. Lincs by Valuers "Munton&Russel";

(ii) Valuation. July 2005, of" ... sample of properties inspected near a proposed wind farm at Esgairwen Fawr, Nr Lampeter, by RE/MAX, the Estate Agency Leaders, Carmarthen, Wales;

(iii) Hansard, House of Commons, written, answer 20457 (13 May 08, column 1442W) John Healey: Details of thce types of local council tax discount that were being awarded: "Property affected by the proximity of electricity generating wind turbine"; and

(iv) "Noise Radiation from wind turbines installed near homes; Effects on health" (Frey & Hadden. 2007, Appendix-Property Values, P Hadden FRICS).

It is no wonder that families are adamantly opposed to wind turbines being located close to their homes. »

France

- The Tribunal de Grande Instance de Quimper by judgment of March 21, 2006, condemns the sellers of a house, having concealed from the buyer the existence of a wind power project which they were notified, to repay 30 000 € on a price of original selling from 145 000€ Note that the Notary as well as a Real Estate Agent solicited in quality of Experts, have assessed the less value of a property situated in the vicinity of a wind power project, in a range between 28 per cent to 46 % of its value of origin.
- Judgment of the Tribunal de Grande Instance of ANGERS of 9 April 2009.

« The concealment to any prospective purchasers of the existence of a projected wind park near a property to sell is a fraud affecting the substantial qualities of the property. The seller has the obligation to inform loyally about a wind power project the possible acquirers. An omission in this information creates the buyers with a prejudice by reason of the loss of value of the property, which justifies the damage – interest corresponding to the depreciation »

- Judgment of the Court of Appeal of Angers.

"...that beyond the mere tallness of these structures, their functioning substantially alters near ecosystems since the technical documentation annexed to the impact study reveals that each device will have a speed of rotation of 6 to 19,5 t/min, which will reach at the end of pale 25 to 80 m per second; that the pale will cover a surface swept of 5281 m² and will issue aerodynamic noise increasing with the speed of rotation, and that can reach, with the sounds of the mechanical parts of the turbine,

a sound level of 38,1 dB(A) in day functioning, and 35, 8 dB(A) of night. Only in respect of these objective data, and without the need to enter the controversy between the emotional activists of wind energy and residents of existing parks, [the sellers] may not seriously argue that the implantation in the vicinity of their dwellings (between 1,1 and 1, 6 km) of constructions as big and perfectly unusual in the landscape that these wind turbines, sources of inevitable noise and important transformations of the environmental landscape, could be considered as an event to this point innocuous and negligible that they could, hide it to their future purchasers... »

Germany

Prof. Hasse (Goethe University Frankfurt) has published a study concerning the influence of wind turbines on the commercial value of built-up land "Der Einfluss auf den von Windkraftanlagen Verkaufswert bebauter Wohngrundstücke». After an inquiry near the offices of cadastre and estate agents he concluded to a decrease of 30 until 50 %.

See <http://www.geo.uni-frankfurt.de/ifh/personen/hasse/>

Wallonia

- Limoy

A real estate agency has estimated the loss due to a wind power project near (550m) a team-manage & corps of homes to 30%.

- Florée- Maibelle

Several expertises have been carried out by a well known Real Estate Agency (*Comptoir Immobilier de Huy*). The surveying concerned homes and lands to build. These goods (among them a castle, farms and houses) would suffer a devaluation of the order of 10 to 25%.

- Tinlot-Seny-Fraiture

Real Estate surveyings on several buildings have been carried out by a Land Counter Society gave the same results as above mentioned.

5. The Myth of Onshore GHG-reduction

Given the fight against global warming, very often opponents are made feel guilty when they refuse to accept wind turbines in their immediate environment. However it is important to stress that, in Belgium, onshore wind energy does not participate at all in GHG-reduction, due to the fact that the fluctuations of daily power demand, the inelasticity of the implemented base load, the gas turbines control of wind intermittency and its corresponding heat-rate penalty (in the terminology of Kent Hawkins), the onshore insufficient producible (load factor less than 20 %), the uselessness of nocturne wind power (the English National Grid stops the wind turbines at 4 am, the GHG balance becomes negative. There are no terrain-studies measuring the reel impacts and the European accounting rule 1MWh wind energy = 456Kg

GHG less is a pure convention that does not at all correspond to reality. Appendix 2 contains a more in-depth analysis of this problem.

6. Birds, Bats, and Other Wildlife

All Belgian bird-protection organizations are aware of the problem but divided by green policy obsessions. The spinning blades kill and maim birds and bats. Especially vulnerable are large birds of prey. European Guidelines state that wind towers should not be near wetlands or other known bird or bat concentration areas or in areas with a high incidence of fog or low cloud ceilings, especially during spring and fall migrations. It is illegal to kill migratory birds. A 2002 study in Spain estimated that 11000 birds of prey (many of them already endangered), 350.000 bats, and 3.000.000 small birds are killed each year by wind turbines. Another analysis⁹ found that it is officially recognized that on average a single turbine tower kills 20–40 birds each year. The wind industry, in contrast, cites the absurdly low results.

7. Conclusions

Wind energy development in Wallonia is a useless whim mainly because of the fact that the Belgium offshore potential is huge and amply sufficient to respect our international obligations related to renewable energy quota. Moreover Wallonia's great wealth is the solid biomass which in 2020, on its own, will be able to produce 11% of the estimated electricity, whereas our national (Belgian) obligation 13%! In a densely crowded country like Belgium, wind turbines are a great nuisance for people, bats and birds because it appears to be impossible to respect serious setbacks. Onshore wind energy does not play a significant role in GHG reduction. The Belgian onshore oppressiveness index is seven times higher than in France. As the wind turbines are constructed and maintained by foreign companies, the local economic impact for is inexistent. So why continue??