



Grant Agreement N° EIE/04/130/S07.38591

WINEUR

Wind Energy Integration in the Urban Environment

SOCIO-ECONOMIC COUNTRY REPORT

-

FRANCE

February 2007

The sole responsibility for the content of this publication lies with the authors. It does not necessarily reflect the opinion of the European Communities. The European Commission is not responsible for any use that may be made of the information contained therein.

Table of Contents

1. Introduction	3
1.1. Methodology.....	3
1.2. Short description of the status of UT on national level: technology, producers, projects, stakeholders, ambitions, bottlenecks.....	3
2. Outcomes of the survey	4
2.1 Socio-economical factors regarding UT: safety, noise, visual impact, environmental effects, effects on job creation, energy balance, financial balance	4
2.1.1 Attitude regarding energy.....	4
2.1.2 Attitude regarding wind turbines installations.....	6
2.1.3 Opinion on some urban wind turbine	6
2.1.4 Opinion on the best implantation of urban wind turbine.....	8
2.1.5 Foreseen obstacles to wind turbine installations	9
2.2 Individual socio-economic criteria: niceness, size, safety, noise, energy balance, financial balance, attitude regarding (renewable) energy, experience with (renewable) energy	10
2.2.1 Level of acceptance of urban wind turbine on roof	10
2.2.2 Message to the French government	11
2.2.3 Attitude and experience regarding (renewable) energies	11
2.3 Market situation, readiness of the potential user: investor, energy producer, building owner to choose for UT.....	13
2.4 Recommendations regarding conditions and possible actions to stimulate the acceptance and implementation process of UT: architectural integration, safety, test procedures, information packages, communication and market development.....	13

1. INTRODUCTION

1.1. Methodology

The objective of this WP4 is to identify the socio-economic and non-technical aspects of UT (urban turbine) then identify barriers and recommend strategies to overcome them and finally highlight the benefits of UT. To achieve that, it is particularly important to gather the maximum relevant actors points of view. In this frame, the consultant has conducted interviews in the building sector and particularly has invited architects and public housing offices to response to few questions. This report is the results of the detailed analysis of data generated by project survey and interviews.

According to the recent status of the French UT market development, it was unfortunately impossible to respond to all the objectives fixed for this country survey report. Indeed, France, on the contrary to UK or The Netherlands, accounts no urban turbine in operation. Thus, there were no possibilities of measuring aspects such as: technical effects, noise, safety and lightning or environmental or visual effects. Without any installations, no conclusions could be made on any measurable impact such as: the status and bottlenecks from UT integration, the implications of UT for the local economy, on the market situation or on CO2 balance. That's why these topics are not appearing in this country report. This report is only presenting items relieving the possible acceptance of this new technology from the building sector. At this stage, it was then difficult to assess the readiness of other potential user (investor, energy producer) than architects and building owners. However, it should be reminded that architects and building owners (OPAC, HLM) have an important role to play in UT development. Architects as well as public building owners could influenced many in the willingness to integrate UT in the building conception.

Thus, to gather individual socio-economic criteria, architects and public housing offices have be questioned on various indicators to highlight UT acceptability. After inviting architects to answer a questionnaire hosted by the French architects website www.architectes.org, we collected around 30 questionnaires. It helped understanding the vision of the French Architects concerning urban wind turbines, their wishes as to how to develop their presence, and their fears, and maybe sometimes scepticism. Furthermore, some French public planners and housing owners (e.g. OPAC and HLM) have been subjected to the same survey. Due to few answers collected, the conclusions would not be the more representative it could have been. However, it shouldn't be analysed as a weak interest in urban wind turbine since all the French pilot projects has been conducted on public buildings.

Throughout the analysis of the answers it should be bared in mind that the different stakeholders who answered were already interested by the energy question since the questionnaire was not made compulsory.

1.2. Short description of the status of UT on national level: technology, producers, projects, stakeholders, ambitions, bottlenecks

Firstly, small wind turbine is not yet really well defined. In France as well as in European Union, urban turbines are a fairly new product.

The market for UT is underdeveloped and there is apparent lack of knowledge with these products. There exists in France some wind turbine producers (manufacturing also some wind turbine) but the experience of France in urban wind turbine is not really extended yet. The few examples of small or medium power wind installations existing in France in an urban or semi-urban environment are mainly for educational purposes. They provide part of the electricity for a community or public building with a high cost per kWh produced, normally higher than the tariffs or purchase currently in force. In conclusion, France is suffering from this lack of products which implies higher cost per unit. At the opposite to the large-scale wind turbines, the UT market hasn't reached the maturity level and is even not really existing.

The WP2 report, named “technical and economic aspects”, has outlined that an important issue for small wind turbines is its economical profitability. Very clearly, the feed-in tariff in force (8,30 Eurocents/kWh) encourages large-scale wind turbine development, whose technological maturity allows profitability of the projects on the basis of this tariff. However, the production and installation costs of small wind turbine technologies are higher than large scale wind and this tariff does not allow for economic feasibility of installations (very long pay back period).

Following conclusions from the WP3 “Legal and administrative aspects”, small wind turbine are facing some administrative constraints such as long connection procedures or unclear authorizations process. A building permit seems to be necessary whereas impact study and public consultation would rarely be useful.

At last, UT seems to suffer in France from this lack of knowledge (technological, administrative, economical), from this bad image and confusion with the large-scale wind turbines (negative impacts as noise and visibility). But seeing the growing presence of renewable energies in the building sector (e.g. PV systems) in France and across Europe, UT could emerge in the future when overcoming the various constraints highlighted. This survey will then summarize the first degree of UT acceptability from the building sector.

2. OUTCOMES OF THE SURVEY

2.1 Socio-economical factors regarding UT: safety, noise, visual impact, environmental effects, effects on job creation, energy balance, financial balance

Results from the survey have been examined to sort out the socio-economical factors regarding UT such as safety, noise, visual impact and environmental effects. As only one urban turbine is installed in France, no effects on job creation or real energy balance could be assessed. The parties being questioned do mention the advantages of a collective production of renewable energies. However no detailed data related to some economical and financial factors could be analysed yet in France.

2.1.1 Attitude regarding energy

Firstly, the persons interviewed were asked on the importance they focus on energy questions. This issues enclosed for instance environmental problems, current state of energy consumption (price, production capacity), impacts on the society.

According to the figure 1, it is obvious that it is mainly the unknown about the future and the environmental issues raised by the energy problem that are motivating the architects. They consider that the economics behind is the second reason. Public housing offices have the same consideration and are particularly concerned about greenhouse gases and the future also related to the waste of energy, mentioned by some parties.

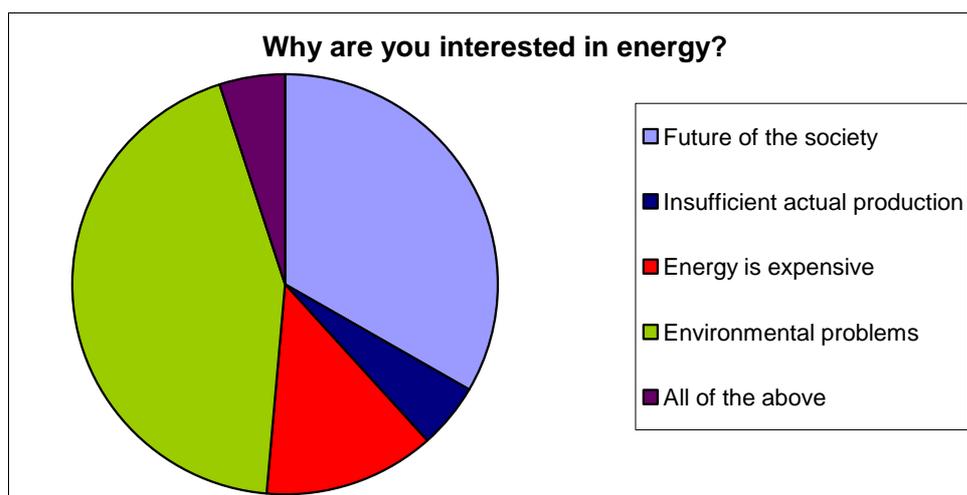


Figure 1: Architects reasons of interest in energy

Then, it was interesting to highlight the knowledge of renewable energies within the building sector. Their representative were asked to enumerate a few renewable energies.

Among the most frequently renewable energies mentioned by architects (see figure 2), we find wind energy and solar energy, without distinction in between Photovoltaic or Thermal. Geothermal and biomass come second, finally we find hydroelectricity. It's interesting to find hydroelectricity at the end, when it's France first renewable source of energy actually used. Architects having not much to do with it, it might explain this classification.

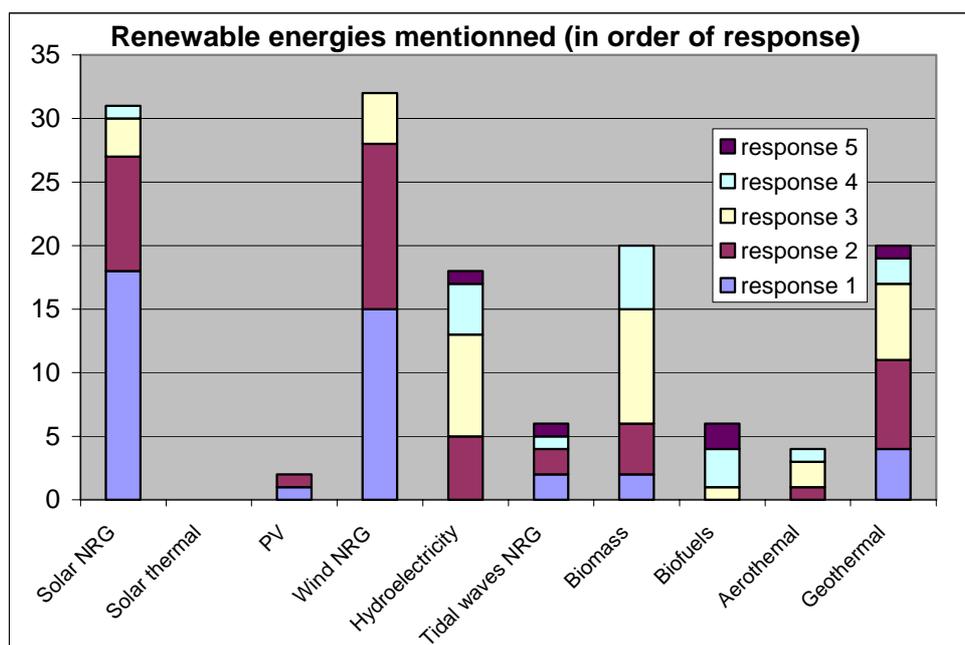


Figure 2: Knowledge of renewable energies

Public housing offices have a large concern about renewable energies and they've particularly mentioned biomass, solar (thermal, PV), hydroelectricity, wind. In France, governmental actions were first focused on public housing with for example the participation of OPAC in the integration of solar thermal appliances in building design. This could explain that hydroelectricity or wind energy are not the first to be stated since they were not seen useful for public housing needs.

2.1.2 Attitude regarding wind turbines installations

To assess the acceptance of urban turbines, it was of a great interest to evaluate the opinion from the building sector on wind energy. First asked if they knew wind energy, they were questioned on implementation problems.

In France, large scale wind parks installations always lead to a lot of controversies. Thus, Architects such as Public housing offices are not without having heard a lot about them since it's the cause of numerous public debate. They dread that a few of the problems encountered in large scale installations may be the same for small building scale wind turbines.

90% of the architects have heard of installations problems and regarding to them it's mainly noise problems, followed closely by landscape integration ones, sometimes due to the esthetics of the object itself (see figure 3). They are mentioning finally some people mentalities who are not ready for a change in electrical production means. Public housing offices raise the same points adding the threat of neighbourhood and building permit. This could be explain by the fact that they are usually confronted to administrative procedures in their work.

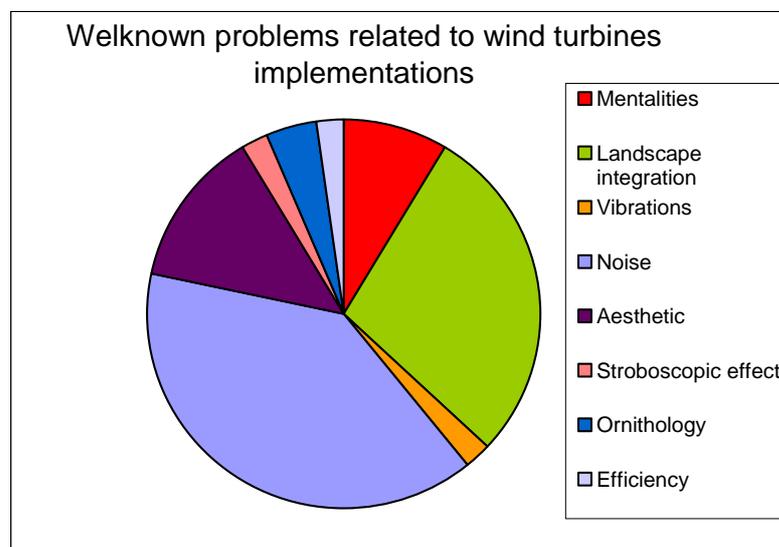


Figure 3: Well-known problems related to wind turbines implementations (architects points of view)

2.1.3 Opinion on some urban wind turbine

65% of the architects declare having heard of urban wind turbines but only 35% of them have actually seen one. A large proportion of public housing offices, such as architects, knew the existence of urban wind turbine. Since urban turbine are not really of common use, few of the representative have ever seen one.

To foresee the success and the acceptance of urban turbines, the directly involved parties from the building sectors were asked to give their opinion on the following proposed design. The answers and the classifications on the wind turbine pictures are as such (mean of the given marks) :



Photo n°1: 7,75



Photo n°2: 5,2



Photo n°3 : 6,1



Photo n°4: 6,15



Photo n°5: 7,95



Photo n°6: 6,95



Photo n°7: 5,5

It is then the 5th wind turbine that has the preference of the architects. A wind turbine quite similar in design with its big sisters. However, the 1st wind turbine, which design could be assimilated with an aeration chimney is being well accepted too. This design is particularly adapted to urban environment.

Public housing offices do share the same point of view as architects. They are not stop by the aesthetics of the turbine particularly linking this results to the question “what are you thinking about urban wind turbines?”. All parties, architects such as building owners, have mainly answered positively (see figure 4).

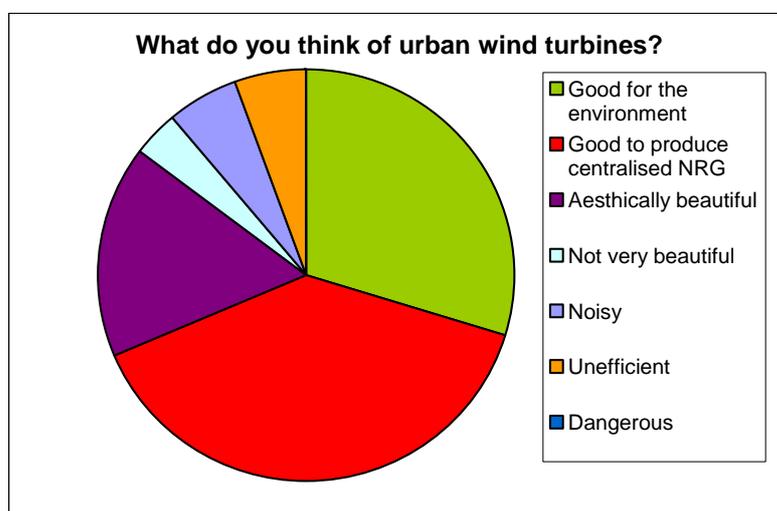


Figure 4: Architects opinion on urban wind turbines

They stress out the environmental positive aspects of having a centralized production, and they are quite positive about their esthetical appearances. 15% of architects are noting negative aspects due to the noise they might generate and their inefficiency. Public housing offices do not really precise negative effects of noise even if this issue has retain their attention for large wind turbines.

Concerning the question “is an urban wind turbine enough to provide a household with enough electricity?”, 45% of architects answer yes. 10% are undeceive. Again, the lack of experience return is probably driving these answers. On the contrary, communication on collective building solar projects was particularly directed to public housing offices. They are indeed particularly incite by the government. That might explain that the parties interviewed do think that urban wind turbine could provide enough electricity for a household.

Owing to the architects (see figure 5), the most two important criteria that should decide the implementation of an urban wind turbine or not are the noise and the security. These two should be followed by the investment costs and finally the aesthetics. Public housing offices do follow this opinion. The aesthetics is placed after each criteria. First technical aspects such as security, vibrations, site implentation, are of the main importance. Then, considering that planners or owners do think in terms of project management and rentability, the economical aspects (costs, amortization) are also of their concern. They do think about aesthetics since

they are aware that they could face problems. But the economical and environmental advantages of collective supply are highlighted as more essential than the aesthetics.

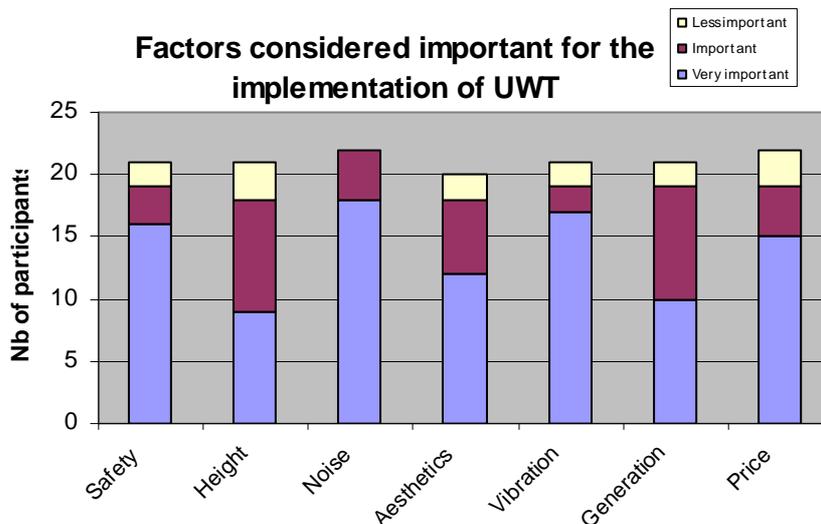


Figure 5: Factors considered as important for the implementation of UWT

These results prove also that French Architects are mainly concerned at that stage by the technical feasibility of an urban wind turbine and not so much about the appearances they could have. All the representative questioned were positive that if most of the criteria they judge essential were respected, they would implement a wind turbine on their own roof. This choice would come out of a “duty as a citizen” feeling, defending environmental values. The only two reasons that could still discourage them to install any, despite the validation of the important criteria, would be the administrative constraints and the bad efficiency in case of a bad exposure.

2.1.4 Opinion on the best implantation of urban wind turbine

French Architects and public housing offices are quite favorable to wind turbine on any type of building rooftop. Public buildings and business centres have their preferences (see figure 6). Some of them would well imagine wind turbines in parcs or public gardens. The pose of such machines on individual houses roof top is however not accepted by everyone (only 40% of the architects have answered favorably to this one). This type of implantation is also not considered by public housing offices.

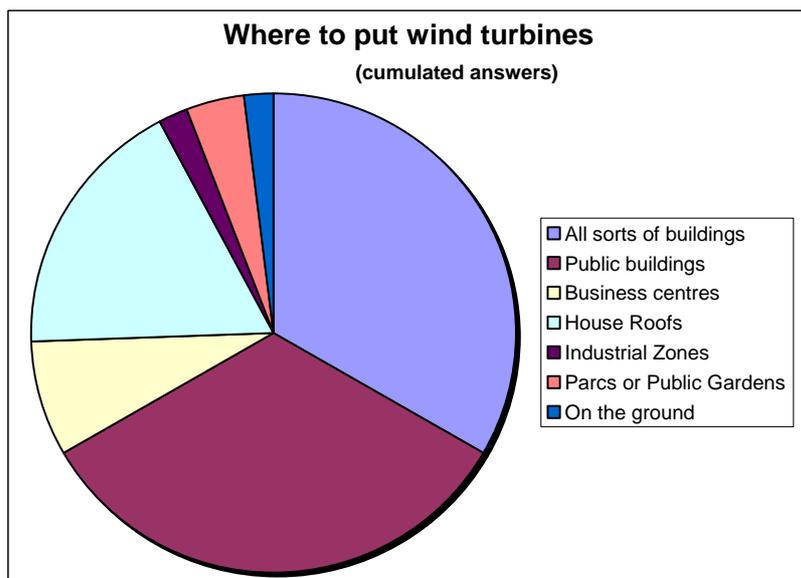


Figure 6: Opinion of Architects on possible wind turbine implementation

Finally, someone suggested that, just as a lot of objects had been integrated to urban landscapes (advertising panels for instance), small wind turbines could be scattered a bit everywhere.

2.1.5 Foreseen obstacles to wind turbine installations

The feared obstacles to the installation of an urban wind turbine are essentially of an administrative type. It is the obtention of the authorisations and the construction permits that can take ages that are seen as the biggest issue. One of the organisation feared as being capable of causing a lot of troubles is the “Architectes des Bâtiments de France”. This institution, constituted by architects and jurists, is in charge in France to apply quite conservative rules aimed at protecting the national patrimony. They are known to be strict and they could indeed be an entity hard to deal with when it comes to historical sites.

Architects are questioning as well the technical certifications of such machines. Finally, they can foresee a problem in the mentality of the inhabitants themselves who could not welcome these new machines in town.

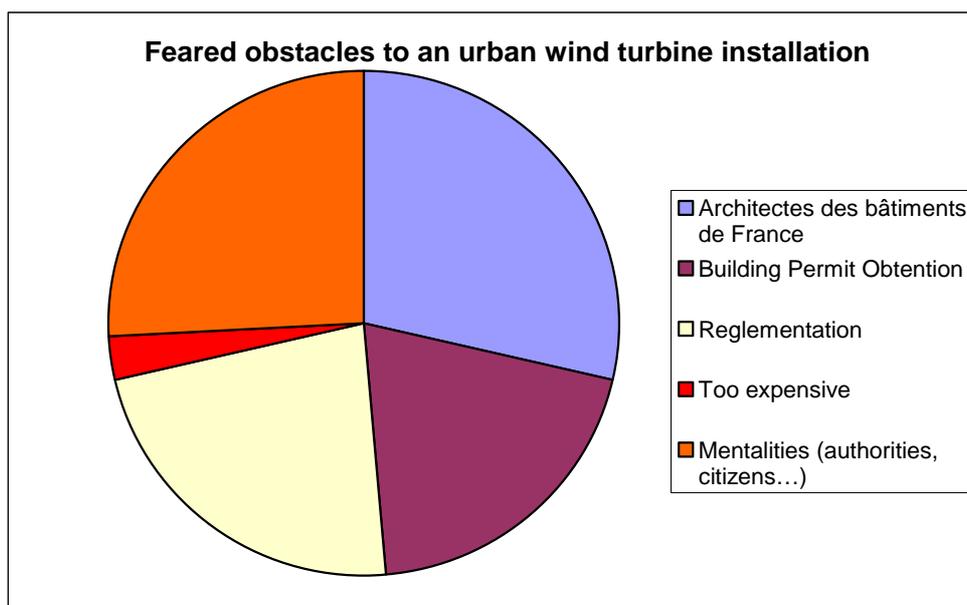


Figure 7: Feared obstacles to an urban wind turbine installation

What have been pointed out by public housing offices is the reluctance of lenders. They also see administrative problems related for example to authorisation or electricity resaling.

2.2 Individual socio-economic criteria: niceness, size, safety, noise, energy balance, financial balance, attitude regarding (renewable) energy, experience with (renewable) energy

85% of the architects who answered the questionnaires have never heard of the DEPEB, in force since January 2006 following the Russian ratification of the Kyoto Protocol. We guess that it is mainly because the NRT 2005 has been integrating a lot of the norms and exigences of it. Therefore, the architects did not have to take notice of it.

Public housing offices don't all have heard of this European directive. It's probably depending on the communication surrounding this measure.

2.2.1 Level of acceptance of urban wind turbine on roof

To the question "Why should you put or not a wind turbine on an urban roof?", the following arguments have been advanced by architects (see figure 8).

Only two architects interviewed judged the implantation of urban wind turbines as being a bad idea, supposing that they are not very efficient. Two others questioned the acceptance by the neighbours in case of the proximity of the installation.

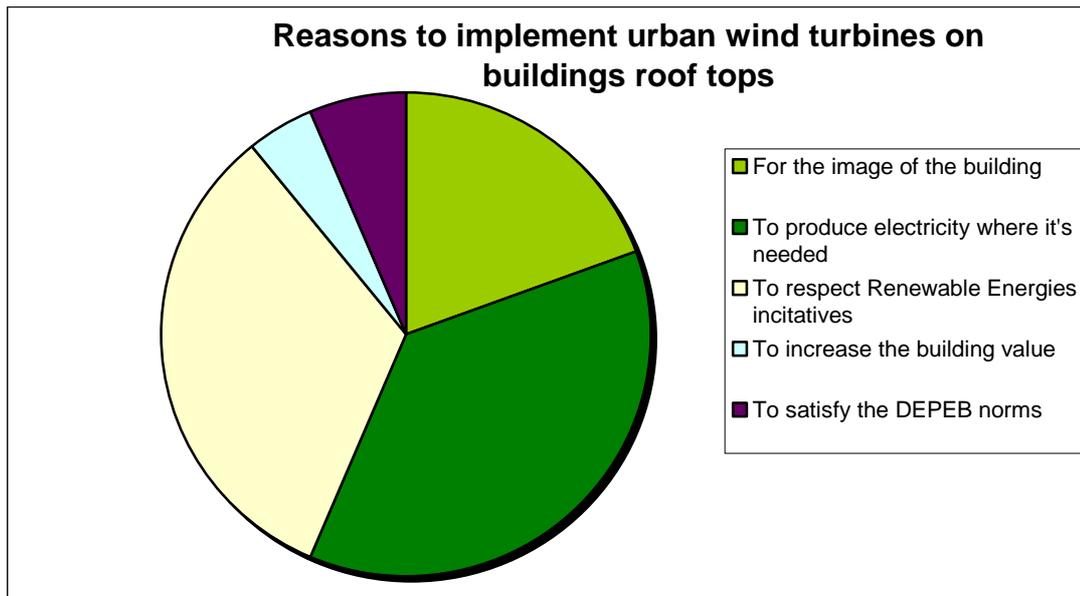


Figure 8: Reasons advanced by Architects to UT implantation on buildings rooftops

From a general point of view, architects are shared in between two tendencies. There are the ones who would promote the installation of urban wind turbines for the interest of having a local production on an environmental level, and the others who see in it the mean to satisfy the new NRT 2006 (French decree concerning building energy performances). The public housing offices are also divided concerning these items. Let's stress out here that the electrical production of urban wind turbines should only be used within the building if it were to be part of the NRT 2006, producing electricity for ventilation, heating and lighting. All the representative insist on the willingness to produce its own renewable energies.

Only a few Architects see there the mean to increase the value of the building. On the contrary, public housing offices advance the importance of the image. This is linked to the ecological advantages for the building viewed in this installation.

2.2.2 Message to the French government

The building sector is in general in favour of an acceleration of renewable energies integration. They wish they could based themselves on legal texts and regulations such as technical evaluation from the CSTB (Buildings Scientific and Technical Centre). In the frame of HQE procedure (one point of the RT 2005), the sector wish to adopt the use of renewable energies. Thus, they wish the government for example to create a legal and regulatory framework integrating noise restrictions and design conditions (surface, height) borders in order to facilitate the administrative procedures.

In conclusion, if they were to address the French government, the Architects and other representative from the building sector would like to ask it to ease the procedures to implement urban wind turbine, or making them clearer and more incentive. A lot have asked for the creation of a tax credit as these turbines are concerned. It proves that the information concerning the new article 90 (decree 2005) on tax credit is not yet well-known. Indeed, in the decree, a tax credit of 50% is mentioned for any kind of energy production of a renewable source.

2.2.3 Attitude and experience regarding (renewable) energies

The persons have been asked to answer the questions "are you using yourself renewable energies? What should be green energy price" in order to assess the current attitude regarding renewable energies.

50% of the architects or other building representative who answered the questionnaire were equipped with a renewable energy production machine. This share being quite high, it proves that the architects who took the time to answer the questionnaire are definitely interested by these green energies. For the other 50% who are not using renewable energies, they explain that this choice is mainly driven by the high price of such energies. Architects explain that to adopt renewable energies they are waiting for some conditions which are summarized in the following table and graph. The first argument is related directly to the price in comparison with traditional energies expenses. The other one is linked to the return on investment expected to finally adopt these new energies.

CRITERIA ADVANCED BY ARCHITECTS TO ADOPT RENEWABLE ENERGIES

Criteria 1 : RE should be less expensive than traditional ones

Criteria 2 : RE Price should be the same as traditional ones

Criteria 3 : RE Price could be 10% more expensive than for traditional ones

Criteria 4 : RE Price could be 20% more expensive than for traditional ones

Criteria 5 : RE Price could be 30% more expensive than for traditional ones

Criteria 6 : RE Price could be 50% more expensive than for traditional ones

Criteria 7 : ROI should be less than 5 years

Criteria 8 : ROI should be less than 10 years

Criteria 9 : ROI should be equal to appliances lifetime

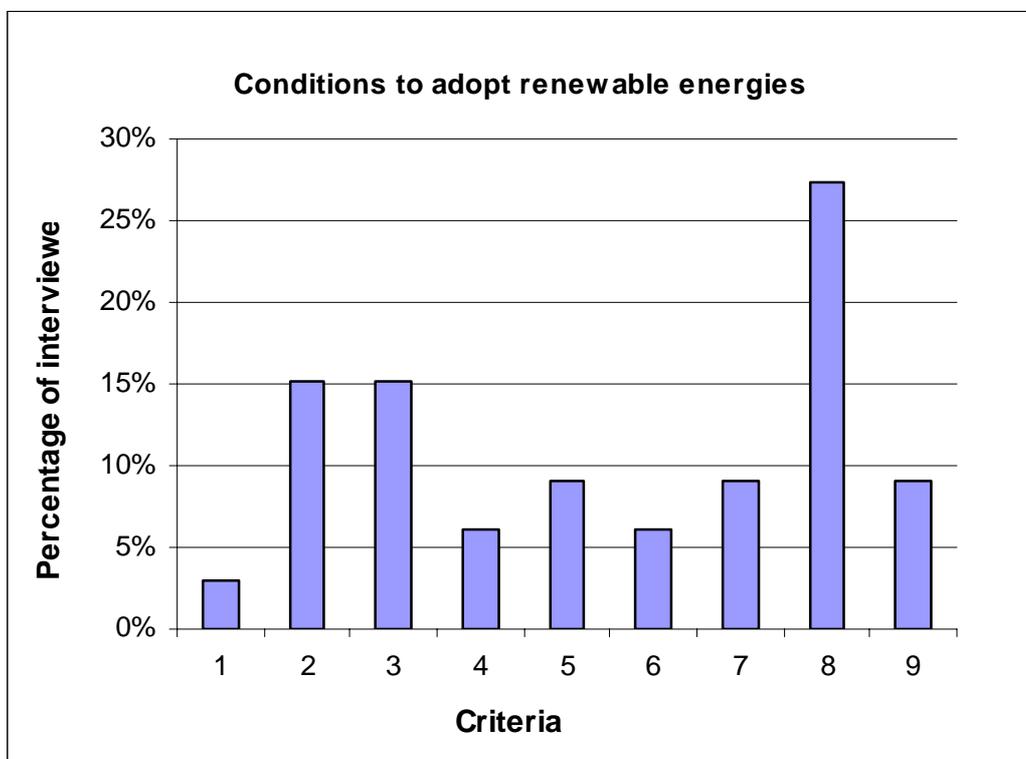


Figure 9: Green Energy price suitable

This figure 9 points out that architects are fixed to the idea of having a price for renewable energies that could be equal or at least 10% more expensive than for traditional energies. On the other side, architects are expecting a return on investment being less than 10 years not more.

Some of the public housing offices have also mentioned the high costs. However they show a strong interest to renewable energies but they are waiting for better profitability. They are advancing the need to have renewable energies equipment competitive with traditional energies (costs, return of investment, payback period, amortization). Furthermore, they are expecting them to induce lower collective charges.

Architects have mainly equipped house or buildings with solar hot water systems and heat pumps. Two had PV panels too. The renewable energies mainly encountered in public housing or buildings are solar thermal or PV systems and heat pumps.

To the question *“who is responsible for the development of renewable energies in France?”*, architects interviewed are convinced that consumers are the main actors of this development. They think that whatever the government puts in place (though it has to start there), things won't change if the public does not respond. Public housing offices, nonetheless, are mentioning the need for more governmental implication towards the development of renewable energies.

A few percentage of architects (5%) is holding EDF responsible for the development of renewable energies. Public planners and building owners are sharing the same point of view.

At last, to the question *“are renewable energies a question of image first of all?”* just about no one has answered positively to this question.

2.3 Market situation, readiness of the potential user: investor, energy producer, building owner to choose for UT

As the market in France doesn't exist for the moment (only one installation), it's difficult to assess the readiness of the potential user such as investor or energy producer. During this survey period, the consultants was able to evaluate the points of view from the building sector concerning the image and the development of renewable energies in France (see 2.3.3). As architects and public building offices interviewed are particularly important in social and public building construction, those opinions are important for the suitable integration of UT in public offices, social or collective building (HLM). Those interviewers are representative from one market segment where individual housing are not really considered.

2.4 Recommendations regarding conditions and possible actions to stimulate the acceptance and implementation process of UT: architectural integration, safety, test procedures, information packages, communication and market development

As explain all along this report, no measurable impacts from UT could be outlined since there is no French UT installations. Within this survey results, it's not possible to give précised conclusions on architectural integration, safety, environmental and visual impacts or communication and market development.

Today, it is clear that administrative constraints are the main brakes foreseen by the building sector representatives, followed very closely by the technical viability. Indeed, they are similar to the actual constraints that larger size projects are submitted to. However, Urban turbines are in addition suffering a non appropriate feed-in tariff.

Due to these economical and technical constraints to UT development, French architects are eager to hear about feedbacks from existing installations since the French ones are really limited. They are curious of what's happening in other countries too. Finally, French architects

are doubting sometimes the efficiency of such machines, and wonder what kind of certification they have from the CSTB (Buildings Scientific and Technical Centre).

Other representatives from the building sector (urban planners, house and building owners) share the architects point of view and do see administrative procedures (construction permits, electricity resale) as constraints. That's why there are all convinced that the government should be clearer and more incentive towards urban wind turbine.

France chose to support the policy for national wind power development by the definition of a feed-in tariff which is unfavourable to the UT. There is currently no mechanism of subsidy set up by central government directly aimed at small wind turbines. In the current national context, it thus seems particularly important to obtain from central government a specific feed in tariff for small wind turbines. It would be particularly appropriate to regard the small wind energy technologies as units of small electricity production, similarly to solar photovoltaic technology, and thus to apply to the small wind turbines the same tariff that currently applies to electricity generated from solar photovoltaic, namely: 25 euros cents/kWh.

It is however possible to consider, within the framework of demonstration projects, subsidies from local authorities (region or department) whose contribution to development of small wind turbines is significant. There is one last measure to note. A tax measure which applies to private individuals who can benefit from a 50 % tax credit on the amount of investment in renewable energy.

In conclusion, it is recommended that a specific feed-in tariff policy is adopted. Above all, as there are no French manufacturers but a lot of small foreign ones, these incentive measures are necessary to see one of them willing to enter the French market. With no big price cutting effect coming from no existing large production volumes, grand funding are essential at that stage essential to make the French market attractive.

Regulatory constraints are barriers to the implementation process of UT (see in the WP3 report the paragraph on administrative and planning barriers). For, example, any turbine that exceeds 12m in height requires a building licence. For building mounted turbines, the restrictive interpretation of the general rules of town planning makes it necessary to include the height of the building. This administrative position means that many impact studies must be undertaken, which dramatically increase the implementation costs and time to obtain a building license. This constraint is very unfavourable for the installation of small or average power wind turbines on large buildings and the situation is not aided by the grid-connection procedures which are also long and complex. However, this definition is not clear concerning turbines on rooftops, is the height of the building counted? To promote the emergence of the UT market, administrative procedures such as the juridical framework should then be simplified and made clearer.

Finally, promotion is also one component essential to the establishment of a mature market for UT. Communication should actually been increased to develop UT awareness in Europe and particularly in France.