

EUROPEAN COMMISSION

Administrative and Planning Issues for Small Wind turbines in Urban Areas

WINEUR Deliverable 3.2

October 2006

ITP/0875

HORISUN

AXENNE

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Intelligent Energy  Europe

European Commission

Client contract No.: EIE/04/130/S07.38591

IT Power reference: 0875

Deliverable 3.2

October 2006

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Document control	
File path & name	I:\0WorkITP\0Projects\0875 WINEUR\2 Work\0 WP 3 Legal and administrative\Combined report v2.2.doc
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Date	21 st November 2006
Distribution level	Public domain

Template: ITP REPORT Form 005
Issue: 02; Date: 27/08/04

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1 INTRODUCTION

This report has been prepared for the WINEUR Project (Wind Energy Integration in the Urban Environment), an initiative funded by the European Commission's Intelligent Energy Europe Agency under the ALTENER Programme.

The report first provides an overview of the international and national policy environment and then goes on to provide information on the non-technical barriers to implementation of small wind turbine projects in urban areas, focusing chiefly on administrative and planning barriers. It draws its information mainly from sources in the UK, France and The Netherlands, including many discussions and interviews with local authority and municipality personnel, manufacturers and suppliers of small wind turbines which took place between April 2005 and October 2006.

The information presented in this report will provide the reader with an understanding of the main non-technical constraints to small urban wind development. The reader is encouraged to use the references provided and to contact their national wind energy association and/or local authority for information on administrative and planning procedures that may apply to the installation of small wind turbines in urban areas in their country and region.

2 BACKGROUND

Until recently, the main renewable energy technologies implemented in urban surroundings were solar thermal, solar photovoltaics and heat pumps. In the last few years, small wind turbines have started to become available and are also being installed in urban areas. Like photovoltaics, urban wind turbines generate electricity on site, avoiding transmission losses and enabling individuals and organisations to visibly express their commitment to the generation of green electricity.

However, small wind turbines for the urban environment are a relatively new product. The market is underdeveloped and there is limited experience with the installation and grid-connection of these products. Consequently, the need for information related to the existing technologies, the economics, the regulations, planning procedures and guidelines specifically related to urban wind turbines is fundamental to enable market development.

The main objective of the WINEUR project is therefore to identify the conditions necessary for the greater integration of small wind turbines in the urban environment and to promote the emergence of this technology as a real option for electricity supply in towns and cities across Europe.

The first Work Package (WP1) of WINEUR, "State of art and experiences gained", produced a comprehensive catalogue of small wind turbines available in Europe suitable for urban installation with an accompanying guide to small wind energy, and a report on the current wind energy situation in a selection of countries in Europe and worldwide.

The second Work Package (WP2), "Techno-economic and grid connection aspects" produced two reports covering the cost of installation of the different technologies and their economic viability and the grid connection issues relating to small wind turbines.

This report is prepared under Work package 3 (WP3) of WINEUR, "Legal aspects and administrative constraints", which examines the administrative and planning issues relevant to the integration of small wind systems in urban areas. The report covers international and national policies relevant to small wind turbines and uses a combination of information, mainly from the UK, France and The Netherlands, to examine administrative and planning issues, limitations, barriers and solutions for small wind urban integration in the urban environment.

Further information on the WINEUR project, all published documents and reports and a brief outline of activities under all work packages are available to download from the project website at www.urban-wind.org.

3 INSTITUTIONAL AND POLICY FRAMEWORK

The European Union and its individual member countries have committed to achieving greenhouse gas (GHG) emissions reduction targets under the Kyoto Protocol. Over the last few years and particularly since the Kyoto Protocol came into force (became a legally binding agreement) on 16th February 2005 this commitment has been informing the policy of the European Union, as well as the policy of individual member countries with regard to the environment and GHG emissions. One of the main sectors affected by these policies is to decrease emissions is the energy/electricity sector. Therefore this section will briefly outline the Kyoto commitments of the EU and its member states, and European and national policies for emissions reductions in the electricity sector, as this is the policy area most relevant to the development in the urban small wind energy sector.

3.1 The Kyoto Protocol

The Kyoto Protocol is an international agreement setting targets for the reduction of greenhouse gas (GHG) emissions in industrialised countries. Gases addressed by the scheme are Carbon Dioxide, Methane, Hydrofluorocarbons, Perfluorocarbons and Sulphur Hexafluoride. As of October 2006, a total of 166 countries and other governmental entities have ratified the agreement, representing over 61.6% of emissions from industrialised countries. By 2008-2012, the industrialised countries have to reduce their GHG emissions by 5.2% below their 1990 levels. The EU has collectively agreed to reduce emissions by 8% below 1990 levels to contribute to this overall target. The 15 individual member countries of the EU at the time of ratification of the Protocol have made the following commitments as shown in Table 1.

Table 1. EU member commitments

Country	Emission reduction (compared to 1990)	Country	Emission reduction (compared to 1990)
Austria	-13 %	Ireland	+13 %
Belgium	-7.5 %	Italy	-6.5 %
Denmark	-21 %	Luxembourg	-28 %
Finland	0 %	Netherlands	-6 %
France	0 %	Portugal	+27 %
Germany	-21 %	Spain	+15 %
Greece	+25 %	Sweden	+4 %
		United Kingdom	-12.5 %

An interesting aspect of Kyoto is that it enables a group of several industrialised countries to join together to create a so-called 'bubble', or a cluster of countries that is given an overall emissions cap and is treated as a single entity for compliance purposes. The EU elected to be treated as such a group, and created the EU Emissions Trading Scheme (ETS). The scheme went into operation on 1 January 2005, although a forward market has existed since 2003. This has affected implementation of national policies in the EU member countries to curb emissions. For example, the UK established its own learning-by-doing voluntary scheme, the UK ETS, which runs from 2002 through 2006. This market will exist alongside the EU's scheme, and participants in the UK scheme have the option of applying to opt out of the first phase of the EU ETS, which lasts through 2007.

3.2 EU Directives relating to energy and emission reductions

The EU's commitment to the Kyoto Protocol has prompted some specific directives and schemes to encourage reduction in energy consumption and increase in the use of renewables across the EU member countries. It is not possible to go through all the relevant initiatives here but three of the most important recent directives and schemes will be outlined. These are the Renewables Directive (2001), the EU Emissions Trading Scheme and the Energy Performance of Buildings Directive (2003).

3.2.1 *The Renewables Directive*

The European Union's Renewables Directive (RD), which came into force in October 2001, proposes that Member States adopt national targets for renewables that are consistent with reaching the overall EU target of 12 % of energy (22.1 % of electricity) from renewables by 2010. Each member country therefore has its own target for renewable electricity production in order to meet this EU target.

3.2.2 *The EU Emissions Trading Scheme*

The EU Emissions Trading Scheme (EU ETS) is one of the policies being introduced across Europe to reduce emissions of carbon dioxide and combat climate change. The EU ETS works on a "cap and trade" basis. EU Member State governments are required to set emissions limits for all installations in their country covered by the scheme. Each installation is then allocated allowances equal to that cap for the particular phase in question. The allocation of allowances is set out in the National Allocation Plan for the particular period. Installations may meet their cap by either reducing emissions below the cap and selling the surplus, or letting their emissions remain higher than the cap and buying allowances from other participants in the EU emissions market in order to meet the cap. The first phase of the EU ETS started on 1st January 2005 and runs till the end of 2007. The second phase runs from 2008 – 2012 to coincide with the first Kyoto Protocol commitment period.

3.2.3 *The Energy Performance of Buildings Directive*

Buildings account for some 40 % of European energy consumption. The Directive on the Energy Performance of Buildings (EPBD) aims to ensure that building standards across Europe place a high emphasis on minimising energy consumption. Member States need to incorporate the Directive on the energy performance of buildings into national legislation by January 2006. Under this directive:

- a common methodology for calculating the energy performance of a building, taking account of local climatic conditions, will be applied throughout the EU;
- minimum standards for energy performance will be determined by Member States, and applied both to new buildings and to major refurbishments of existing large buildings. Many will be based on existing or planned European norms;
- a system of building certification will make energy consumption levels much more visible to owners, tenants and users;
- boilers and air conditioning systems above minimum sizes will be inspected regularly to verify their energy efficiency and greenhouse gas emissions.

The EPBD is beginning to have an impact on the market for small-scale renewables as these are now seen as a component of meeting new building energy performance requirements. Where new buildings have to comply with minimum energy performance standards, the installation of small-scale renewables, including small wind turbines, is starting to play an important role.

3.3 National policies and laws on emission reductions and renewables

The Kyoto Protocol and the EU initiatives outlined above have either encouraged or required equivalent policies and legislation in the EU member countries. This section cannot cover all the national policies and laws that have recently come into force as a result of the efforts of European countries to comply with their Kyoto Protocol and EU commitments. However, it is useful to present examples of some of the policies and laws that have been introduced recently in some European countries. Table 2 below summarises some of the policy papers published by European governments.

Table 2. Policy papers on energy and GHG emissions reduction

Country	Date	Title of document	Key message
UK	2000	UK Climate Change Programme	Committed the UK government to working towards a target reduction of GHG emissions of 20% below 1990 levels by 2010.
UK	2003	Energy White Paper	Detailed the UK's long term goal of reducing carbon emissions by 60% by 2050. The first area identified for changes in this paper is energy production with a detailed account of the projected energy system in 2020 ¹ . In this section micro-generation is identified as a key source of electricity, and the use of wind is mentioned under local production ² .
UK	2006	New UK Climate Change Programme	Sets out policies and priorities for action in the UK and internationally and reiterates the target of a 20% reduction in emissions by 2010.
UK	2006	Micro-generation Strategy "Our Energy Challenge: Power from the People"	Objective is to create conditions under which micro-generation becomes a realistic alternative or supplementary energy generation source for the householder, for the community and for small businesses. Includes small wind (and roof mounted micro-wind) as a key element of the potential for micro-generation in Britain.
France	2000	Programme national de Lutte Contre le Changement Climatique	Over 100 new measures were proposed across the transport, building, energy and other sectors. However, hardly any of these measures have been implemented.
France	2001	Report n°3415 written by Members of Parliament Birraux and LeDéaut	Presented the current state and perspectives of renewable energies. It recommends an improvement of wind energy competitiveness, especially by increasing the turbines unitary rated power but also through the development of off-shore wind energy.

¹ <http://www.dti.gov.uk/energy/environment/climate-change/index.html> - Accessed 7/6/6

² <http://www.dti.gov.uk/files/file10719.pdf> - THE ENERGY WHITE PAPER – Our energy future – creating a low carbon economy, p.18 – Accessed 7/6/6

France	2003	Report n°1153 written by Member of Parliament Poignant	Presents a list of measures likely to improve the standing of renewable energies. It suggests that it is necessary to redefine the energy tax system in order to make it more ecological friendly and reinforce the financial support for renewables.
France	2004	Plan Climat (Climate Plan)	Replaced the PNLCC. Main thrust of measures are in the biofuel and transport sector. Mentions need to improve penetration of wind energy to meet EU targets.
The Netherlands	1997	White Paper Renewable Energy - Advancing Power	Sets a target of meeting 10% of its primary energy demand from renewable energy sources in the year 2020. With respect to the electricity share, this figure is higher: up to 17% of renewables in electricity production.
The Netherlands	1999	The Environmental Policy Document (Uitvoeringsnota Klimaatbeleid)	Defines the target for the CO2 savings in built surroundings as 5,5 Mton/year in 2010.
The Netherlands	2001	Fourth National Environmental Plan (NMP4)	Sets the Dutch renewable energy target to 5% in 2010 and 10% in 2020.
The Netherlands	2001	BLOW document (Bestuursovereenkomst Landelijke Ontwikkeling Windenergie)	Target for wind energy is set at 1500 MW on land in 2010.
The Netherlands	2002	The Fifth National Policy Document on Spatial Planning (Vijfde Nota over de Ruimtelijke Ordening, work title: 'Ruimte maken, ruimte delen')	About the spatial development of the Netherlands as a part of Europe up to 2020, and on some issues even up to 2030. National wind energy target of 1500 MW on land in 2010 and 6000 MW on sea in 2020 is detailed.
The Netherlands	2006	National Policy Document on Spatial Planning	Contains the government's views on the spatial development of the Netherlands and the most important objectives associated with that development. This document sets criteria for the spatial requirements regarding wind energy projects. It also describes the policy framework for wind energy projects on regional and local level.

To enforce the policy aims set out in documents such as those listed above in Table 2, European governments have enacted various pieces of legislation to create obligations on electricity suppliers to generate electricity from renewable sources and to create incentives for suppliers and consumers alike to switch to renewable electricity. Some of the laws enacted are given in Table 3 below. Again, this is not an exhaustive list but aims to give an idea of the variety of laws that have been put in place across Europe.

Table 3. Laws in support of emissions reductions and green electricity

Country	Date	Title of law	Key obligation
UK	2002	The Renewables Obligation Order	Places an obligation on all licensed electricity suppliers to produce evidence that they have sourced a specified proportion of their electricity supplies from renewable energy sources. This starts at 3% in 2003, rising gradually to 10% by 2010. The cost to consumers will be limited by a price cap and the obligation is guaranteed in law until 2027.
France	2003	Law on Town-Planning and Habitat	This law establishes a legal framework for wind turbines implantation as well as rules concerning the public consultation. It announces the creation of regional wind energy schemes. A chapter, named "Wind Turbines" and containing four articles, was added to the Environmental Code. The Town-Planning Code was also completed by an article.
France	2003	Interdepartmental Bill	Gives Prefects guidelines for the application of the Town-Planning and Habitat law. Harmony and visual balance are part of the topics treated. State services are asked to promote wind energy development by assisting project developers to prepare good applications.
France	2005	Program law fixing the orientation of the energy policy	Through the voting of this law, France has set four main objectives: <ul style="list-style-type: none"> • To contribute to the national energetic independence • To guarantee a competitive price for energy • To reduce the greenhouse gas emissions • To make access to energy possible to every citizen The Government is planning to draw up guidelines at the beginning of 2007 to achieve the objectives fixed for 2010. Wind energy should have the best progress, reaching 14000 MW.
The Netherlands	2003	The Law on Spatial Planning (Wet op de Ruimtelijke Ordening)	Regulates spatial planning in the Netherlands. Allows a special procedure for the placement of wind turbines in case that the municipality and the province agree on it. A new version of this law is expected for 2007.
The Netherlands	1993	The Law on Environmental Management (Wet Milieubeheer)	Defines the environmental standards and describes the competences and procedures. Wind turbines can only be placed with a building permit, except for the turbines with a rotor diameter smaller than 2 metres.

The Netherlands	1996	The Regulatory Energy Tax	Tax on fossil fuels for households and medium-small enterprises to encourage energy conservation and renewable energy. Green electricity has been exempted from this tax since 1999, making it on average, as expensive as regular electricity. <i>This measure was cancelled in 2003.</i>
The Netherlands	2003	Law on Feed-in tariff for renewables (Milieukwaliteit ElektriciteitsProductie)	This feed-in tariff used tariffs differentiated by renewable energy technology. Once a tariff was obtained it was fixed at the level of the year it started at for 10 years. For all on-shore wind the tariff was initially set at 4.9 c€/kWh. <i>The feed-in tariff was cancelled in 2006.</i>
The Netherlands	2006	The Energy Investment Law (Energie Investeringsaftrek)	That is a fiscal measure which makes it possible to deduct 44% of the investment in renewable energy hardware from the profit tax. It lowers the investment costs to about 14% (= 0,44 x 0,315).

Table 3 shows a number of laws that impact on the renewable electricity sector and that can also be applicable in the case of small wind turbines. The laws cover the areas of renewable electricity generation from different technologies, environmental law and spatial and town planning laws. Clearly the sectors that influence the development of renewables overlap and therefore co-ordination is needed at the national level to ensure laws work together and do not hinder each other.

A totally harmonious legislative environment for renewables has not yet been developed, largely because of the many areas of legislation involved from electricity and environment to spatial planning and health and safety. However, most European countries are moving towards a more favourable legislative environment for renewable energy technologies as a whole.

Another issue is that the legislation listed above has been developed mainly for application to large-scale renewables. In fact, in practically all European countries, legislation supporting renewables was historically developed for large-scale projects and thus tends to favour large-scale installations, either on purpose or accidentally, over small-scale projects. This is particularly the case for wind energy. Unfortunately, this legislation does not scale down well, leaving a lot of gaps and inconsistencies with regard to development of small-scale renewables (also often called micro-generation or decentralised generation). There is certainly some catching up to do in terms of taking into account the specific case of small-scale renewables in legislation which favours renewable technologies.

4 INCENTIVES FOR WIND ENERGY IN URBAN AREAS

One of the main developments over the last decade is introduction of feed-in laws or certificate trading schemes to encourage development of renewable electricity generation. Examples are the French feed-in tariff and the UK renewables obligation listed in Table 3 above. Many countries in Europe have chosen one of these two options to encourage the renewable energy market in their country. Other options are a capital subsidy on an installation, tendering process or fiscal benefits. Table 4 below summarises the current situation in Europe in terms of subsidies, feed-in tariffs and certificate trading schemes. However, these are not specific to small-scale wind and this is discussed below.

Table 4. Renewable policy mix in selected European countries

Country	Capital subsidy	Feed-in tariffs	Certificate trading
Austria	x	x	
Belgium	x	x	x
Denmark		x	
Finland	x		
France	x	x	
Germany	x	x	
Greece	x	x	
Ireland	x		
Italy	x		x
Luxemburg	x	x	
The Netherlands	x		x
Portugal	x	x	
Spain	x	x	
Sweden	x		x
UK	x		x

Source: Bechberger and Reiche 2003; EEA, 2001

The incentives listed above are often implicitly designed for large-scale renewable installations. In many instances, the cost of administrative procedures that occur before a project can benefit from these incentives often outweighs the benefit of receiving the incentive in the case of small-scale projects. This is particularly the case for certificate trading schemes which have more complex administrative procedures. Capital subsidies that go direct to the consumer exist in some countries and these seem to provide a stronger financial incentive for small-scale installations. These capital subsidies are not always technology specific, just offering a consumer the opportunity to apply for a grant to cover the cost of a renewable energy installation.

Feed-in tariffs can be beneficial for both large-scale and small-scale installations. However, tariffs are usually technology specific and/or depend on the total capacity of installations. So for example in France, favourable tariffs exist for solar PV and for large-scale wind but a specific tariff for small-scale wind does not exist. It is the same as that for large-scale wind, but the administrative procedures to claim it are too expensive compared with the output of a small wind system. The next logical step would be to have a small-scale wind tariff similar to the solar PV tariff but this may take years to establish.

Therefore, the actual incentives existing for installations of small-scale urban wind systems are in fact much more limited. The simplest incentive in terms of administrative procedures is the capital subsidy and this has worked well in the UK. However, in some cases feed-in tariffs and certificate trading are utilised. These would be more effective in encouraging small-scale wind installations if administrative procedures are simplified/adapted for small-scale generators. Some examples of existing incentives for small-scale renewables are given in Table 5.

Table 5. Incentives for small-scale renewables

Country	Type of Incentive	Key benefits	Constraint with regard to small-scale urban wind
UK	The Renewables Obligation Order	Between £30 and £40 per MWh produced from renewables can be achieved.	Administrative procedures are too complex and time consuming.
UK	Low Carbon Buildings Programme	Between 30% and 50% of cost of a small-scale installation with a capped maximum is available to householders and community groups. For bigger installations or multiple installations up to 50% funding is available.	Maximum £1,000 per kW installed for small wind, up to a maximum of £5,000 subject to an overall 30% limit of the installed cost. Funding for bigger installations is competitive. There is no specific allocation for small wind.
France	Decree of March 13 th 2003 on Feed-in tariff policy	The French Electricity Company (EDF) guarantees to buy the production of a decentralized installation for 15 years. The tariff calculations are based on the number of operating hours in full power (energy produced in a year divided by the rated power). From year one to five, this tariff is fixed at 10.4c€/kWh for wind turbines under 36 kW capacity.	Long administrative procedures.
France	Tax credit	Tax credit for the capital expenditures of the principal dwelling using renewable energies for up to 50% of the amount to be paid.	None.
The Netherlands	EIA: energy investment deduction.	This is a fiscal measure which makes it possible for commercial companies to lower the investment costs for approximately 14%.	None, but is not a significant incentive.

For more detail on incentives available in the UK, France and the Netherlands, the Country reports on administrative, planning and legal issues can be consulted. These are available to download from the WINEUR website www.urban-wind.org.

5 PLANNING PROCEDURES

Having outlined policies, laws and incentives affecting urban wind turbines at the national level, mainly from the perspective of electricity production and environmental targets, this section will now look at how urban wind turbines fit into the spatial and town planning procedures of European countries. Again, this analysis will focus on the UK, France and the Netherlands, with the aim of identifying commonalities in criteria used and barriers to urban wind turbine installation.

The section will start by looking at national planning policy and guidelines and then move on to local planning in regions, districts and municipalities. In many European countries, responsibility for town planning and issuing of planning permits is decentralised to the local level to a certain extent. The higher the level of decentralisation of planning decisions in a country, the greater the impact and importance of procedures and guidelines at this level for small-scale renewable development, including small wind energy installations.

5.1 National Planning Policies

At the national level there are usually laws and regulations governing town planning and spatial development aspects, health and safety, environmental aspects and building regulations. Because of the general lack of specific laws and regulations for small wind turbines, often all of these regulations can also apply to small wind turbine planning permits and project development. The main areas of national legislation are:

- Spatial development and town planning laws
- Building regulations
- Health and Safety regulations
- Environmental regulations

To give an example this kind of legislation, these areas are covered below for the UK, France and the Netherlands.

In the UK, probably the most important piece of national planning legislation as far as small wind turbines is concerned The Town and Country Planning Order. This is also known as the General Permitted Development Order (GPDO) of 1995 (Statutory instrument 1995 No. 418). This document lists in various sections different types of development for domestic houses with details of whether planning permission is needed.

The document includes a section on developments within the 'envelope' of a domestic house. With regards to the roof of a building, this document states that planning permission is required if the resulting work:

- would lead to something exceeding the height of the highest point of the existing roof;
- extended beyond the plane of the existing roof slope which faces the road;
- if it resulted in material alteration to the shape of the building.

At the moment these guidelines do not clearly include any micro-generation technologies as general permitted development (GPDO). This has led to the situation where some local authorities have not required planning permission (i.e. they have judged a system to be GPDO), whereas others have required planning permission, leaving the average homeowner with no idea where (s)he stands. The GPDO is currently under review, with the intention of adding certain micro-generation technologies to the list of developments that would not need planning permission. At the moment it seems likely that photovoltaics will be included but the case for small wind turbines is more complex due to their size and moving parts.

On the building regulations side, the England & Welsh building regulations comprise 14 different sections. None of these refer specifically to renewable energy technologies and there is certainly need for guidance to address issues arising from the use of 'Low to Zero Carbon Technologies', including wind power.

One of the relevant parts of the English and Welsh Building regulations is Part L 'Conservation of fuel and power'. SAP is the Government's Standard Assessment Procedure for Energy Rating of Dwellings and forms part of the UK national methodology for calculation of the energy performance of buildings. It is used to demonstrate compliance for dwellings with Part L and to provide energy ratings for dwellings. Again SAP 2005 does not currently include specific reference to small scale wind but Appendix Q for innovative technologies may offer a route to their future inclusion. However, recognising the fast moving nature of the micro-generation sector and technical developments, the government recently issued 'Low or Zero Carbon Energy sources: Strategic Guide' intended to supplement Part L. This does include a section on wind energy technology.

The UK has a very well developed structure of Health and Safety legislation³ which will also apply to small wind installations; this includes EC Directives, Acts of Parliament, Regulations, Approved Codes of Practice and Guidance Notes. This legislative framework must be clearly understood and adopted by those who design, manufacture, install and operate and maintain small wind turbines.

In France the two most relevant laws are the Law on Town-Planning and Habitat, (July 2nd 2003) and the Interdepartmental Bill, September 10th 2003. The Law on Town-Planning and Habitat establishes a legal framework for wind turbine installation as well as rules concerning public consultation. Wind turbines up to 12 metres high can be installed without a planning permit. It also announces the creation of regional wind energy schemes. A chapter, named "Wind Turbines" and containing four articles, was added to the Environmental Code. The Town-Planning Code was also completed by an article.

The Interdepartmental bill, signed by the Ministers of Equipment, Industry and Ecology, gives Prefects several guidelines for the application of the law on Town-Planning and Habitat. Co-visibility, harmony and visual balance are part of the topics treated. State services are asked to promote wind energy development by providing to project-carriers early information on how to build up a construction permit application.

In the Netherlands, the **National Policy Document on Spatial Planning** issued in 2001 is an important document. This document sets criteria for the spatial requirements regarding wind energy projects. It also describes the policy framework for wind energy projects on regional and local level.

The BLOW document (see Table 2) is also important. BLOW is signed by five ministries (Ministry of Economic affairs, the Ministry of Housing, Spatial planning and Environment, Ministry of Agriculture, Ministry of Defence and the Ministry of Transport, Public Works and Water Management), 12 provinces and the Association of Dutch Municipalities. The document describes the backgrounds, targets, responsibilities of the main stakeholders, organisation, other relevant documents, monitoring and reporting. According to this document, the municipality is the most important party for the realisation of the wind energy targets.

Due to the lack of a dedicated set of regulations for urban turbines in the Netherlands at this moment, many kinds of regulations must be taken into account when considering urban turbines. These include the Law on Spatial Planning (WRO) - the decisions and procedures

³ Further information can be found at <http://www.hse.gov.uk/legislation/index.htm>

regarding building and retrofitting must comply with this law, the Law on Environmental Management (Wm) and the Decree on Facilities and Installations for Environmental Management (Bvim) – which falls under the category of general administrative procedures (Algemene Maatregel van Bestuur, AMvB).

Other aspects regarding the wind turbines are regulated in separate documents and relate to nature reserves, birds' area and Public Works and Water Management objects. The regulations of importance for building surroundings are the Building Act (Bouwbesluit), the Housing Law (Woningwet) and the EPC, EPL and EPA. These last three are tools which, in three different ways, create possibilities for renewable energy in built surroundings. EPC (Energy Performance Coefficient), is a standard relating to the energy demand of new buildings. A lower EPC means lower demand for fossil fuels. One way to achieve this is by renewable energy. From 1 January 2006, the proscribed value of EPC for housing was lowered from 1 to 0,8. The architects and property developers are obliged to follow this standard when developing new buildings. EPL (energy performance on location) reflects the total share of renewable energy in newly built areas. An EPL =10 means that energy supply is 100% renewable.

Overall, there are very different laws and regulations for spatial planning and granting of planning permits in the countries across Europe. Typically, planning permission criteria include distance from neighbouring houses, height of construction or height above the roof of the construction if something is being added to the roof of the house. Table 6 below gives a summary of national criteria applicable in the UK, France and The Netherlands.

Table 6. Planning permit criteria in the UK, France and The Netherlands

Country	Cases where planning permit is needed	Relevant legislation
UK ⁴	'The extension is higher than the highest part of the roof of the "original house"; or 'the work would make some part of the house higher than the highest part of the existing roof.'	GPDO
UK	'The building or structure will be more than 3 metres high, or more than 4 metres high if it has a ridged roof. (Measure from the highest ground next to it.)'	GPDO
UK	You want to put up a building or structure which would be nearer to any highway than the nearest part of the "original house", unless there would be at least 20 metres between the new building and any highway.	GPDO
France	Construction higher than 12 metres (height is considered from the ground to the nacelle of the turbine, the turbine blades are excluded)	Décret du 27 mars 2003
The Netherlands	The Law on Spatial Planning (WRO) allows a special procedure for the placement of wind turbines if the municipality and the province agree on it. It is called 'article 19-WRO-procedure'. WRO was last adapted in 2003. The new version of this law is expected for 2007.	WRO
The Netherlands	Wind turbines can only be placed with a building permit, except for the turbines with a rotor diameter smaller than 2 metres.	Law on Environmental Management (Wm)

⁴ Planning: A guide for householders, Section A from http://www.odpm.gov.uk/stellent/groups/odpm_planning/documents/page/odpm_plan_606151-04.hcsp#P117_14479

<p>The Netherlands</p>	<p>Turbines will need a permit if:</p> <ul style="list-style-type: none"> • they are mounted on a building • they are vertical axis • distance to the nearest house or other sound sensitive object is less than four times the height of the mast • total installed capacity is more than 15MW <p>Also the wind turbine must meet the requirements regarding the safety, sound production, shadowing, flickering, vibration and operation as described in AMvB.</p>	<p>Installations for Environmental Management (Bvim) and the AMvB</p>
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However, further guidelines are clearly needed in all countries that specifically refer to small wind turbines. New guidelines should focus on the height of the installation and its closeness to the edge of the owners land, with the aim of creating a simpler process for domestic energy generation and wind turbines in particular.

Guidelines for the installer as to whether planning permission is needed for the installation of a micro-generation unit are vague and that this needs to be clarified. Despite the desire to encourage as much as possible the uptake of micro-generation technologies, the right levels of control need to be achieved to protect the interests of all involved, namely the neighbours as well as the environment and those in the wider areas.

5.2 Local Planning Policies and Guidelines

Planning approval (granting of building permits) takes place predominantly at the local level and, in general, rates of planning approval at the local level for small-sale wind projects are low. In the UK, the British Wind Energy Association (BWEA) has found that local approval rates for small-scale wind projects in England were 50% between the years 1999 and 2003.

To try to make planning approval easier to obtain and encourage more homeowners to install small-scale renewables (including wind) governments usual issue some planning guidance to municipal town planners to help them understand and comply with national laws and regulations. In the UK, the government revised the planning guidance to make it easier for renewable developments to get building permission and issued Planning Policy Statement 22: Renewable Energy. In France, the government produced the Interdepartmental bill which gives Prefects (the local decision makers) several guidelines for the application of the law on Town-Planning and Habitat. Table 7 shows the key documents to be considered.

Table 7. Planning documents facilitating decisions at the local level

Country	Name of document	Main concepts	Constraints with regard to small scale wind projects
UK	Planning Policy Statement 22: Renewable Energy	Local government is being encouraged to try to incorporate renewable energy projects in all new developments designing their policies to 'promote and encourage' the use of renewable energy rather than restrict it. Guidelines are given to ensure that each project is	Policies for the existing housing stock are less clear. No specific reference to small wind projects

		considered on an individual basis without regard for past experiences or size of the installation.	
France	The Interdepartmental bill	Gives Prefects guidelines for the application of the law on Town-Planning and Habitat. State services are asked to promote wind energy development by providing project developers early with information on how to prepare a construction permit application.	Not specific to small-scale wind. Procedures more suited to large scale wind and too complex and costly for small projects.
The Netherlands	Bestemmingsplan	Describes the future development of an area in a municipality. It defines the rules for the future ground exploitation, but also the maximal heights and widths of the building objects. For example, this plan describes that a certain area is reserved for housing, industry, recreation etc.	If wind energy generation is not mentioned as a possible development, or if the wind turbines will exceed the proscribed height, than the plan must be adapted before the municipality can allow the placement of the turbines. This is called the Article-19-WRO procedure. In exceptional cases, the municipality can exempt some objects from the Development Plan. The exception can be made for temporary objects for the period of five years. This is called the Article 17-procedure.
The Netherlands	Bouwbesluit	Describes with which technical requirements regarding safety, health, energy and environment the building objects must comply.	As long as small wind turbines are not incorporated within this document, they can not be placed on buildings without a special permit procedure.
The Netherlands	Woningwet	The most important issue in this law in relation to wind turbines is the 'building paragraph' which describes the permit procedure. According to this law, the municipalities are obliged to define the requirements the building objects must meet in order to get the building permit. These criteria are called 'welstand criteria'. Most of them are related to the visual appearance of building objects.	The local officials are not familiar with urban turbines. Therefore, UT are often not accepted.

Planning at the local level usually takes place within a development plan system which usually has a number of levels:

- Regional,
- Sub-regional
- Local (county)
- City/town

Each country has its own sub-divisions of development planning levels. At each level there is guidance for state bodies and staff, usually in the form of regional and local plans and strategies. Regional-level planning policies usually give advice to local planning authorities in their area on what their plans should contain and what the overarching land use aims for the region are. They are informed by other regional strategies, such as regional economic strategies, as well as national planning policy including planning policy guidance notes. The Regional Plan describes the future destination of a ground in a (part of) province. For example this plan defines in which region the villages or cities will be developed (further) or which parts of the province are reserved for the agriculture or recreation. The Regional Plans must fit into the governmental spatial plans.

The local planning and development documents contain local-level detail, setting out the detailed local interpretation of regional advice.

In France, the "Plan Local d'Urbanisme" allows individual cities decide whether they authorise wind turbines in their territories, including their urban areas. If there is no explicit interdiction in the "Plan Local", then wind energy projects could be authorised. However, in some cities, a different town-planning document is used: "Plan d'Occupation des Sols". This document lists every authorised equipment that can be installed in the different zones. If wind turbines do not figure on that list, then they cannot be installed. This shows that there is some confusion between town-planning documents and the decision of a local authority will depend on which document they decide to use.

In the Netherlands, the Climate Covenant, launched in 2002 by the Ministry of Environment, is a framework which makes it possible for municipalities to develop and realize their own action plan for the environmental savings. The municipalities are free to choose the actions which have the best chance in their region, including (urban) wind turbines.

In any case, the cooperation between regions/provinces and the municipalities is crucial for the realisation of wind energy projects, including small-scale projects. Some municipalities prefer a regional approach, as they feel more supported and less isolated and feel projects are better justified if supported at regional level. In this case they look to develop a common plan together with other municipalities from the same region. This can take longer to implement but may eventually result in more widespread dissemination of information and projects and a more uniform approach across a region with regard to how projects are evaluated and approved (see section 6 on planning procedures and permits).

Overall, in recent years, as national policies and strategies (as mentioned in previous sections) have started to include renewable electricity targets and provisions for development of renewable energy technologies, so regional and local plans have started to adapt and include guidance and references to renewables. However, this process has only just started and different countries at different stages of this process. In many countries, regional planning guidance and strategies are better developed for large-scale renewables (often wind), rather than small-scale renewables.

5.3 The Role of Local Authorities

There is no doubt that municipalities will have an important role in achieving wind energy targets and renewable energy targets across Europe in general. The ways in which municipalities can influence wind energy applications are many. For example they can be involved in:

- developing active, wind energy friendly, local policies;
- creating a positive attitude with the local actors by offering information and organising wind energy themed seminars and/or excursions;
- defining clear requirements regarding wind energy projects;
- defining a clear permit procedure and/or managing the permit procedure;
- taking part in the realisation of wind farms and small-scale wind projects.

Local planning authorities are encouraged by national and regional targets to incorporate renewable energy projects in any new development project. Local planning authorities are also told to encourage this 'through positively expressed policies in local development documents'⁵. Some local authorities have taken their policies a step further and have laid out requirements for new developments in their territory to incorporate a certain percentage of electricity and heat from renewable sources. In total, approximately 70 local authorities have either included, or are looking to include, similar policies in their development plans. Three examples of these local policies are given below. Although the examples are all from the UK, there have been similar initiatives in municipalities in Sweden and the Netherlands.

5.3.1.1 *Merton*

The London Borough of Merton has set up a scheme making it a requirement of all new non-residential developments to reduce the predicted levels of carbon emissions by 10% through the use of micro-renewables on site. Since the introduction of this scheme a number of developments have used renewables, including the installation of ten 1kW Windsave rooftop turbines, five 6kW Proven wind turbines, eighteen 1.5 kW Swift rooftop turbines, three ground source heat pumps and two solar PV arrays.

5.3.1.2 *Croydon*

Croydon Borough Council have recently introduced a renewable energy strategy within their Unitary Development Plan, which states that all new major developments (either new build or conversion) with a floor space of 1,000m² or more than ten residential units must generate 10% of their energy requirements onsite from renewables (a scheme similar to that of Merton).

5.3.1.3 *Kirklees*

Kirklees Council have proposed that by 2011, 30% of energy used in the council's new buildings is from renewable sources. In addition Kirklees have set an incremental target for non-residential developments above a threshold of 500m² along with all residential developments (new build, renovation or conversion).

⁵ ibid

The Kirklees vision states "Proposals for major development submitted before 2011 will need to include an energy efficiency statement and incorporate renewable energy generating capacity to provide at least 10% of the development's predicted energy needs; proposals submitted during 2011 to 2015 will need to incorporate 15% and proposals submitted after 2015, 20%".

5.4 Permit procedures

When installing a small wind turbine, usually two kinds of procedures will have to be completed. The first is the obtaining of a planning approval or construction permit, the second will be going through the procedure of connection to the grid. Each country has different planning approval or building permit procedures and different procedures for connection of micro-generation systems to the national grid. This section will summarise the procedures for 1) planning approval / construction permit and 2) grid connection for the UK, France and the Netherlands.

5.4.1 UK

The UK planning permission (construction permit) procedure for small-scale wind turbines in urban areas is as follows:

1. Planning application forms are obtained from the planning department of the local Council offices
2. The project developer submits a planning application. This will either be an 'Outline' application or 'Full' application. The outline application is used in circumstances where one wishes to establish the principle of the planning proposal, without necessarily presenting a full scheme. Full applications are made in circumstances where there is a clear idea of what is to be developed, and all the relevant plans are drawn up in detail.

The principal information required will be:

- Name and Address. Enter the name and address of the applicant and other contact details.
 - Location. Provide details of the location of the property and the area over which the application is to be made. The applicant will need to outline the application area in RED on an Ordnance Plan and any other land owned adjoining in BLUE.
 - The area over which the application is sought should be calculated in metric units (hectares / square metres). Any plan measurements should also be stated in metric units.
 - Description. A description of proposed project. This should be stated in simple terms.
 - Type of Application. Decide on the type of application to submit. Outline or Full. In either case additional information will be required concerning the proposal, such as whether it is for a new building or a change of use.
3. Once a full planning permission is granted the development may begin without applying for any further planning consent, subject always to compliance with Planning Conditions and obtaining any necessary Building Regulation or other approvals.
 4. If Planning permission is not granted then an appeals process is possible, or the application can be altered and re-submitted.

Figure 1 below shows the planning permission procedure in the UK.

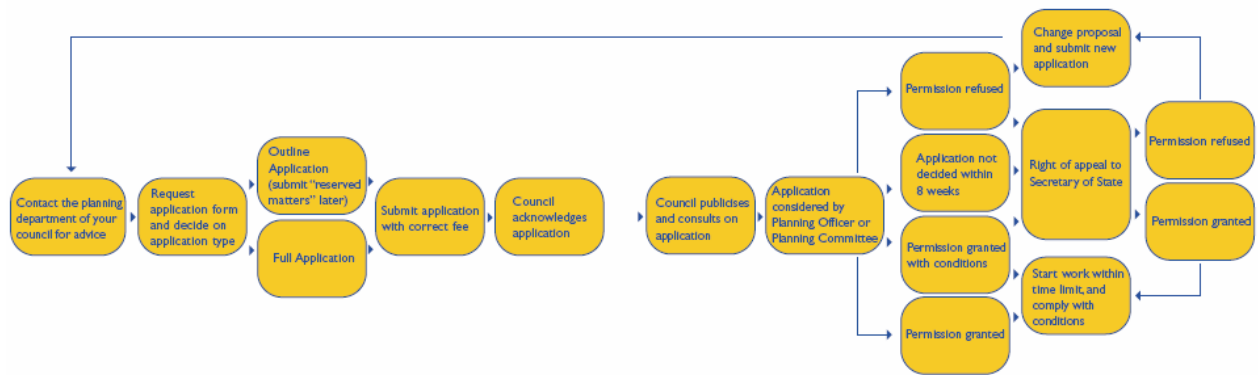


Figure 1. Planning permission application procedure

5.4.1.1 Grid connection procedure

Once the project has been granted planning permission and an installation date has been decided, the project developer should contact the Distribution Network Operator (DNO) and ensure that the commissioning of system is carried out with respect to the appropriate engineering standards.

If the proposed installation is under 16 Amps per phase or just under 12kW in total (on 3 phases), no special permission is needed but the DNO must be notified of the commissioning date and be sent notification once commissioning (using the G83 engineering standards) is complete.

If there are multiple systems to be installed in the same area or if the installation is greater than 16 Amps, an application for permission to connect must be made to the DNO. Also for individual installations over G59 engineering regulations must be followed for commissioning.

Once the system has been commissioned a power purchase agreement can be arranged with an electricity supplier. There are a range of packages available for small-scale generators to sell their electricity back to electricity suppliers. This can be arranged directly with an electricity supplier.

5.4.2 France

5.4.2.1 Planning approval / construction permit

When installing a small turbine in an urban environment, the project developer has to go through several administrative steps. The description here briefly covers the necessary steps to obtain the permits and licences needed in France.

1. The installation of a wind turbine whose height is less than 12m does not need a construction permit.

The height of an installation is defined as the one between the bottom of the tower and the top of the nacelle, blades are excluded. It is worth noting that this definition is not clear concerning turbines on rooftops – is the height of the building counted?

2. However, in all cases a declaration of work is necessary.

When the energy produced is destined to self consumption, the authority to be consulted concerning the construction permit (or the declaration of work) is the Mayor. When all the energy produced is destined to be sold, this authority is the Prefect.

3. An impact notice is also necessary for installations under 12m.
4. If the rated power installed is less than 2.5MW, an impact study is needed but no public survey is necessary.
5. If a turbine of over 50m height is to be installed then a public survey is needed.
6. The operator is financially responsible for the disassembly of the installation and the rehabilitation of the site.

Table 8 below summarises the documentation / surveys and studies needed for different size of wind turbine. Although urban wind turbines are only usually a few kilowatts they still have the same requirements as installations of 2.5 MW.

Table 8. Summary of documentation required depending on wind turbine height

Height	< 12 m	12m < H < 50 m	> 50 m
Necessary documents	<ul style="list-style-type: none"> • Declaration of work • Impact notice 	<ul style="list-style-type: none"> • Construction permit • Impact study 	<ul style="list-style-type: none"> • Construction permit • Impact study • Public survey

5.4.2.2 Grid connection procedure

According to the current legal framework on grid connection, the procedure for private producers is composed of four main steps. These are listed below.

Step 1: Authorisation of exploitation application

For installations smaller than 4.5 MW, a declaration delivered by the DIDEME (Energy Markets Agency, under the authority of the Ministry of Industry) is required (decree 2000-877, September 7th 2000). This authorisation is also required for self-consumption installations.

Step 2: Purchase obligation certificate

The Electricity Control Division of the DRIRE (Industry Research and Environment Regional Agencies), represented by the Prefect is in charge of delivering the certificate of purchase obligation by the grid administration (decree March 27th 2003). Energy producers must send a file containing the following elements:

- If the turbine owner is a physical person, a name and an address. If it is a moral person (e.g. a company or community group), its social status, its juridical form, the address of its corporate headquarters, its identity number (n°SIRET) and the position of the person authorised to sign the papers;
- The location of the installation;
- The primary energy source and technology used; and
- The installed power, the estimated production and operating hours at full power.

Step 3: Electric energy purchase contract

In order to obtain an electric energy purchase contract, producers have to apply to the Purchase Obligation Agency. This agency will indicate which tariff will be applied.

Step 4: Grid connection contract

The grid administrations (RTE and EDF-GDF SERVICES ARD), in collaboration with professional syndicates and the Electricity Regulation Commission, have created a specific procedure for the grid connection of decentralised energy producing installation.

Installations inferior to 10 MW are managed by EDF-GDF SERVICES ARD. All the applications are concentrated in the ARD agency of Tours.

The producer must fill in a general data sheet for the ARD to carry out an exploratory study. The public agency will then study the technical feasibility study of the grid connection, which will be at the agency's expense, and produce a Technical and Financial Proposition (TFP). The producer will finally be financially responsible for the connection works.

below illustrates the procedure for private producers with turbines under 36 kW to connect to the national grid in France.

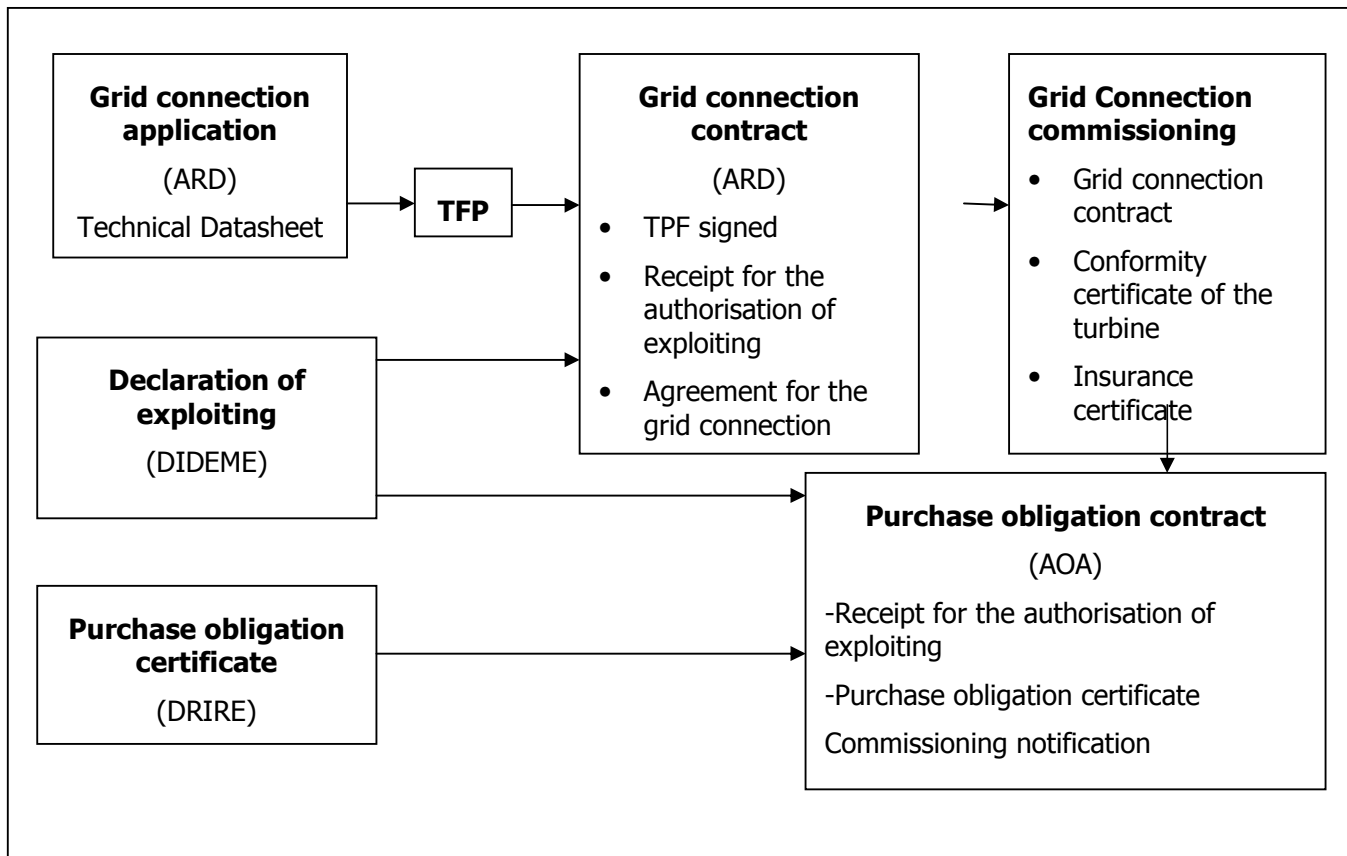


Figure 2. Grid connection procedure for turbines under 36 kW

5.4.3 The Netherlands

5.4.3.1 Building permit

According to the Dutch Housing Law, it is forbidden to build without a building permit. This regulation concerns all kinds of 'regular' building objects, including wind turbines. Some building objects can be exempted from the building permit. In that case they need just a 'light' building permit or no permit at all. The exemptions are described in the document: 'Besluit bouwvergunningsvrije en licht-bouwvergunningplichtige bouwwerken' (Bblb from 2002). According to the existing legal framework, urban turbines always need a building permit. Figure 3 below describes the existing building permit procedure.

This procedure follows after confirmation that urban turbine requires no environmental permit (see next paragraph). Depending on the local situation, the municipality checks the request for building permit with regard to the following regulations:

- Development Plan (Bestemmingsplan)
- Municipal criteria (Welstandscriteria)
- Housing Law (Woningwet)
- Building Act (Bouwbesluit)
- Building Decree (Bouwverordening)
- Municipal Spatial Plan (Structuurplan)
- Regulations regarding monuments

If the urban wind turbine does not comply with any one of the municipal criteria, it is not allowed to be installed, i.e. it is refused a building permit.

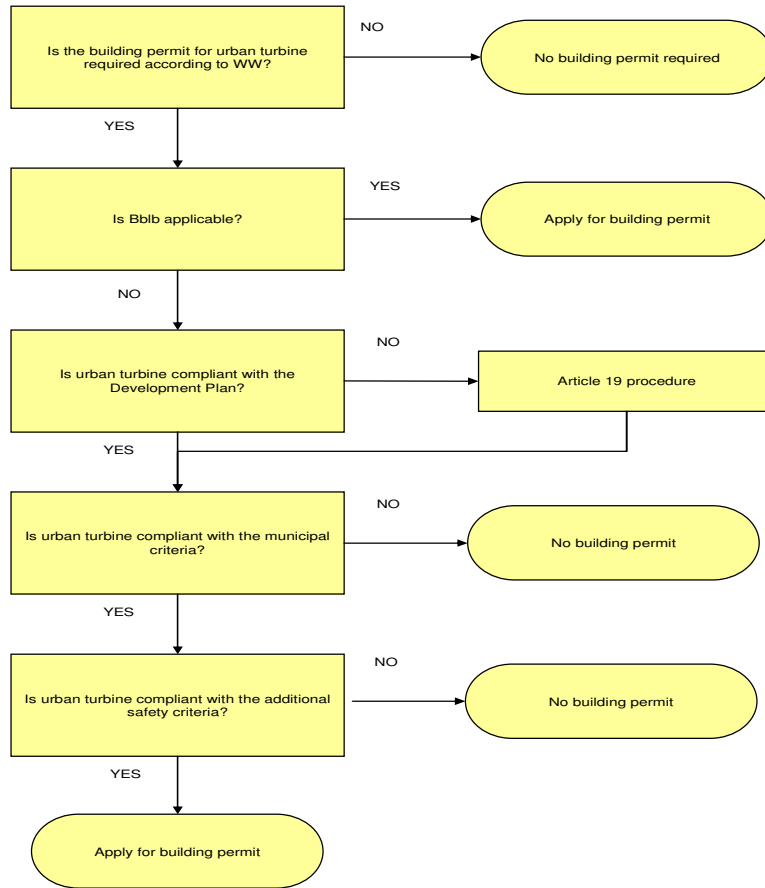


Figure 3. Schematic of the building permit procedure

Legend

WW: Woningwet (Housing Law)

Bblb: Besluit bouwvergunningsvrije en lichtbouwvergunningplichtige bouwwerken (Decree on objects with light permit procedures)

Article 19 procedure: the procedure for changing of the Development Plan due to urban turbines

The regular building permit procedure takes 12 weeks. The light procedure takes six weeks. The Article 19-procedure takes much longer because the Development Plan must be changed.

5.4.3.2 Environmental permit

For wind energy projects larger than 15 MW an environmental permit is always necessary. Small wind turbines also need an environmental permit if they are to be placed on an object which normally needs the environmental permit (for example a factory building). Otherwise they do not need one.

A project developer can apply for the building permit only after receiving the environmental permit, or confirmation that an environmental permit is not needed. Therefore, the first check on urban turbines is the one regarding the environmental permit. The procedure regarding the environmental permit procedure is described in Figure 4 on the next page. The procedure for the environmental permit takes half a year.

5.4.3.3 Other requirements

Because an urban wind turbine is an equipment installation, it must also be checked against the requirements of the following regulations: Decree on Facilities and Installations for Environmental Management (Besluit voorzieningen en installaties milieubeheer, Bvim) and The Law on Environmental Management (Wet Milieubeheer, Wm).

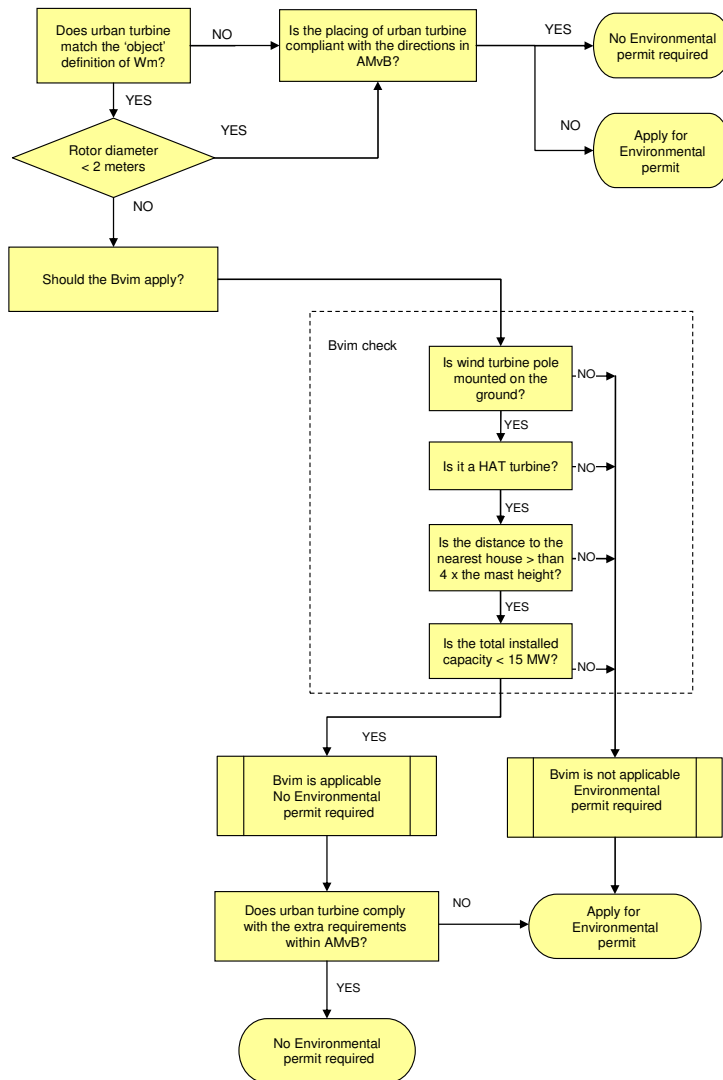


Figure 4. Environmental permit procedure

5.4.3.4 Grid connection

Criteria regarding the grid connection of the installations for decentralised electricity generation are described in the Electricity Law from 1998 and in the document called Netcode made by the Dutch Office of Energy Regulation (DTe): <http://www.dte.nl/engels/home/index.asp>.

All low voltage installations must match the Dutch safety regulation NEN1010.

6 PLANNING AND ADMINISTRATIVE BARRIERS

From the application of procedures outlined in the previous section, a number of barriers to implementation of small wind turbine projects in urban areas emerge. Sometimes these barriers are in-built to the procedures, other times these barriers arise from the interpretation of procedures by local government departments and staff.

This section will first examine the main barriers arising at the point of planning permission (or construction permit) application. These are largely common barriers and/or issues that have been identified across the UK, France and The Netherlands. Then this section will go on to examine other administrative barriers not related to planning permission but that still have an impact on small wind energy projects.

6.1 Planning permission barriers and issues

Where planning permission is required, constraints experienced by users when applying for planning permission are mainly centred on the local planning departments and individuals' lack of experience with small wind installations. There are also problems with interpretation of existing regulations or even lack of regulations which means that staff do not know where to look for guidance on decision-making. Familiarity with the technologies is slowly changing as more planning applications are made and more installations appear. However, it is a slow process. On the other hand, there is a need for laws and regulations to be adapted or clarified to reduce confusion and help local decision-makers.

Another quite different but important point with regard to planning permission, that is an issue in the UK and may have an affect other European countries, is local politics. Whilst the planning officers of a local authority are non-political civil servants who make recommendations to the Committee of a local Council (city or other local authority), the Committee comprises of politically elected members who may not have the longer term interests of the environment as their key focus. These politically elected members can be heavily influenced by extraneous matters such as local politics, influential land owners and small but powerful local lobby groups who may want to block the installation of a small wind turbine in their area.

From information and experience gathered from the UK, France and The Netherlands, the following issues have been identified as persistently hindering, delaying or blocking small wind turbine installations at the stage of obtaining planning permission.

6.1.1 *Visual appearance / impact*

Visual appearance or impact is a highly subjective issue. It has certainly caused a lot of controversy in the development of large-scale wind and seems to also be an important barrier to development of small-scale wind. Although this is an issue often brought up in discussion on small wind in urban areas, a recent survey⁶ carried out on 20 installations in built-up areas in the UK showed that a majority of wind turbine owners and their neighbours were unconcerned or happy with the visual appearance of the installation. It seems to be the case that once the turbine is up, nobody minds but of course, this does not help overcome the problem or pre-installation perceptions that the turbine will look ugly. Complaints from neighbours about visual impact can often block the installation of a turbine.

⁶ Urban wind turbines: Development of the UK market. K. Syngellakis, P. Robinson, S. Carroll, Proceedings of the European Wind Energy Conference, February 2006

To counteract perceptions there are a number of guidelines which have been created and these often restrict the locations where wind turbines can be mounted. These regulations are sometimes arbitrary without any real reason behind them (e.g. limiting height of mast to 12m) or unclear (height of turbine given but not clarified whether this applies for roof mounted turbine). Some of the guidelines are open to variable interpretation and ultimately lead to rejections of applications. Some examples of criteria used are given below.

- "There must be enough distance between two different groups of wind turbines in order to keep a harmonious visual impression" – *comment: this phrase is clearly open to different interpretations by different individuals.*
- "The distance between the wind turbines in the same group must be at least five times the rotor diameter. All turbines in the same group must be placed on the same distance from each other".
- "The turbines in the same group must be of the same type and the same dimensions" – *comment: this is restrictive.*
- "The spatial arrangement (in line or bow) of the group of turbines must follow the lines of the local landscape" - *comment: this last phrase is clearly open to different interpretations by different individuals.*
- "Turbines with three wings are considered visually less disturbing and more attractive" – *comment: what about vertical wind turbines?*
- Colour of wind turbines has an important visual impact on the landscape. The municipality can require a special colour in order to make the turbines blend in better with the surrounding building or even to try to make them invisible.
- "Wind turbines should not be installed above the highest point of a building" – *comment: this clearly restricts the potential for wind capture.*

In the UK, it has been considered useful to compare an installation with telegraph poles, telephone masts or satellite dishes and to consider that the visual impact is comparable and therefore that wind turbines should be allowed in more circumstances. Many applications now do photomontages of the wind turbines to clearly show visual impact compared with other urban features.

However, the issue still remains very subjective and clear guidelines do not currently exist to assist planning departments in local authorities to make a more objective judgement of individual installations.

6.1.2 Land use

National designations (Sites of Natural Beauty, Nature Reserves, National Parks etc) can restrict the location of small wind turbine projects. In these areas policy is often that planning permission (construction) should only be granted where it can be shown that the 'objectives of the designation of the area will not be compromised by the development'. It is expected that large scale developments will be stopped in such areas but small scale developments could be acceptable in the right circumstances.

Also sometimes planning bodies or local authorities might set up 'buffer zones' around protected areas. This would even further restrict projects. This should be avoided as sometimes this leads to all renewable energy applications to be refused without consideration of individual project merits.

Other particular land uses can have rules which result in restrictions to wind turbines installation. A particular case is airports, which usually have a zone around them where wind turbines cannot be installed. This regulation is usually introduced to deal with large wind turbines and may not be appropriate for small wind turbines but it is still applied.

In the Netherlands, when placing the wind turbines along the highways, railways and industrial installations, the Ministry of V&W and the Dutch Railways can define additional requirements. Table 9 below shows general guidelines regarding distances between wind turbines and other building objects.

Table 9. Directions for the distance between wind turbines and other objects

Function	Distance to the wind turbine
living and recreation areas	300 - 500 m
roads	30 m (road), 50 m (waterway)
railway	radius+7,85 m
high voltage line	50 m
airport, flying route	1,852 m from flying route, 500 m from airport
highway	30 m
parking area and gas station	30 m
channel, river, haven	50 m from the edge

6.1.3 Noise

Laws on noise pollution state that urban noise is defined by its impact over and above the usual "background" noise of a specific location. In other words what is important is the difference in noise intensity between the usual noise of an area, measured in dB(A), and the noise created by a specific disturbance (such as a wind turbine). In France the regulations state that the difference permitted is +5 dB(A) during the day time (7am to 10 pm) and +3dB(A) during the night time (10pm to 7am). Similar regulations exist in most European countries.

Another way to set limits on noise is to look at the total noise emitted from a wind turbine. In the UK and in most European countries, developers of large-scale wind farms are required to carry out a noise assessment before submission of their proposal to the planning office. In the UK, the noise limits set for these developments are 30-40dB outside nearby properties not linked to the project and 45dB outside those that are linked to the project⁷. Similar regulations exist in other countries.

However, there are no noise guidelines in the UK or other European countries specifically for small wind turbines, especially for the case of roof mounted models. This is creating confusion over the issue of noise near residential properties in particular and is an obstacle for development of small wind projects in urban areas. Sometimes the guidelines for large wind turbines or for standard "background noise" regulations are applied because there is nothing else available, even though these guidelines are not always appropriate.

6.1.4 Flicker

Flicker is when the shadow of a turbine makes the sunlight appear intermittent due to its periodic blocking of it while the rotor turns. This is considered a nuisance when the frequency is above 2.5Hz; however, the frequency of flicker from wind turbines is usually below 1Hz. At a distance of 10 rotor diameters the turbine should not be perceived to be cutting the light but rather as a body with the sun behind it. Taking an average diameter of

⁷ <http://www.dti.gov.uk/energy/energy-sources/renewables/planning/Offshore%20Wind/Noise/page18800.html> - Accessed 9/6/6

2m, the effects of flicker should therefore not be seen 10m from the turbine⁸. Modern blade design should also eliminate any reflection of the blades.

Flicker has been shown to have adverse effects on some epilepsy sufferers. Due to these effects the positioning of the turbine must be carefully considered and will have an effect on planning permission⁹. However, if some precautions are taken the effects should be minimal. Again, the lack of specific guidance on flicker is causing confusion and may be making the issue seem more important than it is.

6.1.5 Vibration and structural issues

There have been very limited independent assessments of vibration effects and structural issues of installing small wind turbines on buildings and especially on domestic houses where vibrations would cause the most disturbance because of very high occupancy levels (especially at night). This leads to uncertainty when it comes to the planning process and in particular complying with national safety and building regulations.

6.2 Other Administrative barriers

6.2.1 Grid connection

Grid connection regulations vary a lot between the UK, France and the Netherlands. In the UK, connection of the smaller systems is relatively straight forward; however for systems over 12kW the procedure is more complicated. The DNO must be consulted and the DNO could require a charge to carry out a study and could refuse the installation (although this rarely happens). The cost and complexity of G59/1 and generally the lack of knowledge amongst DNO staff with regard to grid connection of micro-generation (which complicates arrangement of the grid connection) is a barrier towards accelerating the installation rate of small scale wind technologies.

In France, the authorisation of exploitation application must be obtained from the Energy Markets Agencies (DIDEME) before grid connection can be completed. However, amongst the information needed by this agency to complete the application is the SIRET number. The problem is that only companies can obtain a SIRET number, therefore a local community or individual consumers will not be able to get the authorisation of exploitation for their renewable energy system. This is obviously a barrier towards development of small wind projects.

These are just two examples of complications in the grid connection process. If small wind installations are to become more frequent across Europe, grid connection procedures need to be examined in each country and will probably need to be simplified to make the process for small renewable systems (like wind) simpler and cheaper to connect.

6.2.2 Property issues

There are a number of property issues which are emerging as small wind turbine installations in urban areas become more common. Sometimes neighbours protest or try to block the placing of small wind turbines because they believe the value of their properties will decrease if a wind turbine is installed nearby.

⁸ <http://www.dti.gov.uk/energy/energy-sources/renewables/planning/Onshore%20Wind/Shadow%20Flicker/page18736.html> - Accessed 8/6/6

⁹ <http://www.bwea.com/small/faq.html#flicker> – Accessed 6/6/6

In some countries the small wind turbine can not overhang any neighbouring property without the authorisation of the neighbour. If the turbine overhangs into public property then the public authority must give permission. In general, it is considered that neighbours property rights must be respected and therefore scaffolding for installation and maintenance should not interfere with neighbouring property without permission from the neighbour.

6.2.3 Time constraints

From evidence gathered from the UK, France and the Netherlands, obtaining planning permission or building permits can take anything from 12 weeks to 18 months. Sometimes this period of time is required even when the decision is then negative. This is likely to be the case in most European countries. This is obviously a heavy burden for community groups or individuals and increases the cost of a project. Procedures need to be simplified and shortened.

6.2.4 Administrative expenses

The administrative expenses for the handling of a planning application or building permit depend on the investment costs and on the local municipal tariffs. These vary between countries and even between regions or districts within the same country. For a big company this might be a minor cost but for small community groups or for individuals this administrative cost also constitutes a barrier particularly when there is no guarantee that the permit will be granted and the money will simply be lost for no benefit.

6.2.5 Metering

Metering arrangements in different countries are also not clear at the moment. There is no 'standard' recommended practice for meter installation with micro-generation systems and this does lead to confusion on the part of consumers. Each electricity supplier tends to have their own requirements regarding metering, sometimes requiring a specific meter to be installed which adds to installation cost.

An area of uncertainty is what meter or combination of meters should be used to monitor the export of electricity from the micro-generator and the amount of electricity used (imported) from the grid. There is no definite recommendation on what kind of meter should be used, although some electricity supply companies will ask the consumer to install a specific type of meter. This can add cost and is a barrier to project implementation.

7 STANDARDS AND CERTIFICATION

Standards and certification are of importance for business and society, especially in the areas of safety, public health and the environment. Standards and certification clearly have a role to play in the development of the small wind turbine market, for example with regard to product performance, accreditation of installers and health and safety procedures. The total market in which accreditation bodies, standards and certification operate consists of a wide range of interested parties like business, government and end users¹⁰.

For manufacturers (both purchasers and suppliers) certification, testing, calibration and inspection are means of establishing the quality of the products, especially in cases where the special expertise of the manufacturer diminishes and the distance over which products have to be transported increases. A trade association brings together several parties concerned with the same product. Certification of products can be an instrument for increasing the quality levels within the sector. The end user is in many cases the consumer, for whom the added value of standards and certifications lies in the provision of transparent conformity statements and product information with clear explanations. This will lead consumers to having justified confidence in the product or service that is purchased.

Overall, there are electrical, mechanical, building, health and safety, noise and consumer standards that are relevant to small wind turbines. In this section, existing standards in these areas will be examined and the gaps in relevant standards for small wind turbines will be identified.

7.1 International electrical standards

The International Electrotechnical Commission (IEC) has developed a number of standards for wind turbines. These are detailed in Table 10 below. Most of these standards apply to large wind turbines but one standard (IEC 61400-2) applies to 'Small Wind Turbine Systems'. Here 'small' is defined as wind turbines with swept areas under 40 square meters (m²).

The IEC are the recognised international body for standards development activities¹¹. The IEC 61400-2 / WG4 standard – Small Wind Turbine Systems is designed to ensure that every turbine displays, in tests, the behaviour predicted by the designers. Special standards were developed for small wind turbines due to their specialist features and control methods¹². Dynamic behaviour tests, duration tests, load measurements and blade tests are carried out and specific standards must be met for the product to be certified as safe. The tests include investigation of emergency shut-down procedure, effectiveness of the control system, yaw system and the performance of the protection system¹³.

¹⁰ http://www.rva.nl/resources/AMGATE_10218_1_TICH_R6725280695223/AMGATE_10218_0_TICH_R68430685607 - Accessed 31/10/2006

¹¹ http://www.awea.org/standards/iec_stds.html - Accessed 9/6/6

¹² http://www.awea.org/standards/iec_stds.html - Accessed 10/6/6

¹³ http://wind.nrel.gov/cert_stds/Certification/tests/typetest.html - Accessed 10/6/6

Table 10. Status of IEC wind standards

Table I IEC Wind Energy Standards						
Working Group	Title	Convener	Start	Finish (Plan or Actual)	Purpose	Document Number
WG-1 WG-2 WG-3	Safety Requirements for Large Wind Turbines	R. Sherwin, AWEA, USA	09/1989	12/1993	Principal standard defining design requirements	IEC 61400-1*
WG-4	Small Wind Turbine Systems	F.Van Hulle, ECN, NL	02/1992	01/1994	Principal standard defining design requirements for small turbines	IEC 61400-2*
WG-5	Acoustic Emission Measurement Techniques	T.J. DuBois, USA	11/1992	09/1998	Defines acoustic measurements methods	IEC 61400-11*
WG-6	Performance Measurement Techniques	T. Pedersen, Riso NL, Denmark	11/1992	01/1998	Defines performance measurement techniques	IEC 61400-12*
WG-7	Revision of IEC 1400-1	P.H. Madsen, Riso NL, DKr	03/1994	01/1999	Edition 2 of IEC 1400-1	<i>61400-1 Ed2</i>
WG-8	Blade Structural Testing	D.van Delft, TU Delft, NL	03/1994	1999	Defines methods for blade structural testing	<i>61400-23</i>
WG-9	Wind Turbine Certification Requirements	J.McGuire, Lloyds Register, UK	10/1995	1999	Defines certification requirements (Harmonized version of several European standards.)	<i>61400-22</i>
WG-10	Power Quality Measurements	J.O.Tande, Riso NL, DK	02/1996	1999	Defines power quality measurement techniques	<i>61400-21</i>
WG-11	Structural Loads Measurement	F.Van Hulle, ECN, NL	02/1996	1999	Defines methods for measuring operational loads	<i>61400-13</i>
*Published Standard						

Source: American Wind Energy Association, www.awea.org – Accessed 27/0/06

7.1.1 Safety Requirements for Small Wind Turbines

Standards for wind turbines with swept areas less than 40 square meters (m²) were developed separately because of the unique control methods and features used by designers of these systems (such as foldable tails.) The separate standard was developed to avoid imposing costly requirements that would not result in improved safety of the smaller systems, which have different inherent risk factors than larger systems.

The scope of work of the standard is to deal with safety philosophy, quality assurance, engineering integrity and specifies requirements for the safety of small wind turbine generators (SWTGS), including design, installation, maintenance and operation under specified external conditions. This standard is concerned with all subsystems of small wind turbines such as protection mechanisms, internal electrical systems, mechanical systems,

support structures, foundations and the electrical interconnection with the load. The standard applies to wind turbines with swept area less than 40 m².

7.1.2 System for testing and certification of wind turbines

The PD IEC WT 01:2001 standard defines a certification system for wind turbines. It specifies rules for procedures and management to carry out conformity evaluation of wind turbines, with respect to specific standards and other technical requirements, relating to safety, reliability, performance, testing and interaction with electrical power networks. It provides:

- definitions of the elements in a wind turbine certification process;
- procedures for the conformity evaluation in a wind turbine certification system;
- procedures for conformity surveillance;
- rules for the documentation that is to be supplied by an Applicant for the conformity evaluation; and
- requirements for certification and inspection bodies and testing laboratories.

The standard is not limited to wind turbines of any particular size or type. It describes procedures relating to design, manufacture, erection and installation, operation and maintenance, and decommissioning.

7.1.3 AWEA Small Wind Turbine Performance and Safety Standard

The American Wind Energy Association is in the process of drafting a standard which deals with small wind turbine performance and safety including modifications to the ISO standards for large wind turbines. This has not yet been finalised.

7.2 National standards

The international standards mentioned above have generally been incorporated into national standards (BS in the UK, NEN in the Netherlands and NF in France) and European standards (EN). For example BS EN 61400-1, BS EN 61400-2, BS EN 61400-11 and BS EN 61400-12 all derive from the IEC standards of the same number. There are also national standards on electrical, mechanical, health and safety, noise and consumer relations that may apply. The following section will examine some examples.

7.2.1 Electrical standards

In addition to the international standards, European and national standards on electrical connections usually apply to small wind installations.

Table 11 below gives a summary of electrical standards for the UK, France and The Netherlands. This is not an exhaustive list but these are the minimum standards that must be complied with in the case of a small wind turbine installation.

Table 11. National electrical standards

Country	Standard	Application to small wind
UK	G83/1	<16 Amps per phase
UK	G59/1	>16 Amps per phase
UK	BS7671	Wiring regulation: applies to all electrical installation, whether they involve micro-generation technologies or not. All qualified electricians work to this standard when carrying out installations.
France	NF C 15-100	The latest edition of this regulation was published in July 1st 2003. It details every safety and technical aspect for low voltage installations. The user will for example find a list of tools and equipment accepted by the current regulations and the electricity company.
The Netherlands	NEN1010	All low voltage installations must match the Dutch safety regulation.

7.2.2 Health and Safety regulations

In general, national safety standards do not exist specifically for small wind turbines but installations of this technology usually fall under the standard Health and Safety Regulations for construction work. Most countries have legal requirements for work on construction sites or work at height (which would be necessary for roof mounted installations).

In the UK for example, the Management and Safety at Work Regulations 1999 and the Health and Safety at Work Act 1974 may apply. The British Wind Energy Association (BWEA) has recently commissioned a health and safety study specifically to develop guidelines for safety for small wind turbines. This has not yet been completed.

Where installation is carried out by the user themselves, the user will be responsible for the safety of all the persons involved in those works. The user must be well aware of all the safety measures and make sure his insurance company would cover the expenses in case of an accident during the works. In the UK, accredited installers (qualified electricians) are usually the only people authorised to carry out micro-generation installations.

7.2.3 Installation guidelines

There is currently very limited information on installation standards. The Energy Saving Trust in the UK has recently released a guide for installers. This covers basic system site and sizing, system design, safety, commissioning and testing¹⁴. Commissioning and testing documentation is also presented in CE 72. In France, Promotelec, a not-for-profit association that promotes safety and quality for electric installations has produced a guide that sums up some safety precautions when carrying electrical installations, but this does not cover small wind installations in particular.

¹⁴ www.est.org – Accessed 30/6/06

7.2.4 Noise regulations

Noise regulations were mentioned in section 6 of this document. Although specific noise regulations for small wind turbines do not exist, most countries have general noise regulations. These are either absolute, i.e. a certain activity cannot produce more than X number of decibels, or relative, i.e. an activity cannot produce additional noise above background noise. Usually the relative level of additional noise is different for day time and night time.

The guidance set out for large scale wind turbines in the UK suggests noise levels should not exceed 43 dB(A)¹⁵. Siting small turbines should take background noise into account as this masks noise arising from a small turbine, especially if located near to busy roads.

In France the regulations state that the difference permitted is +5 dB(A) during the day time (7am to 10 pm) and +3dB(A) during the night time (10pm to 7am).

¹⁵ The assessment and rating of noise from wind farms. ETSU –U-97

8 RECOMMENDATIONS

The popularity of small wind turbines in the UK and other European countries is growing and there is increasing interest from home owners and businesses to install small wind turbines on their homes and buildings. However, the current planning framework is unclear and essential safety checks, such as product standards and certification and installer accreditation are missing. Some guidelines, product standards, certification and accreditation of installers are planned but are still far from completion. This process needs to be accelerated and all countries need to have these procedures in place to avoid the danger of poor quality products and installations ruining the market and consumer confidence.

With regard to policy framework, there have been promising steps in the UK but in France and the Netherlands there have been steps backwards and/or there is still little encouragement for small wind installations – despite popularity at the municipal level. Overall, national policy direction which is strong on reducing emissions and increasing renewable electricity, has yet to be translated into concrete policy and action at the local level. If cities are to contribute to national targets, within their limited space constraints, micro-generation technologies such as small wind turbines may be the most appropriate solution. But at the planning level, there is a need to modify, clarify and improve planning guidelines to local authorities to encourage small wind turbine development.

Therefore, there are many ways to improve the legal, planning and policy framework to encourage development of small wind turbines in towns and cities. Table 12 reviews the planning and other administrative barriers (listed in section 6) and provides examples of possible solutions or mitigation factors. The following paragraphs then look at overall recommendations to government policy makers to encourage the further development of the small wind turbine market.

Table 12. Possible solutions to planning and administrative barriers

Barrier	Possible solution or mitigation factor
Visual appearance or impact	<ul style="list-style-type: none"> • The siting and design of small wind turbines should aim to minimise the contrast with the surroundings – unless making them a distinctive element in the landscape is appropriate, e.g. small wind turbines can be seen as symbols of positive action to address climate change and promote sustainability • The colour and finish of the wind turbine can be made to minimise visual impact. For example, where the main background is the sky, then an off-white colour may be appropriate. If the main background is vegetation then green/brown and if it is building elements then black/grey. Even where for practical reasons the blades cannot be coloured, it may be possible to colour the mast or cabling. • Where possible the height of towers should relate to the height of existing vertical elements in the landscape such as light columns, telegraph poles, trees, buildings and other structures • Roof-mounted wind turbines are comparable in height to existing urban features, e.g. large television aerials or chimney stacks. • Conditions can be attached to planning permission to limit corporate branding on the turbine.

Barrier	Possible solution or mitigation factor
Land Use	<ul style="list-style-type: none"> • Clear guidelines should be established for protected land. Areas of high sensitivity should be avoided. • Within natural heritage designation special attention needs to be paid to siting and design of the installation. Good siting should relate to existing features and patterns within the local landscape, such as grouping of buildings, line of hedgerow or the proximity of power lines.
Noise	<ul style="list-style-type: none"> • New designs of small wind turbines have greatly reduced noise levels due to improved blade design and reduced mechanical noise. • To protect nearby residents from any potential noise, a condition can be attached to any consent controlling the level of noise. A detail noise assessment should not be necessary.
Flicker	<ul style="list-style-type: none"> • Disturbance by light flickering and shadowing depend on personal experience. Colour and special surface treatment can help prevent disturbance. • The small diameter and likely location of small wind turbines can greatly reduce the probability of shadow flicker occurring, therefore in the majority of cases shadow flicker will not be an issue.
Vibration and structural issues	<ul style="list-style-type: none"> • Where turbines are fixed to a building, a condition might be attached that appropriate measures should be taken to mitigate any vibrations. • There may be a need for a structural survey and load calculations according to building regulations to accompany a planning application.
Grid connection	<ul style="list-style-type: none"> • Grid connection procedures need to be simplified in many cases. This will often be something the central government has to do. • Awareness should be raised within the companies controlling the distribution network, so they become more familiar with small-scale renewable technologies and thus will be happier to connect them to the distribution network without prolonged procedures.
Property issues	<ul style="list-style-type: none"> • To avoid problems with property rights and neighbours, no part of the small wind turbine system should be within 2 metres of the boundary of the property in which it is placed.
Time constraints	<ul style="list-style-type: none"> • Reduce the time needed to process an application by simplifying the application itself and the process. • Try to standardise the time needed to process the application in different parts of the same country. It should not be 8 weeks in one place and 8 months in another. • When an initial pre-application contact is made, clearer guidelines should be given to applicants and advice on how to make their application more likely to succeed.

Barrier	Possible solution or mitigation factor
Administrative costs	<ul style="list-style-type: none"> • Reducing the cost of planning permission. For an individual, an application fee (with no guarantee that the application will even be successful) can deter them from trying to install a small wind turbine. • Making sure the cost of an application is the same across the country (equity) • To raise awareness amongst planners, local authorities should organise visits to an existing installations to introduce staff to small wind turbine technology.
Metering	<ul style="list-style-type: none"> • Some guidance should be issued on metering, so homeowners and installation companies understand better what kind of meter must be installed with the small wind turbine system so that energy produced can be recorded (and payment for exported electricity can be received).

8.1 Recommendations on policy and planning

The following points are overall recommendations to government policy makers on ways to encourage the development of the small wind turbine market. These points relate mainly to policy and planning and also some information dissemination. If some or all of these measures could be adopted across Europe, the small wind market would be greatly strengthened.

- In the UK, Merton, Croydon, Sheffield and Reading City Authorities have all made it a requirement for major new developments that 10% of their energy comes from renewables and some are trying to take this further where possible¹⁶. Governments could make this type of requirement compulsory for all local authorities' policies by 2010.
- Micro-generation (small-scale renewables) integration could be a building regulation requirement for **all new** building developments rather than just encouraging it '*where feasible*'.
- The national Energy Agencies and the Wind Energy Associations should have more short case studies on how barriers were overcome to the installation of small wind turbines, on costs, available technologies, etc. These agencies should also have specific programmes aimed at disseminating information on how to install wind turbines in an urban environment.
- Planning guidance and guidelines (companion booklets) that are prepared in the future should be written in plain language and avoid technical and legal jargon, so it is easy for the average homeowners to understand. This will enable individuals to make decisions over whether they need planning permission and how to prepare an application.
- A specific feed-in tariff should be allocated to the energy produced by small wind turbines (as applied to photovoltaics in many countries). If possible, the feed-in tariff should be high enough to give a pay-back time under 10 years.

¹⁶ <http://www.communities.gov.uk/index.asp?id=1500655> accessed 26/6/6

- The appropriate height and the power of a small wind turbine will depend on the location. Placing constraints regarding these values should be avoided within the planning procedures.
- Governments could take the initiative to develop a general policy regarding urban turbines which, in combination with standard criteria, would make it possible to install a certain size/type of small wind turbines in an urban environment without need for a permit from the local authority. The authority would just have to be notified. (This type of policy is currently under consideration in the UK).
- Governments should ensure that small wind turbine technologies fit better into the legal framework of the country with regard to electricity, building, spatial development and environmental laws so there is not conflicting or missing information.

8.2 Recommendations on standards and certification

The development of the small wind market cannot rely solely on policy and planning measures. To ensure good quality products and installations and thus the sustainability of the market in the long term, there are important actions that are needed in the area of standards and certification. The following points are recommendations of measures that could be adopted across Europe; the more uniform the adoption the more the small wind market will be strengthened as trade between European countries will be facilitated.

- Governments should mandate an independent institution or committee to define a set of technical criteria and/or requirements and standards which urban turbines must match and develop an adequate measuring and control system for these issues.
- Each turbine product should undergo a standard technical and environmental test. The costs of the type test should be proportional to the costs of the turbine. In that case, these costs will be calculated into the price. If the costs are not proportional, the government should subsidize a part of it.
- Any small wind turbine standards should be developed in cooperation with manufacturers, installers and small wind experts.
- A uniform data sheet for all small wind turbines should be established (this could be part of a small wind turbine standard) . For example, all small wind turbine power capacity should be rated at the same wind speed and annual energy production should be given for the same average wind speed. (In the UK, these values have been set at 11 m/s for rated power and 5m/s for annual energy production). This will enable fairer comparison of turbines and all turbines could be tested to verify their compliance with announced values.
- A number of bodies within a country should be able to test products and issue certification to the standards developed (i.e. act as an accreditation body).
- Noise standards for small wind turbines should be defined. Noise measurements should be independent from the surroundings (location of installation).
- Measurements of noise produced above background noise at the installation location should have a standard procedure.
- The requirements regarding the installation on roofs should be clarified and standardised.
- Governments should consider facilitating field test trials for small wind turbines in urban areas where detailed monitoring could take place. The results would be publicly available.

9 BLUEPRINT FOR URBAN SMALL WIND PERMIT SYSTEM

This section proposes an improved permit procedure for the UK, France and The Netherlands. Depending on which institutional framework is most similar, one of these procedures could be chosen and adapted for other European countries. These "Blueprints" for permit systems are intended as guidelines to governments to show where improvements in the procedure could be made and the blueprint, if eventually adopted by government, would be useful to municipalities to help them issue permits for small wind turbine installations.

9.1 UK

A simplified procedure for the UK is proposed below in Figure 5. This 'blueprint' would allow certain sizes of wind turbines to be installed in an urban environment without need for planning permission. This procedure would apply to the smaller (micro) wind turbines and could apply both to ground installations and roof-mounted turbines.

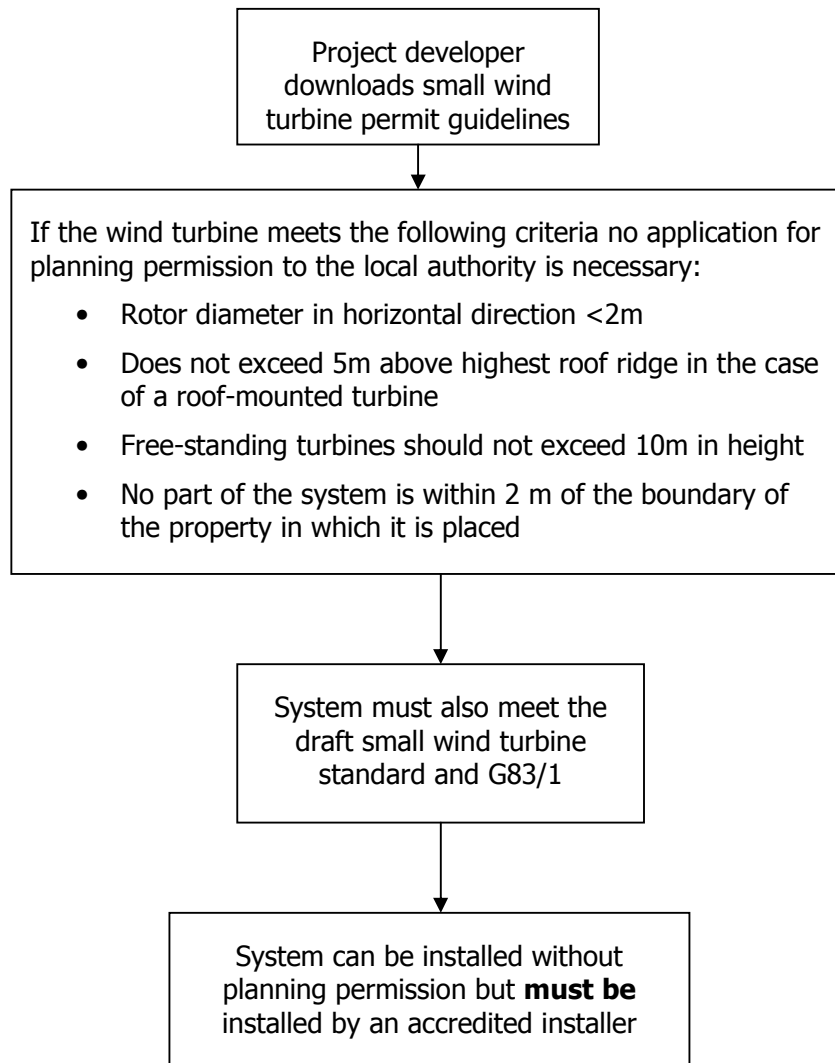


Figure 5. Proposed criteria for simplified installations in the UK

The suggested pre-conditions that would apply to this procedure are as follows:

- This procedure would apply to public and commercial buildings, schools, houses, flats and garages
- The 'system' refers to the wind turbine, mast and mounting brackets
- The system must be installed by an accredited installer
- Systems should be of a predominantly matt finish (grey, white or black)
- Noise limits at nearest boundary of neighbours should be specified

9.2 France

A simplified procedure for France is proposed below in Figure 6. This 'blueprint' would allow certain sizes of wind turbines to be installed in an urban environment without need for a construction permit. This procedure would apply to the smaller wind turbines and could apply both to ground installations and roof-mounted turbines.

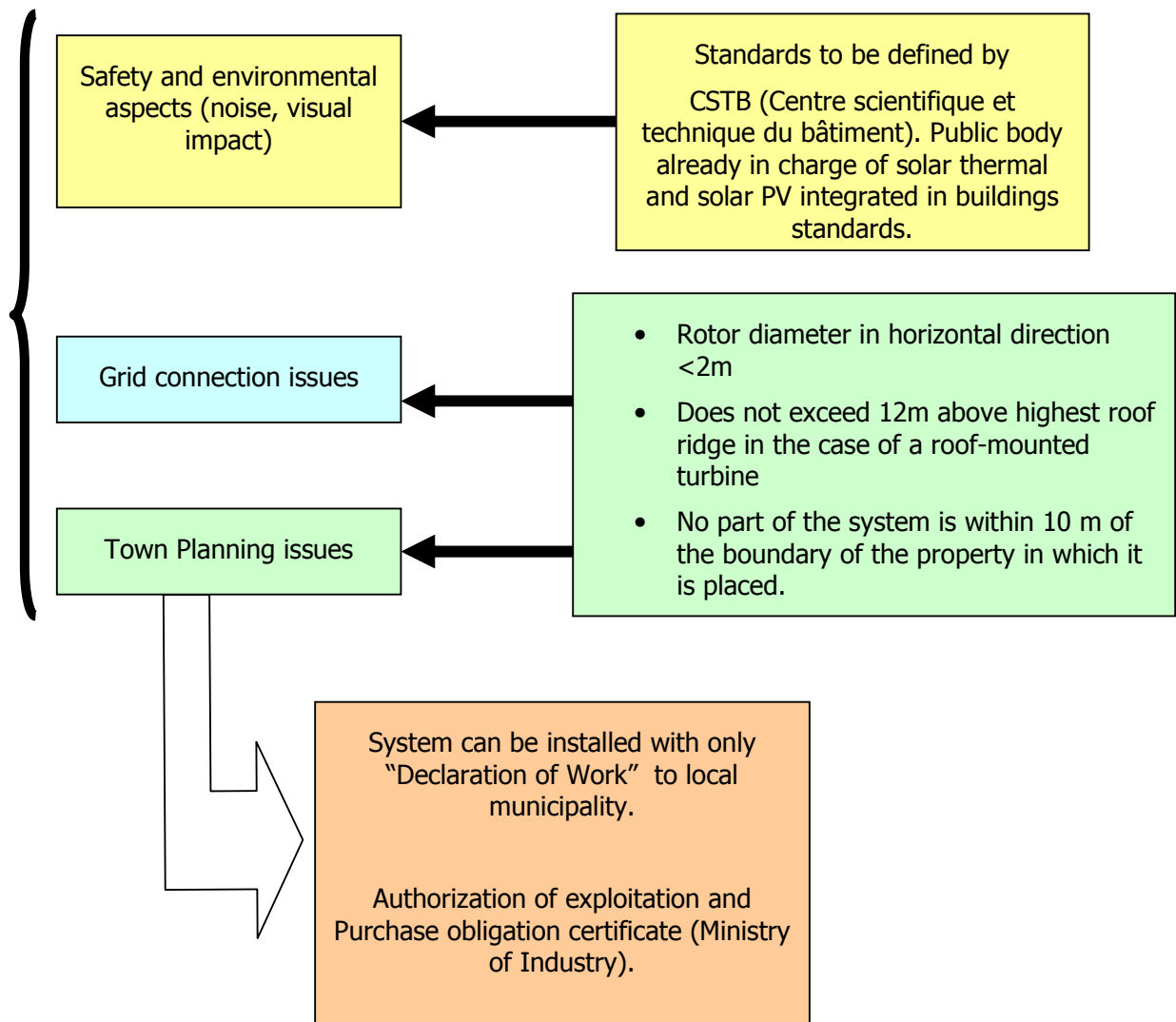


Figure 6. Proposed simplified installation procedures for France

9.3 The Netherlands

The result of the procedure outlined below in Figure 7 is a 'placing permit'. This procedure takes into account the recommendations of the market actors as given during a brainstorming session held in Amsterdam, The Netherlands.

The procedure consists of three steps, namely: 1) check if the turbine has a type guarantee (safety on technical and environmental aspects), 2) if it complies with the new 'surroundings requirements' (WABO) which will come in place of the existing environmental and building permit requirements and 3) if the roof of the building is suitable for the placement of the urban turbine. If the turbine can not meet any of the requirements, the placing permit cannot be obtained.

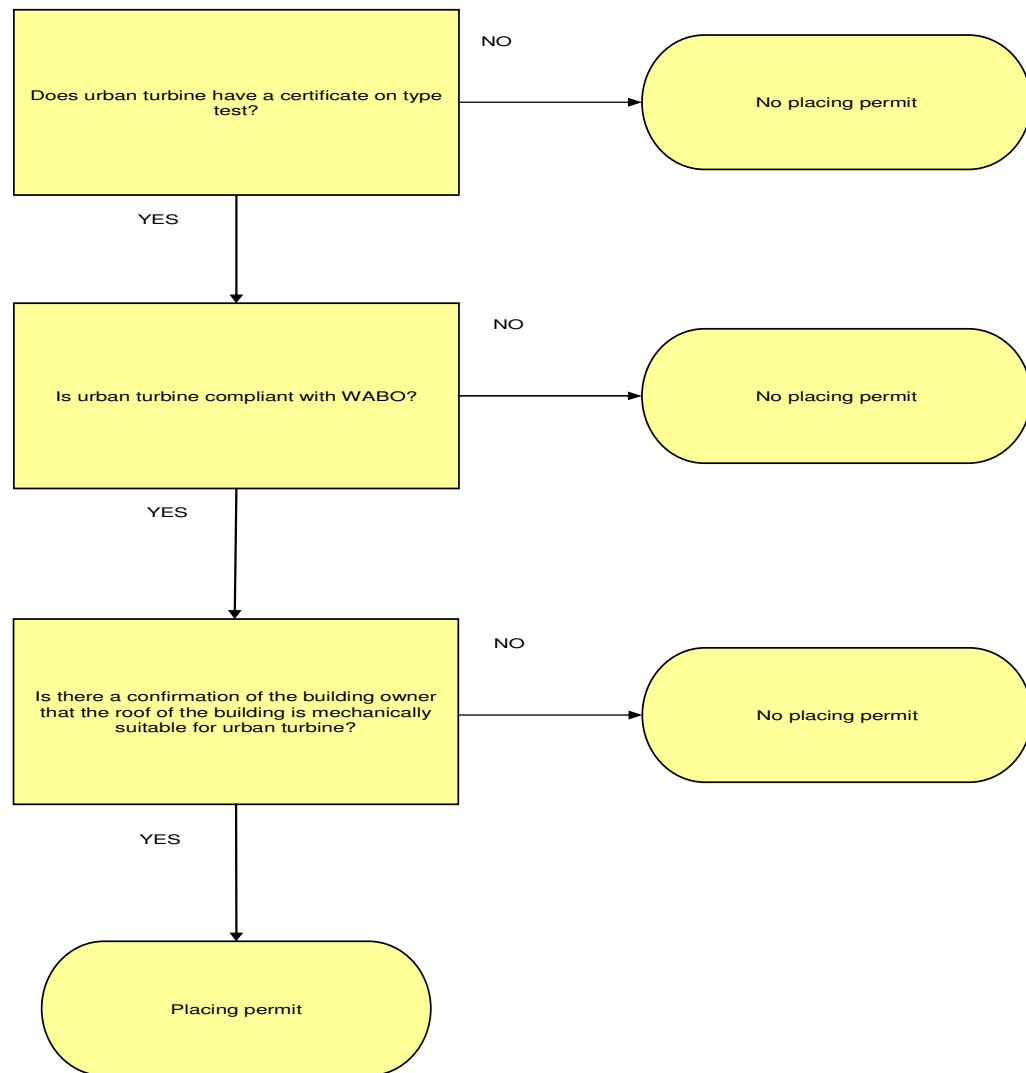


Figure 7. The 'ideal' permit procedure for small wind turbines in the Netherlands

This 'ideal' procedure requires the following preconditions:

- Small wind turbines are embedded into all relevant acts regarding renewable energy. This means that the effects of urban turbines count for energy and environmental savings within: EPC, EPL, EPA and EPBD.
- There is a set of general safety and (environmental) quality criteria for urban turbines. Also there is an independent institution accredited for testing of urban turbines on those criteria. And each producer is (financially) able to obtain the safety guarantee.
- The set of general spatial requirements an urban turbine must meet is embedded into the WABO procedure. This also includes the directions regarding the dimensions of urban turbine in relation to the building the turbine will be placed on.
- Municipalities will not require any other procedures except for the special (for example heritage) buildings.