EWEA
THE EUROPEAN WIND ENERGY ASSOCIATION

wind barriers

WindBarriers

Administrative and grid access barriers to wind power

July 2010

Grant agreement number: IEE/07/513/SI2.499556
Duration: December 2008 – November 2010
Co-ordinator: European Wind Energy Association asbl/vzw (EWEA)
Cover picture: ©Ecotecnia

Project partners:
Asociación Empresarial Eólica (AEE)
DONG Energy A/S
Austrian Wind Power GmbH
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer)
Iberdrola Renovables S.A.
Magyar Szélenergia Társaság (HWEA)
Polskie Stowarzyszenie Energetyki Wiatrowej (PWEA)
Vindmølleindustrien (DWIA)

Supported by:

Intelligent Energy Europe

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Photo: RES

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ACKNOWLEDGEMENTS:

The authors wish to thank everyone who contributed to drafting and producing this report.
In particular we would like to gratefully acknowledge the following persons:
Contributors:
Benjamin Pfluger, Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (Fraunhofer)
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Special thanks to:
EWEA's national wind energy member associations for their important contribution to the project.
The developers who replied to the WindBarriers survey.
Glória Rodrigues (EWEA) and Jacopo Moccia (EWEA) for their very useful remarks.

Design and production by: **Megaluna**
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Published in July 2010
Printed on FSC certified paper

Disclaimer: The analysis, conclusions and recommendations provided in this publication are based on the answers received on onshore and offshore wind projects from developers in 23 EU countries in the framework of the WindBarriers project. Some of the samples are too small to be representative and therefore the corresponding recommendations would need to be confirmed on a larger scale.

Foreword

I am delighted to introduce this first publication from the WindBarriers project. The Directive on the promotion of the use of energy from renewable sources (2009/28/EC) is a pillar of European sustainable energy policy, and its implementation will require significant efforts from EU member states to reduce administrative and grid access barriers. The WindBarriers project is important because it supports member states in this implementation process by providing a clear and detailed picture of the challenges being faced across the EU, as well as indicating some of the ways these challenges can be overcome.

WindBarriers analyses both the administrative and grid access processes in the different member states and regions, and compares them using transparent and objective criteria. This will help to highlight best practices, as well as to identify potential bottlenecks.

The WindBarriers project, which is supported by the Intelligent Energy Europe programme, is expected to significantly reduce the lead times for the development of new wind projects, and it also has the potential to accelerate the development of projects involving other renewable energy sources. It will engage with decision makers and help them to benchmark their performance using an agreed monitoring methodology.

WindBarriers has the potential to make an important contribution to accelerating the growth of renewable energy markets across the EU, and to implementing our common European vision of a more sustainable future.

William Gillett
Head of Unit Renewable Energy
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Executive Agency for Competiveness and Innovation (EACI)

Photo: Gehring

1 EXECUTIVE SUMMARY

Introduction

On 30 June 2009, the European Commission adopted a template setting out the minimum requirements for the National Renewable Energy Action Plans (NREAPs), as required by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 (2009 Renewable Energy Directive).

The NREAPs, which are to be provided to the European Commission by June 2010, are national roadmaps of each country's expected path to its binding renewable energy target for 2020. Each NREAP is to set out the country's expected renewable energy contribution, both in terms of capacity to be installed (MW) and of energy production (MWh), for each of the renewable energy technologies mentioned in the directive from 2010 to 2020. Moreover, each member state (MS) has to provide an estimate of its gross final energy consumption from all types of energy (both renewable and non-renewable), for each year between 2010 and 2020, for three sectors: heating/cooling, electricity and transport. The NREAPs will also include information on all policies and support schemes to promote renewable energy in that country.

The WindBarriers project seeks to build a reliable methodology to obtain concise information on the administrative and grid connection barriers that obstruct the development of wind energy. This methodology is to be used by member states and the European Commission to monitor the implementation of Articles 6 (administrative schemes) and 7 (grid connection) of directive 2001/77/EC on the promotion of electricity produced from renewable energy sources, which correspond to the new Articles 13 and 16 of the 2009 Renewable Energy Directive.

Building on a large stakeholder consultation, the WindBarriers consortium put together an extensive database with precise information on administrative and grid barriers. More than 200 wind energy projects installed during 2007 and 2008, both onshore and offshore across the EU-27, were analysed.

Questions were asked on a set of potential barriers – referred to as "indicators" - allowing information to be gathered on the administrative and grid obstacles in 23 countries of the EU. The results from the indicators can be compared from country to country, giving an indication of the implementation of the 2001 and 2009 EU directives. The results are accompanied by a set of recommendations on how to improve administrative and grid access procedures in the EU-27 in order to help each EU member state reach its binding target, as described in Table 1.1.

Administrative procedures and corresponding barriers

Project developers need to obtain a building permit in order to install a wind farm. This goes for the grid connection as well. The total time taken to get the building consent and grid connection permits is called the total "lead time" of a wind farm. Based on the WindBarriers survey, the average total lead time in the EU is 54.8 months for onshore and 32 months for offshore. Reasons for the long lead times vary from country to country, but they are often related to Environmental Impact Assessment (EIA) restrictions and/or grid connection constraints.

The EU average for the administrative lead time of an onshore wind energy project is 42 months. Compared to this, offshore wind energy projects seem to be much quicker, with an average of 18 months according to the surveys submitted to the WindBarriers project. The administrative lead time differs significantly for each country and each project: from 2 to 154 months. Some developers in Greece, Portugal and Spain have experienced lead times of 100 months or longer for their building permit applications. As regards offshore, a possible explanation for the shorter building consent time is that the six countries in the survey seem to have developed efficient and streamlined decision-making processes, including Maritime Spatial Planning (MSP).

On average nine authorities have to be contacted directly and an additional nine indirectly for onshore wind projects in the EU, while offshore developers have to liaise with seven authorities directly and 16 indirectly. This is, however, many more than would be involved in the recommended 'one-stop-shop' approach, whereby the applicant would have to contact a single entity which would be in charge of coordinating the whole application process. The 'one-stop-shop' should be an EU objective for both onshore and offshore projects.

The barriers faced by developers during this process are often related to the approval and scope of the Environmental Impact Assessment, compliance with spatial planning, the number of parties/ authorities involved and to barriers related to other stakeholders involved in the process (e.g. social acceptance issues).

For offshore, the main barriers are likely to be the administrative bodies' lack of experience, an unclear EIA process, and difficult interaction with other users of the sea, according to the survey.

Costs, the approach of the authorities, the transparency of the decision-making process and the use of deadlines are also analysed in the survey - and depending on the country, they can constitute an obstacle to wind power development.

Grid connection procedure and corresponding barriers

Some of the main barriers to grid connection procedures were evaluated against the requirements of Article 13 of the Renewable Energy Directive 2009/28/EC.

Once a project developer has secured the basic technical requirements (e.g. project location, sufficient wind resource, access to the site of the future farm), a grid connection application can be sent to the system operator.

A basic technical project is submitted to the Distribution System Operator (DSO), but can be transferred to the Transmission System Operator (TSO) if it requires a higher grid capacity (usually over 132 kV).

According to the WindBarriers survey, the EU average for grid connection lead time is 25.8 months for onshore projects and 14 months for offshore; for onshore, the grid access lead time is significantly lower than the administrative one (42 months).

The average number of TSOs involved in the grid connection process is 0.85 onshore and 0.92 offshore, whereas for the DSOs, it is 0.77 onshore and 0.47 offshore. In terms of third parties involved during the grid connection process, the EU average is 24 onshore and 4.4 offshore. The ideal situation remains the 'one-stop-shop' approach, as described above.

The barriers faced by developers during this process are mostly related to an absence of clear information on the available grid connection capacity, a lack of planning for future grid extension and reinforcements on behalf of system operators, insufficient grid capacity, and other aspects such as land ownership and the EIA.

Table 1.1: Overview of the main results of the survey on administrative and grid procedures

	Administrative procedure				Grid access procedure			
	Total lead time	Administra-tive lead time	Authorities: direct contact	Authorities: indirect contact	Grid access lead time	TSOs	DSOs	Other parties: grid
	Average	Average	Average	Average	Average	Average	Average	Average
Country	Months	Months	Number	Number	Months	Number	Number	Number
Austria**	31.65	18.93	10.38	13.90	17.56	0.84	1.00	3.42
Belgium	22.61	20.33	4.08	10.28	7.08	0.91	1.00	3.18
Bulgaria**	31.65	18.93	10.38	13.90	17.56	0.84	1.00	3.42
Czech Republic	39.44	31.56	11.23	11.44	24.76	1.25	0.77	6.91
Denmark	34.46	31.81	4.25	0.90	2.01	0.78	0.92	0.13
Estonia*	37.80	28.30	10.54	16.03	22.33	1.72	1.38	5.46
Finland*	37.80	28.30	10.54	16.03	22.33	1.72	1.38	5.46
France	34.02	29.58	22.06	14.22	6.36	1.00	1.65	14.39
Germany	55.15	30.12	6.16	20.41	6.59	0.76	0.64	8.60
Greece	54.60	50.09	18.63	22.38	20.20	0.84	1.00	11.80
Hungary**	31.65	18.93	10.38	13.90	17.56	0.84	1.00	3.42
Ireland	55.59	33.49	5.74	8.77	31.42	0.82	1.00	5.01
Italy	32.24	18.06	12.73	2.84	18.96	0.45	0.51	32.25
Latvia*	37.80	28.30	10.54	16.03	22.33	1.72	1.38	5.46
Lithuania*	37.80	28.30	10.54	16.03	22.33	1.72	1.38	5.46
Netherlands	45.74	38.85	4.34	1.93	12.93	0.75	0.66	1.11
Poland	48.76	43.09	7.78	12.57	15.46	0.89	0.88	32.13
Portugal	71.11	58.03	7.58	6.61	46.61	0.79	0.38	47.25
Romania**	31.65	18.93	10.38	13.90	17.56	0.84	1.00	3.42
Spain	76.08	57.74	5.53	4.28	33.50	0.94	0.80	27.85
Sweden*	37.80	28.30	10.54	16.03	22.33	1.72	1.38	5.46
United Kingdom	25.88	26.87	3.47	11.74	8.36	0.55	0.94	2.62
Offshore EU	32.00	18.52	6.88	15.92	14.06	0.92	0.47	4.44
Onshore EU-27	54.80	42.32	9.03	9.13	25.83	0.85	0.77	23.89
Offshore EU-6	31.67	28.67	12.10	11.63	7.68	1.00	1.25	7.87

Source: EWEA 2010, WindBarriers survey

** grouped as 'Baltic and nordic countries with less than four projects'*
*** grouped as 'Central and eastern European countries with under four projects'*

Recommendations to EU-27 member states

Administrative procedures: Article 13 of the EU 2009 Renewable Energy Directive	
Total lead times	• Reduce the average total lead time in the EU to 24 months; • Make clear requirements on Environmental Impact Assessments (EIAs) (fixed deadlines, how many EIAs need to be carried out depending on the size of the park, its location) and reduce the number of irrelevant documents; • Develop spatial planning by defining the most appropriate locations and wind development areas, lowering investment risks and streamlining project application procedures; • Train and allocate enough civil servants to handle the expected applications;
Number of authorities to be contacted directly and indirectly	• Develop and implement the 'one-stop-shop' approach in all member states; • The authorities should disseminate clear information to developers on the administrative procedures and decision-making processes;
Administrative lead times	• Lower the average administrative lead time to a maximum of 20 months, to ensure that the total lead time in the EU stays below 24 months; • Perform onshore and offshore spatial planning and define the most suitable wind development areas, with streamlined administrative procedures in these areas; • Provide clear definitions of the administrative requirements, in terms of procedures, deadlines and EIA content; • Set deadlines for the administrative process. If the authority is not able to meet the deadline, the project automatically goes to the next stage; • Train and allocate the necessary civil servants to handle the expected applications;
Administrative costs	• Lower the average administrative costs in the EU to 1.5% of the total project costs; • Perform a preliminary environmental assessment; • Give incentives to competent authorities to gather data and studies collected under the EIA process and make them public; • Limit the administrative requirements to the key relevant elements, in particular the ones identified through past projects. Update procedures regularly; • Learn from past projects, and avoid requiring similar information from other projects with the same conditions; • For offshore, maritime spatial planning should give special importance to cross-border cooperation and to developing synergies with other sea users;

Transparency of the administrative procedure	• Improve the transparency of administrative procedures across the EU to an average of 4 out of 5 [1]; • Inform both the developers and the local authorities of the applicable rules and regulations; • Set deadlines for the administrative process. If the authority is not able to meet the deadline, the project automatically goes to the next stage;
Authority's attitude	• Improve the attitude of local authorities across the EU to an average of 4 out of 5 [2]; • National authorities should make sure local and regional authorities are aware of the targets set out in their NREAP, and of the necessity for their country to meet them; • Disseminate transparent and unbiased information to the authorities at all levels on wind energy technology and developments, addressing the myths associated with wind energy.

[1] According to the WindBarriers survey, the transparency of administrative procedures is rated 3.21 on average, on a range from 1 to 5 where 1 means non-transparent and 5 means maximum transparency.

[2] The attitude of local authorities is rated 3.36 on average across the EU, on a range from 1 to 5, where 1 means 'negative attitude' and 5 means 'maximum positive attitude'

Grid connection procedures: Article 16 of the 2009 EU Renewable Energy Directive

Grid connection lead time	• Reduce the average grid connection lead time in the EU to six months; • Set deadlines for the administrative process. If the authority is not able to meet the deadline, the project automatically goes to the next stage; • Train and allocate the necessary civil servants to handle the expected applications; • Develop the grid infrastructure: - Provide clear definitions of the grid connection requirements. In particular, develop and implement standardised grid codes across the EU; - Plan and build transnational offshore grid infrastructure to connect the anticipated offshore wind power, and guarantee connection to the grid for offshore wind projects; - Reinforce the onshore and offshore transmission system (through cooperation between different EU member states); - Finding and occupying the land for interconnection infrastructure for wind farms should be made easier, with adequate economic compensation for the land owners; • On the developer's side: - Avoid an excess of requests on the same grid point; the projects should be realistic and based on measured wind data. The use of the land should also be guaranteed for the entire length of the project; - Close collaboration with grid operators is required;
Grid connection costs	• Lower the average grid connection costs in the EU to 2.5% of project costs; • System operators should cover and contribute to the grid connection costs in the countries where this is not yet the case, and adapt these costs to the project size; • Upgrade the public grid infrastructure within reasonable costs; • Limit the technical grid connection requirements to a reasonable level (remain within the scope of the project); • Provide clear definitions of the grid connection requirements. In particular, develop and implement standardised grid codes across the EU. Grid codes have to be realistic and compatible with the latest technology. Harmonisation of grid codes at EU level is important; • The voltage range should be the minimum required according to the short circuit capacity of the grid and the load flows in the common coupling point (PCC). Feasibility studies should identify the voltage range for the connection. This will affect the final line tracing and the costs and time schedule; • Clear information about grid costs should be provided to developers at an early at an early stage of project development, in order to reduce investment risks;

Transparency of the grid connection process

- Improve the transparency of the grid connection process at EU level to an average of 4 out of 5 [1];
- Provide a clear, streamlined procedure and decision-making process for grid connection;
- Unbundling of vertically integrated power companies would make grid access fairer. Plans for the construction and reinforcement of new grid lines should be realistic and effective. It is fundamental to have better coordination between distribution and transmission companies when building new infrastructure and for connection requests. This coordination should also be extended during the wind farm's operation;
- Widely publicise information on the characteristics of the grid. Developers can carry out access capacity studies and propose technical and management solutions. These proposals will allow grid capacity to be increased and a realistic calendar to be set for grid connection;
- Set deadlines for the grid connection process. If the authority is not able to meet the deadline, the project should automatically go to the next stage of the authorisation process.

[1] According to the WindBarriers survey, the transparency of administrative procedures is rated 3.21 on average, on a range from 1 to 5 where 1 means non-transparent and 5 means maximum transparency.

Photo: Jan Oelker

2 PROJECT METHODOLOGY

The aim of the project methodology was to find criteria that could be used to measure administrative and grid barriers to wind energy projects for years to come.

Before beginning to collect the data, the consortium set up a working group made up of experts from the consortium partners, 27 national wind energy associations, and representatives of the Executive Agency for Competiveness and Innovation (EACI). The working group agreed on a specific methodology, based around the following criteria.

Targeting recent projects: 2008 and 2007

The objective of the project was to collect recent data from both large and small projects, in all EU-27 countries, via a questionnaire. In order to have the most up-to-date information on barriers to wind energy development, it was decided to focus on projects installed in 2008 (when the project started). In order to obtain statistically reliable datasets, representative of the different rates of development across the EU, the consortium decided to monitor a minimum of 10 projects per country, and to cover from 20% to 50% of new capacity installed in 2008 in each country, as described below. Since some countries installed low amounts of wind energy in 2008, projects from 2007 were also sometimes taken into account, provided they were relevant.

Figure 2.1: Map of the cumulative capacity in MW at the end of 2008

Source: EWEA

Building a representative sample: adaptation to market dynamism

The goal was to build a data sample that represented the different types of market in Europe. Considering the wide variability of annual installed capacity in the different countries, the sample size for each country had to be adapted to the market size. This was done in order to avoid collecting the vast majority of data from large developed markets, and losing focus of the newer wind energy players, where the barriers may be higher.

Generally, market analysts determine the maturity of the market (regulatory environment, public authorities' expertise, developers' skills, and so on) using four market categories based on the new installed capacity. Experience shows that a high annual installation of wind power is a good indicator of the level of barriers for countries with similar wind resources.

For the WindBarriers project, the consortium used the capacity installed in 2008 as per statistics published by the European Wind Energy Association (EWEA: see Figure 3.1). More information on these statistics is available on EWEA's annual statistics web page on www.ewea.org.

- For countries **where less than 150 MW came online in 2008**, the sample had to cover at least 50% of the new installed capacity.
- For countries where **between 150 MW and 1,000 MW came online in 2008**, the sample had to cover at least 30% of the new installed capacity.
- For countries where **more than 1,000 MW came online in 2008**, the sample had to cover at least 20% of the new installed capacity.

Getting a minimum number of projects

In addition to covering the minimum percentages mentioned above, the sample was expected to include at least 10 projects per country. However, this was not possible in Cyprus, Latvia, Luxembourg, Malta and Slovenia, as there were not enough new projects in 2008. In such cases, the project collected other relevant data to indicate the barriers.

Analysing regional variations: regional distribution

In order to ensure that all types of regional development were considered, the samples targeted regions where wind power was less developed.

The Nomenclature of Territorial Units for Statistics (NUTS) classification of the Committee of the Regions was used to define regions; but not all regions in each country were to be covered by WindBarriers.

A substantial number of the projects to be considered per country were to come from regions that performed at or below the European average. The remaining projects were to come from the best performing regions.

Balancing the regional distribution was one of the most complex tasks in this project and only a few countries managed to take it into account in the definition of their country sample.

Looking for showstoppers: analysis of non-finalised projects

While obtaining a balanced overview of recently implemented projects in the EU was relatively straightforward, projects that are planned but whose implementation has been delayed represent a significant capacity that is not registered in any database and can be at various stages of development.

However, it is necessary to differentiate between projects delayed specifically due to administrative barriers, and projects delayed because of the lack of experience of the developer, an inadequate project proposal, or an overly speculative approach.

The WindBarriers consortium decided to address this issue by adding a specific section on delayed/blocked projects to the questionnaire. Since the questionnaire was filled in by developers with a proven track record, the consortium avoided considering unrealistic projects.

Sample and survey

On the basis of these criteria, each national wind energy association compiled a sample of representative projects, and identified the developers to be contacted.

A copy of the WindBarriers online based questionnaire was sent to those developers. Almost all member states were covered, with the exception of the countries where no capacity was installed at all in 2008.

Definition of the indicators

The main aim of the questionnaire was to obtain a comprehensive description of existing administrative and grid access barriers, primarily in a quantitative manner, by means of particular criteria or "indicators". In order to evaluate the results, and make recommendations, it was necessary to make the barriers in the individual member states measureable and comparable.

A summary of the indicators is given in Table 2.1. They fall into three categories depending on whether they measure administrative or grid access barriers, or provide overall information on the project and the developer's success rate.

In most cases, direct quantification of the barriers was possible. The questions relate to numerical values with pre-defined units. Lead times are measured in months, costs as a percentage of the overall project costs, and the number of involved authorities, operators or other persons/parties involved in the project in absolute values.

The indicators measuring administrative and grid access transparency are derived from several questions. The respective answers are ranked on a five-point scale.

Table 2.1: Selected indicators

	Indicator	Unit	Number of questions
Overall	Total lead time	Months	1
	Number of projects on hold in same region	Numerical value	1
Administrative barriers	Number of authorities that developer must contact directly	Numerical value	1
	Number of authorities developer does not have to contact directly	Numerical value	1
	Administrative lead time	Months	1
	Administrative costs	As share (%) of total project costs	1
	Authority's attitude	[1-5]	1
	Transparency of administrative procedure	[1-5]	4
Grid connection barriers	Number of Transmission System Operators (TSOs) involved	Numerical value	1
	Number of Distribution System Operators (DSOs) involved	Numerical value	1
	Number of other parties involved in obtaining grid connection	Numerical value	1
	Grid connection lead time	Months	1
	Grid connection costs	As share (%) of total project costs	1
	Transparency of grid connection process	[1-5]	3

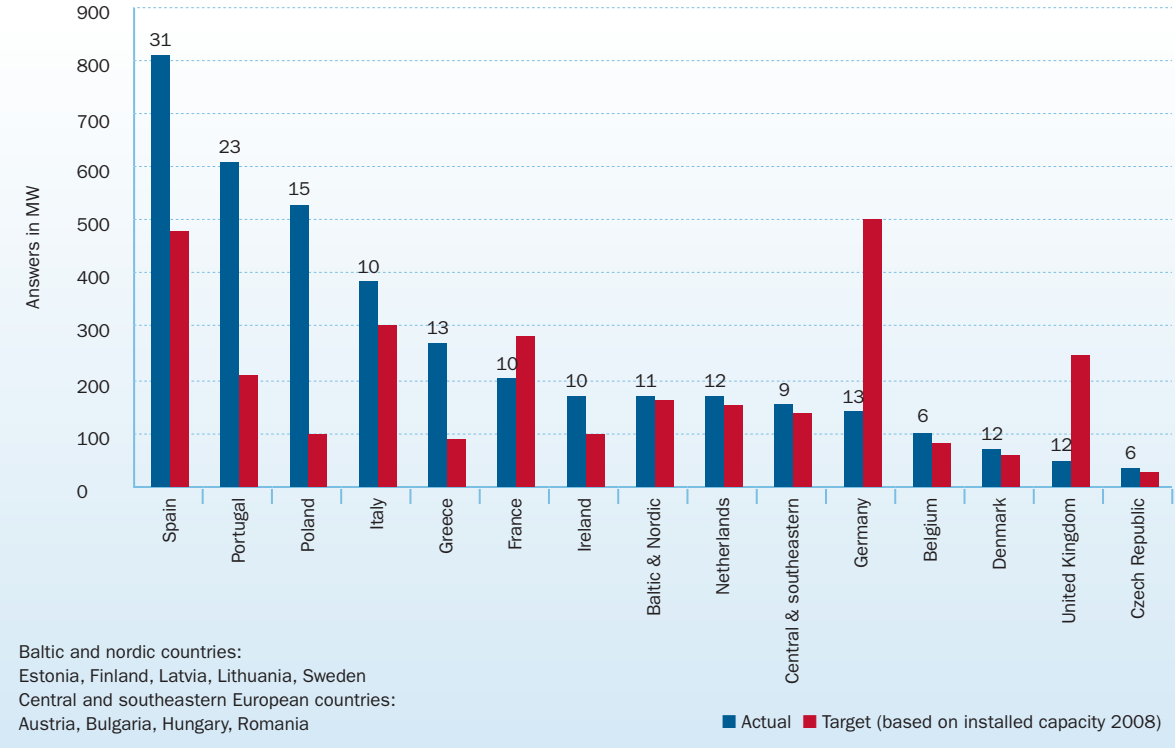
Source: Fraunhofer ISI 2009, for WindBarriers

Confidentiality and representativeness

Before the data gathering process began, the consortium decided to cover the whole questionnaire with a confidentiality agreement. It stipulated that the data from the questionnaire would only be visible to two of the project partners and that only aggregated figures would be published. Despite these measures, for some countries the number of replies was relatively low and the results would therefore have to be considered cautiously and tested on a larger sample.

The target amount of replies for each country, and the actual number received, can be seen below:

Figure 2.2: Rate of replies



Source: Fraunhofer ISI, 2010, for WindBarriers

Photo: Shutterstock

3 ANALYSIS OF BARRIERS IN ADMINISTRATIVE PROCEDURES

In the following sections, the main barriers to the administrative procedures are evaluated against the requirements of Article 13 on "Administrative procedures, regulations and codes" of the 2009 Renewable Energy Directive.

This article is included at the end of this chapter (page 36) its first paragraph reads: "All member states [must] apply all proportionate and necessary rules concerning the authorisation, certification and licensing procedures for the production of electricity, heating or cooling from renewable energy."

The rest of the article defines the responsibility of the member states to take the necessary steps in order to ensure:

- Clear administrative structures and rules for certification and licensing at all administrative levels: local, regional and national.
- All the actors involved in the authorisation, certification and licensing application for renewable energy installations have clear and concise information on what is required.
- Administrative procedures are simplified and streamlined at all levels for all stakeholders involved in the authorisation and permitting processes.

3.1 Generic model of the permitting process

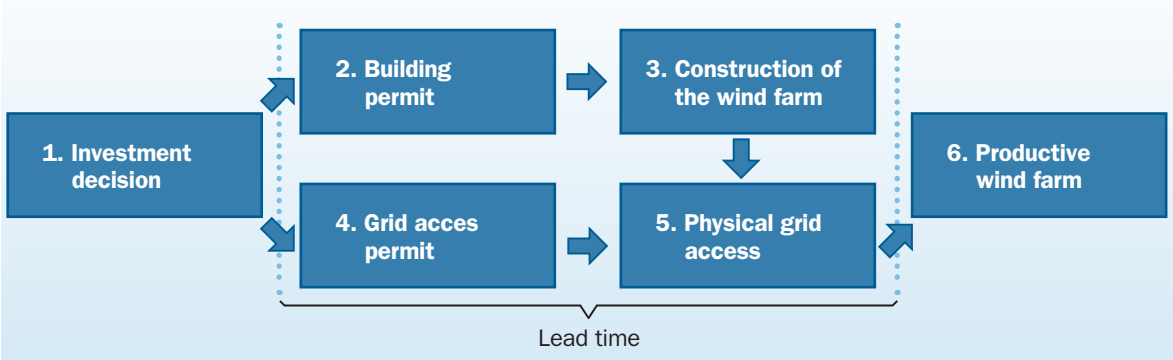
Throughout the EU-27, project developers need to obtain a building permit in order to install a wind farm. This goes for the grid connection as well: developers cannot link up to a network without a grid permit. Developers often need more than one permit, and barriers can be related both to other stakeholders involved in the process (such as NGOs, local community opposition, and other sea users in the case of offshore) and/or the final building consent and grid connection.

Based on the information WindBarriers gathered on the perceived barriers to wind energy projects, a simplified process can be drawn for the permit process, as shown in Figure 3.1.1 below.

This simplified process is primarily based on onshore wind farm procedures, as at this stage there are few descriptions of the procedures for offshore wind farms. The time needed to obtain these permits - the "lead time" - is calculated from the moment when the project developer submits his first application (both for the building permit and for the grid connection permit) to the point in time when a wind farm is online.

As the application processes for building and connecting a wind farm to the grid can run in parallel, the overall lead time cannot be calculated as the sum of the building permit procedure and the grid connection procedure. Figure 3.1.1 summarises this process.

Figure 3.1.1: The process of getting the permit to build and connect a wind turbine



Source: DWIA 2009, Windbarriers survey

Phase 1: Investment decision/project planning:
The project developer first has to decide when to start the application process for the necessary permits. If the initial application is rejected, the lead time is considered to be zero.

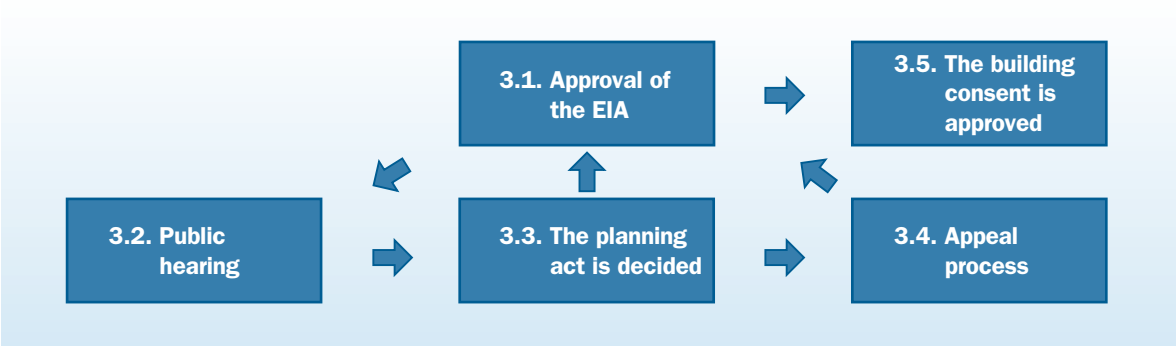
The most common barriers during this phase are market barriers, for example insufficient support schemes, rejection of the project based on an informal dialogue with the public authority, or risks that are perceived by developer as too high compared to the expected rate of return. High risk can be caused by administrative barriers in the form of:

- Lack of access to information concerning the material needed for the permits.
- Lack of regulation and/or uncertainty about regulation related to wind farms and electricity production.
- Overly strict rules on noise requirements and distance of wind farms from habitations.
- Negative/lack of support from local authorities and/or the neighbouring community.

Phase 2: Early development and maturation:
The real process of getting a permit starts when the project developer submits an application to get a building permit. Now a 'sub-process' begins and this process differs from country to country.

The five sub-processes described in Figure 3.1.2 sum up the complete building permit procedure.

Figure 3.1.2: **Process for getting the building consent**



Source: DWIA, 2009, for WindBarriers

3.1 EIA approval process:
The public authorities prepare to take a decision to approve or reject the building permit. The process generally begins at local level and it can run in parallel with other phases of the administrative processes.

The project developer can encounter barriers such as:

- Lack of official information about the decision-making process.
- Delays in the administrative process. For example, even when the authority has a fixed deadline to give an answer to the EIA, it can postpone this deadline by asking for more materials or studies from the project developer.
- Negative attitude and inexperience of the authorities.
- Disagreement regarding the scope of the EIA and the spatial planning.
- Having to contact several authorities to obtain the necessary permits.

3.2 Public hearing:
Approval of the EIA is often followed by a public hearing, where the local community can express their views on the project. The typical barriers encountered at this stage are social acceptance barriers, such as the "not in my backyard" attitude (NIMBY), answering questions from environmental NGOs, and a negative attitude from the local authorities. Developers can face a lawsuit against the project at this stage, but this happens more often after the building consent has been given.

3.3 The planning act:
If the planning act is adapted to the wind farm project, the developers will continue with an appeal process or another legal proceeding (box 2.4, Figure 3.1.2) or they will directly obtain the building permit (box 5, Figure 3.1.2). If the planning act is not adapted to the wind farm, it can either be rejected outright, or developers can be asked to start again with a new EIA process (box 2.1, Figure 3.1.2). This delay occurs in almost all EU countries.

3.4 Complaint procedures / appeal process:
Much time can be wasted waiting for the outcome of a complaint/appeal process. From the perspective of the project developer, these processes often lack clear, fixed deadlines, causing great uncertainty for the developer as to the exact date/time when the building permit will finally be obtained. There is also the possibility that the authorities will reject the wind farm based on the complaint procedures.

The project is then stopped or started again with a new EIA process (box 2.1, Figure 3.2.1). Some developers also face legal proceedings against the project during or after the construction of the wind farm, which is a great financial burden.

3.5. Building permit approved:
At this stage, all the necessary permits are approved and the final building permit has been obtained. The project developer can now start building the wind farm.

Construction of the wind farm:
Barriers related to the construction process are not targeted in the WindBarriers project; therefore delays during construction were not counted in the overall lead time.

3.2. Barriers to administrative procedures

Table 3.2.1: Barriers to administrative procedures and corresponding indicators

	Total lead time (months)	Number of authorities to be contacted directly	Number of authorities with indirect contact	Administra-tive lead time (months)	Administra-tive costs (of overall project costs)	Transparency of the administrative procedure (1-5)	Authority attitude (1-5)
Austria	+	+	-	+	-	+	-
Belgium	+	+	-	+	+	+	0
Bulgaria	+	-	+	+	+	-	-
Czech Republic	+	-	-	+	-	0	-
Denmark	+	+	+	+	+	-	+
Estonia	+	-	-	+	+	+	-
Finland	+	0	-	+	+	0	-
France	+	-	-	+	+	0	-
Germany	0	+	-	+	-	0	0
Greece	0	-	-	-	-	-	-
Hungary	-	-	-	+	+	0	-
Ireland	0	+	0	+	+	+	+
Italy	+	-	+	+	+	0	0
Latvia	+	+	+	+	+	0	-
Lithuania	+	-	-	+	-	-	-
Netherlands	+	+	+	0	-	-	-
Poland	+	+	-	0	0	0	0
Portugal	-	+	+	-	+	+	+
Romania	+	0	+	+	+	0	-
Spain		+	+	-	-	0	0
Sweden	+	+	-	0	-	+	+
United Kingdom	+	+	-	+	0	0	0
Offshore EU	+	+	-	+	-	0	0

Source: EWEA 2010, based on WindBarriers

Relative country performance:

- "+" performs 10% or more better than the EU average.
- "-" performs 10% or more below the EU average.
- "0" performs at EU average, within a 10% range.

Offshore: comparison onshore / offshore practices

Country colour codes:

- : Noticeable deviation from the EU average in negative direction (worst cases).
- : Noticeable deviation from the EU average in positive direction (best cases).
- : Emerging markets.
- : Growth market.
- : Developed market.

Total lead time

The length of the total lead time for obtaining all the needed permits for wind projects across the EU-27 is on average 54.8 months for onshore and 32 months for offshore.

As indicated in Figure 3.2.2, the total lead time is based on both the administrative and grid connection procedures. For onshore, the best performing countries are Austria, Romania, and Finland with a total lead time of less than 20 months each. However, the very small sample size from these countries, due to a low level of MW installed in 2008 (less than 10 projects), means that the results are not representative enough to be the basis of a recommendation.

According to the survey, Belgium, the UK, Italy, France, and Denmark each have a total lead time of between 25 and 35 months.

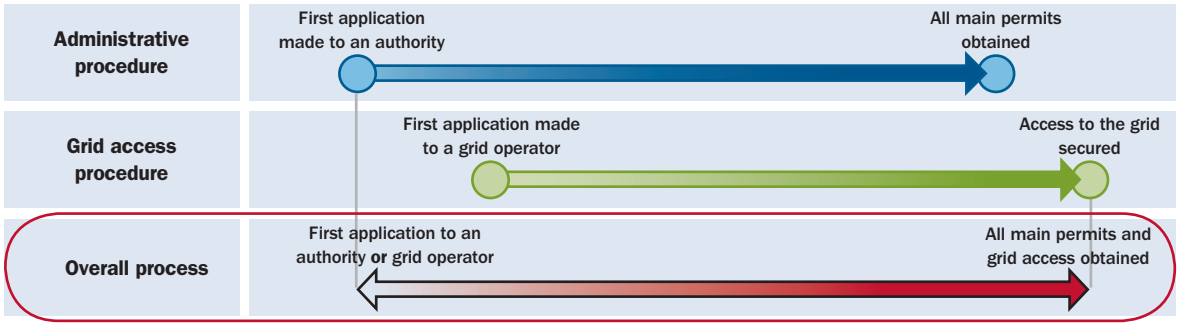
The countries that have a lead time of longer than the EU average are Hungary, Portugal and Spain.

Urgent action is needed to reduce these lead times, despite the fact that Portugal and Spain are considered extremely dynamic markets, falling in the categories of "developed" and "growth" markets.

Reasons for long lead times vary from country to country, but are often related to EIA restrictions and/or grid connection constraints due to a high number of requests for connection to the power network.

We recommend an average lead time of 24 months at EU level for both onshore and offshore. EU member states should take measures to reach this target by improving their EIA procedure[3]: reducing the number of authorities to be contacted when carrying out the EIA, and putting concise EIA procedures in place.

Figure 3.2.2: Definition of total lead time, administrative procedure, and grid connection procedures



Source: Fraunhofer ISI, based on WindBarriers

[3]The EIA should be carried out at member state level, based on European recommendations.

Administrative lead time

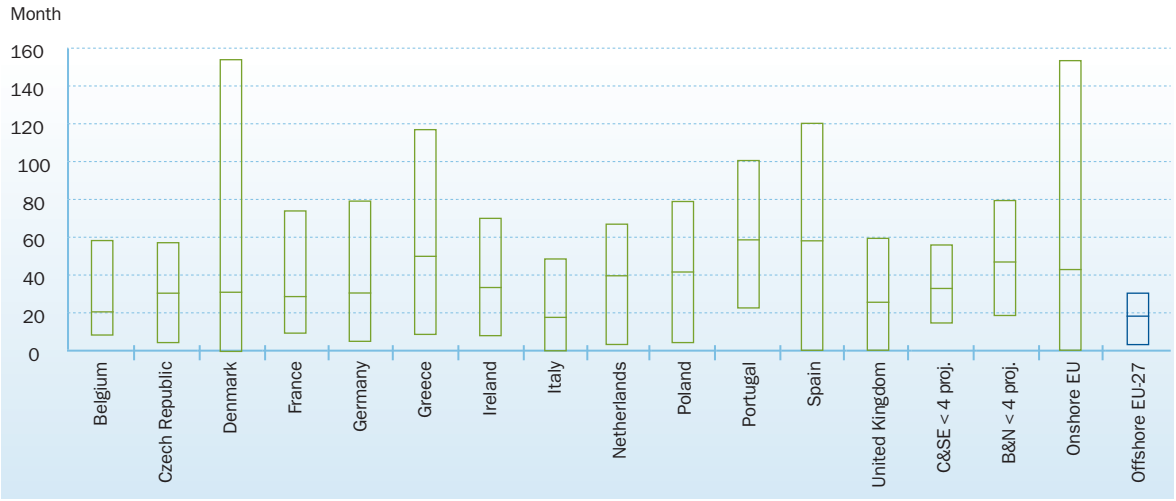
The EU average administrative lead time for an onshore wind energy project is 42 months. Compared to that, offshore wind energy is much quicker, with an average of 18 months. Figure 3.2.3 below shows clearly how much the administrative lead time differs from country to country.

The total range of the administrative lead time varies from two to 154 months. Some developers in Denmark, Greece, Portugal and Spain have experienced lead times of 100 months or longer for their applications. For onshore, the five best performing countries are: Finland, Austria, Romania, Italy and Belgium, with an administrative lead time of less than 20 months. Considering the small sample size for Finland, Austria and Romania, with very little wind power capacity installed in 2008 and 2007, the recommendations we make in the factsheets (Chapter 6) need to be tested on a larger sample.

The three countries that are performing far below the average are Greece, Spain and Portugal, with more than 50 months on average. For Spain and Portugal, this is related to the long total lead time. The Spanish case is a paradox with a very long lead time for the administrative process, but a small number of authorities to be contacted (nine). This could indicate that there is a surcharge on the administrative side due to a high number of applications in comparison to the allocated staff resources.

However, taking into account the earlier recommendations, and in order to achieve a total lead time of 24 months, the EU average administrative lead time should be reduced to a maximum of 20 months, provided that the administrative and grid connection procedures run in parallel.

Figure 3.2.3: Administrative lead time for obtaining the building consent per EU country



Source: 2009 WindBarriers survey

Note 1: C and SE: Central and southeastern European countries: Austria, Bulgaria, Hungary and Romania; B and N: Baltic and Nordic countries: Estonia, Finland, Latvia, Lithuania and Sweden
Note 2: The top of the box plot represents the maximum lead time, the middle bar the mean lead time and the bottom of the box plot the minimum lead time according to the survey answers received.

Number of authorities to be contacted directly and indirectly[4]

On average, nine authorities have to be contacted directly and an additional nine indirectly for onshore wind projects in the EU, while offshore developers have to liaise with seven authorities directly and 16 indirectly. These averages are relatively high compared to the best performing countries on this indicator.

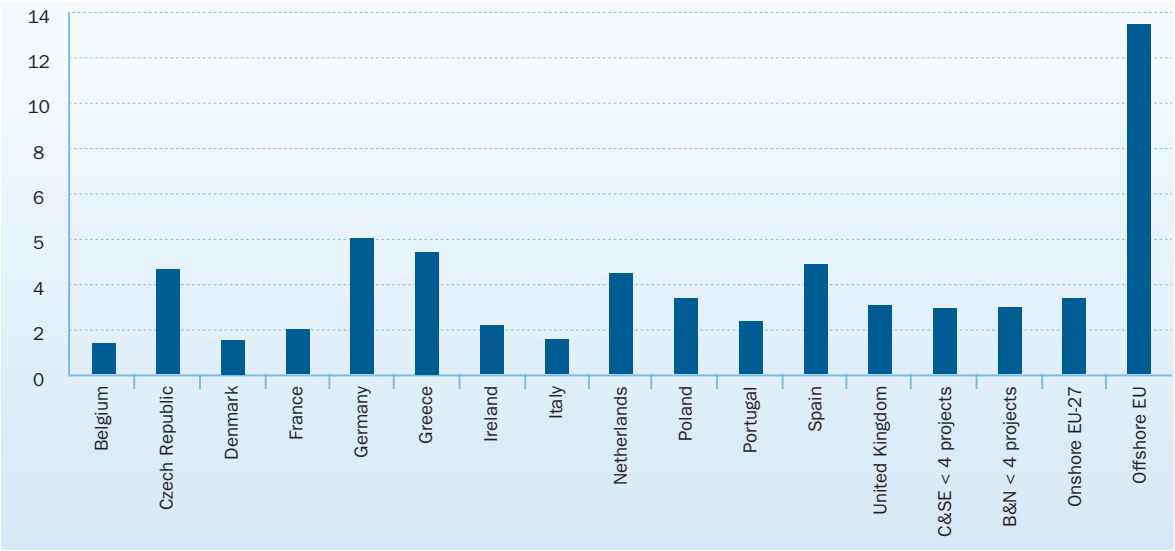
Taking into account both direct and indirect contacts, the best performing countries in this study are Denmark, the Netherlands and Spain, with fewer than ten contacts in total. This is however much higher than the 'one-stop-shop' approach, where the applicant would have to contact a single entity in charge of coordinating the application process for them. This should be the objective both for onshore and offshore wind energy in all EU countries, as already indicated in the 2001 Copenhagen strategy on offshore wind power deployment[5].

Five countries are performing significantly below average, namely Austria, Hungary, Finland, France and Greece, with over 30 direct and indirect contacts to make. In these countries, urgent action is needed to streamline the administrative processes.

Administrative costs[6]

On average, administrative costs in the EU represent 2.9% of the overall project costs for onshore and 14% for offshore. For offshore, this particularly large share is related to the high costs of the EIA studies required for the application procedure. For onshore, ten EU countries have administrative costs below 2%.

Figure 3.2.4: Administrative cost as a percentage of total project costs



Source: DWIA and Fraunhofer ISI 2010, for WindBarriers

Note 1: C and SE: Central and southeastern European countries: Austria, Bulgaria, Hungary and Romania, B and N: Baltic and Nordic countries: Estonia, Finland, Latvia, Lithuania and Sweden

[4] Authorities to be contacted directly are the ones that a developer has to negotiate with personally or in correspondence, e.g. through applications or other documents. In some cases these documents are automatically forwarded to other authorities for processing, without action from the developer.

[5] Copenhagen Strategy on Offshore Wind Power Deployment, European Policy Seminar on Offshore Wind Power, Copenhagen, 27 October 2005.

[6] The costs of the administrative procedures include all expenses needed for the building consent (NOT the grid connection procedures): a) staff costs for the administrative procedures, b) fees, c) costs for the preparation of necessary studies such as environmental impact assessments. "Overall cost" in this context means all the money spent in order to build the wind park, but not later operation and maintenance costs.

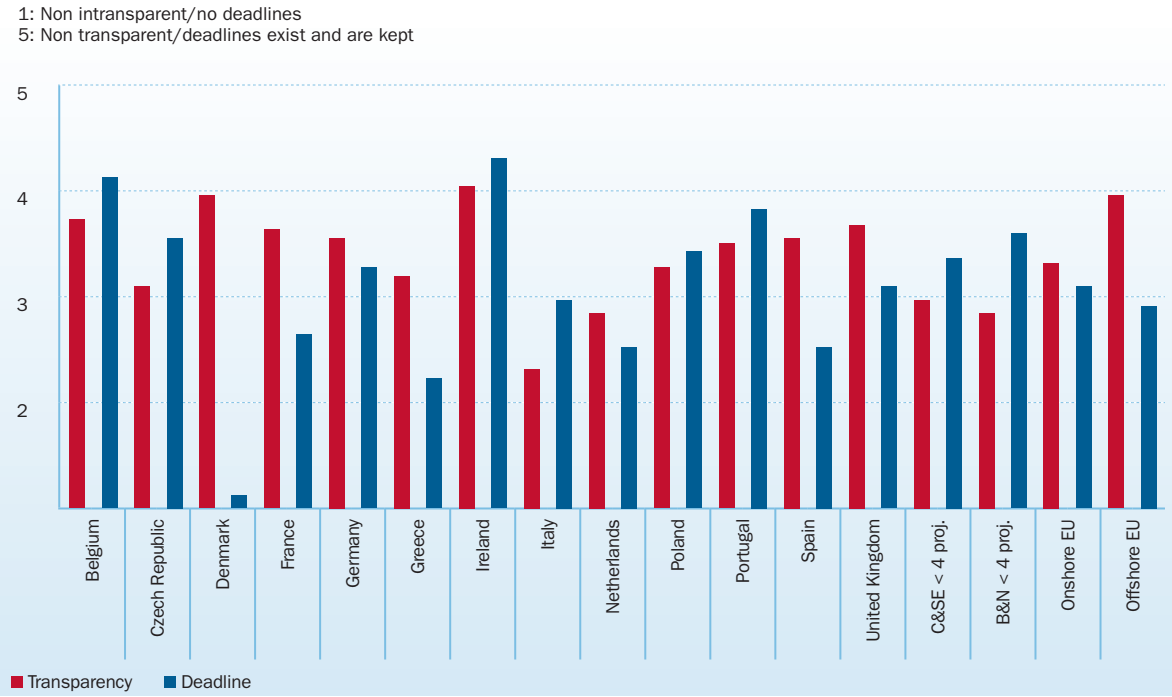
The cost of obtaining the building consents varies between 1.1% and 5.3% of the total onshore project costs. For offshore the administrative costs are higher – 13.6% (nearly 14%) of the total costs. This variation in administrative costs can be explained by different fees, the length of the administrative lead time and the number of studies required. The best performing countries are Romania, Finland, Latvia, Belgium, Denmark and Italy, with an average building consent cost of below 1.4%. Due to the sample size from Romania, Finland and Latvia, however, generalised European recommendations cannot be made.

Six countries are performing significantly below average; these are the Czech Republic, Spain, Greece, Austria, Germany and Sweden, with more than 4% of project costs spent on administrative procedures. In Germany, these high costs can be partly explained by compensation costs and the fees paid to public authorities. We recommend that project costs allocated to administrative costs should not be higher than 1.5% of the total.

Transparency and fixed deadlines concerning administrative procedures

The lack of deadlines and a non-transparent administrative process are two other major challenges for many EU countries. The following graph shows the developers' evaluation of deadlines and transparency on a scale from 1 to 5, where 1 means either not transparent or no fixed deadlines and 5 means either that fixed deadlines exist and are respected, or that the decision-making process is very transparent, with easy access to information concerning the different requirements.

Figure 3.2.5: Deadlines and transparency of the administrative process



Source: DWIA and Fraunhofer ISI 2010, WindBarriers survey

Note: 1 means that the process is not transparent and there are no deadlines, while 5 means there is a maximum transparency and that deadlines not only exist not only exist, but they are kept
Note: C and SE: Central and southeastern European countries: Austria, Bulgaria, Hungary and Romania, B and N: Baltic and Nordic countries: Estonia, Finland, Latvia, Lithuania and Sweden

The transparency of the administrative procedures is generally high, rated 3.21 for onshore and 3.36 for offshore, when 1 is not transparent and 5 is maximum transparency.

Six countries are performing significantly better than average. Portugal, Sweden, Estonia, Belgium, Austria, and Ireland all have an average rating of over 3.5. Five countries are performing significantly below average, namely Denmark, Lithuania, the Netherlands, Greece and Bulgaria.

Denmark, France, Greece, Italy, the Netherlands and Spain either have no, or only a few, deadlines in the administrative process and if fixed deadlines exist, they are often not kept. In Denmark, although the decision-making processes are transparent and well known by the local authorities, there are no deadlines at all. This can partly explain why one of the highest administrative lead times amongst all projects in the survey, of 154 months, was experienced in Denmark. The main effects of the non-transparent decision-making process and missed deadlines are long lead times, a lack of knowledge as to when the outcome of the application will be known and hence insecurity regarding the project's outcome, insecurity about the requirements of the content of the EIA, technical demands, insecure and/or unstable legislative framework, and rejections of the project for unexplained political reasons.

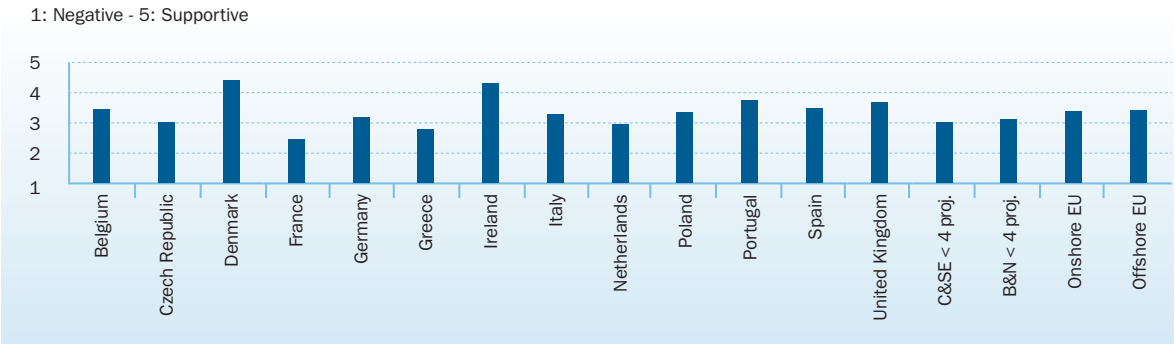
We recommend aiming for a level of administrative transparency of 4 out of 5 in the whole EU-27.

Authority's approach

Another way of evaluating the overall decision-making environment is through the attitude of the authorities[7]. In general, the attitude of the authorities towards wind power is fairly positive. On a scale of 1 to 5 where 1 is a negative attitude and 5 is very supportive, there is an average of 3.4 for EU onshore and 3.3 for EU offshore.

However, twelve countries are performing significantly below average, with France, Finland, Greece, the Netherlands and Bulgaria having a score of less than 3/5. Four countries are performing significantly above average, with a score of over 3.7: these are Denmark, Ireland, Sweden and Portugal. In some countries, the authorities themselves are a barrier because their regulations are so strict. For example, requiring projects to be situated a considerable distance from human habitations, even though there is no evidence of problems from shorter distance requirements in other countries. At European level, we recommend an average of 4/5 for the authority's attitude, and urge local authorities to provide a greater amount of information.

Figure 3.2.6: Authorities' approach

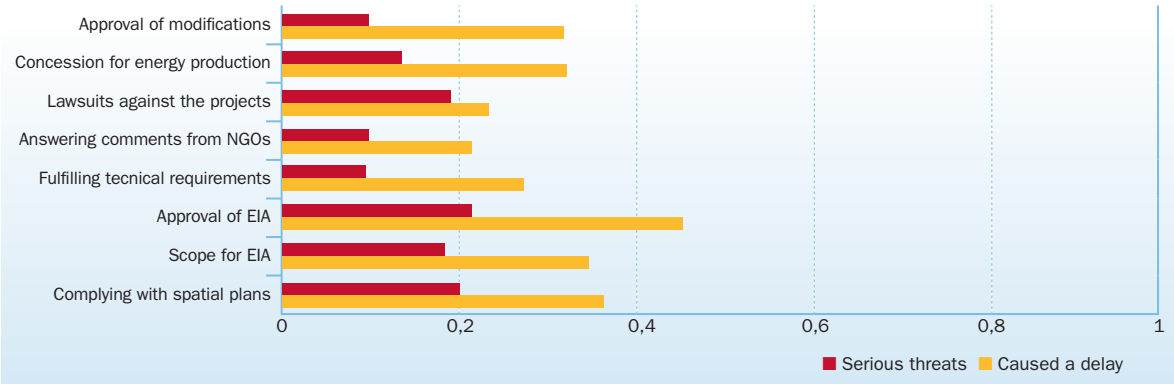


Source: DWIA and Fraunhofer ISI 2010, WindBarriers survey

Note: C and SE: Central and south-eastern European countries: Austria, Bulgaria, Hungary and Romania, B and N: Baltic and Nordic countries: Estonia, Finland, Latvia, Lithuania and Sweden

[7] In many cases the attitude of the authorities can be a decisive factor. They can support the project or make development difficult. This indicator shows the developer's impression of how this project was supported by the main authorities concerned, whose cooperation is imperative. This question concerned only the authorities, not the grid operators or the residents of the region.

Figure 3.2.7: Barriers most frequently encountered barriers in EU-27



Source: DWIA and Fraunhofer ISI 2010, WindBarriers survey

Note: The word "threat" in this project and context means that the project developer encounters serious problems or difficulties that can negatively impact the project or even stop it.

Barriers most encountered by developers across EU-27

The barriers encountered most frequently by developers across the EU-27 are shown in Figure 3.2.7 above.

The barriers that most frequently cause problems for developers are the approval and the scope of the Environmental Impact Assessment (EIA), and complying with spatial planning procedures.

According to the survey, projects have been delayed by the following situations:

- 40% of the projects by lawsuits against the projects (during the EIA phase).
- 30% by the attitude of the environmental NGOs and their questions.
- The remaining 30% by the other barriers mentioned in Figure 3.2.6.

There are four countries where "only" a few projects have experienced serious problems or no problems at all; therefore in these countries there is a good chance of obtaining a building consent with a low risk of facing serious difficulties.

The countries are: Belgium, Denmark, the Netherlands, and Portugal.

However, this does not guarantee a short lead time: an example in this sense is Portugal with an average lead time for the administrative procedure of 58 months.

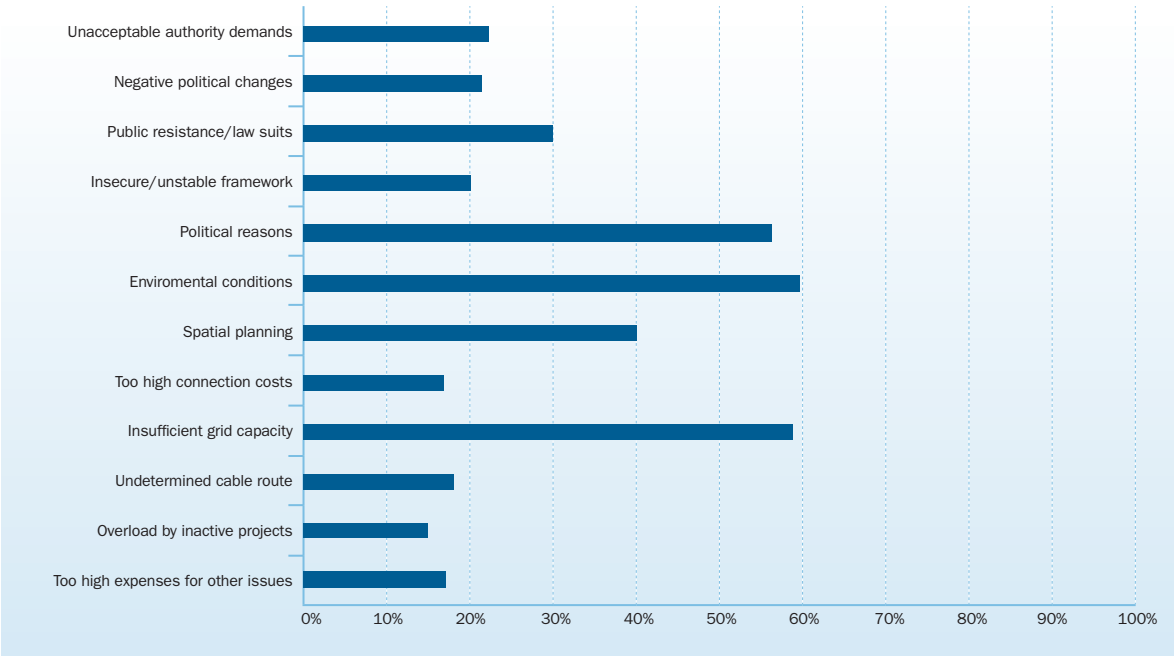
Non-finalised projects

Unfortunately there are also many projects that are blocked during the administrative process. The barriers that cause the administrative process to stop totally are shown below.

The most common reason to stop projects are political decisions, environmental conditions, law suits, political changes and spatial planning procedures.

Environmental conditions relate to the number of environmental studies to be carried out, a difficult EIA and/or the impact of wind turbines on neighbours or the surrounding nature. 30% of the non-finalised projects are stopped due to lawsuits and public resistance, directly linked to the social acceptance of wind parks. According to the survey, in some of the central and

Figure 3.2.8: Non-finalised projects in EU-27 onshore



Source: DWIA and Fraunhofer ISI 2010, WindBarriers survey

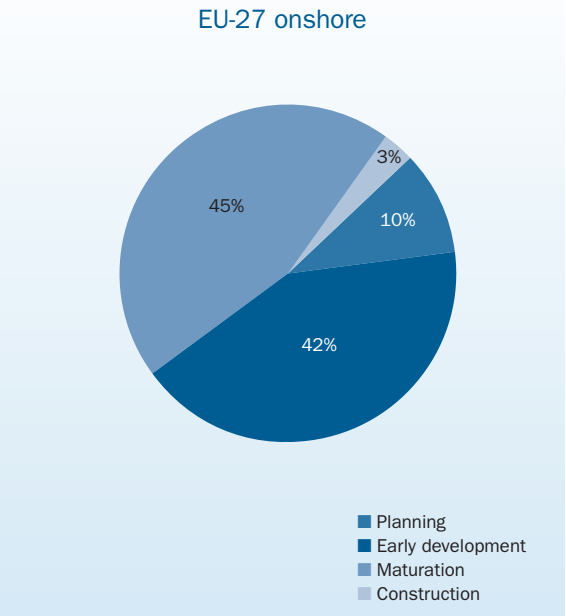
south-eastern European countries there seems to be a tendency to submit unrealistic projects, which means that more realistic projects are blocked or significantly delayed before being considered.

The projects can be stopped in different phases and, as shown in Figure 3.9, half of them are put on hold in the planning phase or early development phase, while the other half are stopped in the maturation phase or construction phase.

Stopping projects late in the maturation or construction phase can be expensive, especially if the turbines have already been ordered and other construction costs have had to be paid.

A negative political attitude and the need to meet the requirements for the EIA can contribute to stopping projects in earlier stages of the decision-making process. In those stages, developers have not paid out huge amounts on the project, but the developer will have spent much time trying to get the decision-making process out of the impasse.

Figure 3.2.9: Phases in which projects were were put 'on hold'



Source: DWIA and Fraunhofer ISI 2010, WindBarriers survey

3.3 A quick look at offshore

In 2008, only 357 MW were installed offshore in the EU[8]. Therefore, in order to get a wider range of data on offshore farms, the survey also included relevant projects connected in 2007 and projects that obtained building consents at the latest in the first half of 2009. In total, the analysis is based on 1,800 MW of operational offshore capacity, which is enough to allow conclusions to be drawn. The results are summarised in one EU-offshore country factsheet in order to respect project confidentiality.

Developers from six countries participated in this survey, namely Belgium, Denmark, Finland, France, Sweden and the UK.

The results for the administrative process for the offshore building consents are compared both with the EU-27 onshore average results and the average onshore results of these six specific countries (called for this purpose EU-6).

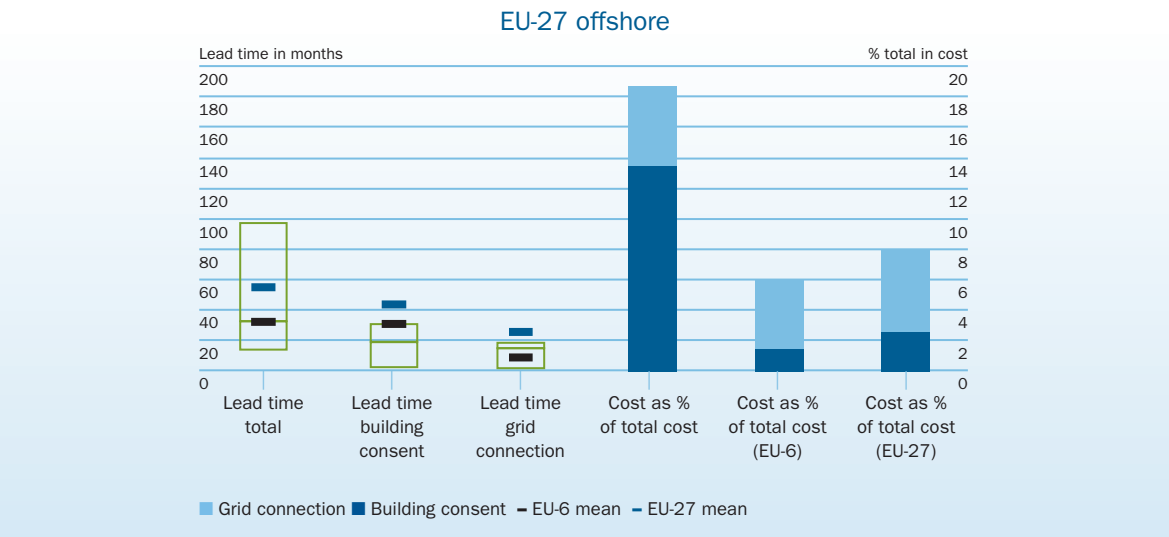
Total and administrative lead times

For offshore, there are shorter total and administrative lead times, primarily thanks to a shorter waiting time for the necessary building permits and other relevant permits. However, if we compare the lead times for offshore wind farms and for onshore projects, the total lead times are similar, but the lead time for the building consent is only 18 months on average for the offshore projects, compared to 28 months for the EU-6 onshore and 42 months for the EU-27.

The analysis made in the offshore factsheet (See Chapter 5) mentions that countries with installed offshore wind farms have developed efficient and streamlined decision-making processes including Maritime Spatial Planning (MSP), which ensures lower investment risks for the developers.

A strategic impact assessment method used as part of a national Maritime Spatial Planning (MSP) proce-

Figure 3.3.1: Administrative lead times and costs for offshore projects



Source: DWIA and Fraunhofer ISI 2010, for WindBarriers

[8] According to EWEA's annual statistics available on the EWEA website at: http://www.ewea.org.

dure could be a reason to justify shorter lead times. Markets and countries that have not already implemented MSP at national level should make this a key priority.

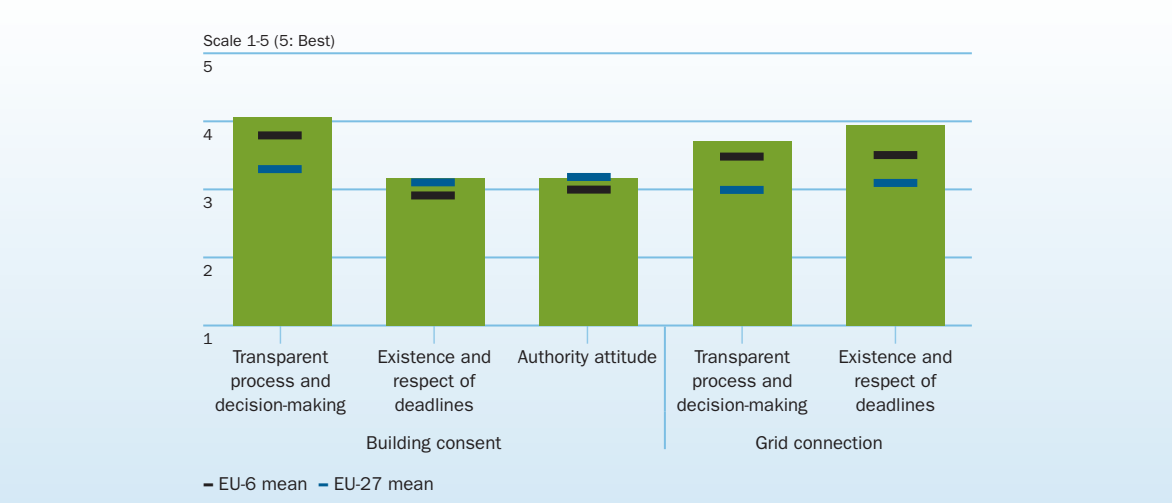
Administrative costs

Nevertheless, despite relatively short lead times for offshore, comparing it to onshore power reveals the authorities' lack of experience in dealing with offshore wind farm approvals and high administrative costs (14% of total costs), that are mainly due to the EIA. The offshore market, despite its growing capacity, is not yet fully developed. This causes insecurity as to the scope of the EIA, spatial planning, and answering new types of questions from environmental NGOs. Offshore projects, unlike the onshore wind parks in the EU-6 countries, are seldom put at risk by lawsuits and social acceptance issues.

Authorities approach and number of direct and indirect parties to be contacted

Another explanation for the lower lead time for offshore projects could be the existence of a centralised authority. When handing in an offshore application, a developer has to contact fewer direct authorities/parties directly: just seven, compared to 12 authorities for onshore applications, which is almost double. For offshore, the national energy agencies preselect sites, and in some of the countries MSP has been implemented so developers know where wind farms can be built. Therefore, the developer and the authorities often start with better documentation that serves as a basis for the decision-making process and political support. The figure below shows the decision-making environment for the offshore projects featured in the survey. The offshore decision-making environment in general scores better than onshore on transparency, use and respect of fixed deadlines, and a positive authority attitude. Please see the offshore factsheet in Chapter 6 for more information.

Figure 3.3.2 Transparency of the decision-making process and the authority's approach



Source: DWIA and Fraunhofer ISI 2010, for WindBarriers

3.4 Recommendations

Grid connection procedures: Article 16 of the 2009 EU Renewable Energy Directive

Total lead times	• Reduce the average total lead time in the EU to 24 months. • Make clear requirements on Environmental Impact Assessments (EIAs) (fixed deadlines, how many EIAs need to be carried out depending on the size of the park, its location) and reduce the number of irrelevant documents. • Develop spatial planning by defining the most appropriate locations and wind development areas, lowering investment risks and streamlining project application procedures. • Train and allocate enough civil servants to handle the expected applications.
Number of authorities with direct and indirect contact	• Develop and implement the one-stop-shop approach in all member states. • The authorities should disseminate clear information to developers on the administrative procedures and decision-making processes.
Administrative lead times	• Lower the average administrative lead time to a maximum of 20 months, to ensure that the total lead time in the EU stays below 24 months. • Perform onshore and offshore spatial planning and define the most suitable wind development areas, with streamlined administrative procedures in these areas. • Provide clear definitions of the administrative requirements, in terms of procedures, deadlines and EIA content. • Set deadlines for the administrative process. If the authority is not able to meet the deadline, the project automatically goes to the next stage. • Train and allocate the necessary civil servants to handle the expected applications.
Administrative costs	• Lower the average administrative costs in the EU to 1.5% of the total project costs. • Perform a preliminary environmental assessment. • Give incentives to competent authorities to gather data and studies collected under the EIA process and make them public. • Limit the administrative requirements to the key relevant elements, in particular the ones identified through past projects. Update procedures regularly. • Learn from past projects, and avoid requiring similar information from other projects with the same conditions. • For offshore, maritime spatial planning should give special importance to cross-border cooperation and to developing synergies with other sea users.

Transparency of the administrative procedure	• Improve the transparency of administrative procedures across the EU to an average of 4 out of 5[9]. • Inform both the developers and the local authorities of the applicable rules and regulations. • Set deadlines for the administrative process. If the authority is not able to meet the deadline, the project automatically goes to the next stage.
Authority's attitude	• Improve the attitude of local authorities across the EU to an average of 4 out of 5[10]. • National authorities should make sure local and regional authorities are aware of the targets set out in their NREAP, and of the necessity for their country to meet them. • Disseminate transparent and unbiased information to the authorities at all levels on wind energy technology and developments, addressing the myths associated with wind energy.

[9] According to the WindBarriers survey, the EU average is situated at 3.21 on a range from 1 to 5 where 1 means non-transparent and 5 means maximum transparency.

[10] The EU average is 3.36, on a range from 1 to 5, where 1 means 'negative attitude' and 5 means 'maximum positive attitude'

2009 Renewable Energy Directive

Article 13

Administrative procedures, regulations and codes

1. Member States shall ensure that any national rules concerning the authorisation, certification and licensing procedures that are applied to plants and associated transmission and distribution network infrastructures for the production of electricity, heating or cooling from renewable energy sources, and to the process of transformation of biomass into bio fuels or other energy products, are proportionate and necessary.

Member States shall, in particular, take the appropriate steps to ensure that:

(a) subject to differences between Member States in their administrative structures and organisation, the respective responsibilities of national, regional and local administrative bodies for authorisation, certification and licensing procedures including spatial planning are clearly coordinated and defined, with transparent timetables for determining planning and building applications;

(b) Comprehensive information on the processing of authorisation, certification and licensing applications for renewable energy installations and on available assistance to applicants are made available at the appropriate level;

(c) Administrative procedures are streamlined and expedited at the appropriate administrative level;

(d) Rules governing authorisation, certification and licensing are objective, transparent, proportionate, do not discriminate between applicants and take fully into account the particularities of individual renewable energy technologies;

(e) Administrative charges paid by consumers, planners, architects, builders and equipment and system installers and suppliers are transparent and cost-related; and

(f) Simplified and less burdensome authorisation procedures, including through simple notification if allowed by the applicable regulatory framework, are established for smaller projects and for decentralised devices for producing energy from renewable sources, where appropriate.

2. Member States shall clearly define any technical specifications which must be met by renewable energy equipment and systems in order to benefit from support schemes. Where European standards exist, including eco-labels, energy labels and other technical reference systems established by the European standardisation bodies, such technical specifications shall be expressed in terms of those standards. Such technical specifications shall not prescribe where the equipment and systems are to be certified and should not impede the operation of the internal market.

3. Member States shall recommend to all actors, in particular local and regional administrative bodies to ensure equipment and systems are installed for the use of electricity, heating and cooling from renewable energy sources and for district heating and cooling when planning, designing, building and renovating industrial or residential areas. Member States shall, in particular, encourage local and regional administrative bodies to include heating and cooling from renewable energy sources in the planning of city infrastructure, where appropriate.

4. Member States shall introduce in their building regulations and codes appropriate measures in order to increase the share of all kinds of energy from renewable sources in the building sector.

In establishing such measures or in their regional support schemes, Member States may take into account national measures relating to substantial increases in energy efficiency and relating to cogeneration and to passive, low or zero-energy buildings.

By 31 December 2014, Member States shall, in their building regulations and codes or by other means with equivalent effect, where appropriate, require the use of minimum levels of energy from renewable sources in new buildings and in existing buildings that are subject to major renovation. Member States shall permit those minimum levels to be fulfilled, inter alia, through district heating and cooling produced using a significant proportion of renewable energy sources.

The requirements of the first subparagraph shall apply to the armed forces, only to the extent that its application does not cause any conflict with the nature and primary aim of the activities of the armed forces and with the exception of material used exclusively for military purposes.

5. Member States shall ensure that new public buildings and existing public buildings that are subject to major renovation, at national, regional and local level fulfil an exemplary role in the context of this Directive from 1 January 2012 onwards. Member States may, inter alia, allow that obligation to be fulfilled by complying with standards for zero energy housing, or by providing that the roofs of public or mixed private-public buildings are used by third parties for installations that produce energy from renewable sources.

6. With respect to their building regulations and codes, Member States shall promote the use of renewable energy heating and cooling systems and equipment that achieve a significant reduction of energy consumption. Member States shall use energy or eco-labels or other appropriate certificates or standards developed at national or Community level, where these exist, as the basis for encouraging such systems and equipment.

In the case of biomass, Member States shall promote conversion technologies that achieve a conversion efficiency of at least 85 % for residential and commercial applications and at least 70 % for industrial applications.

In the case of heat pumps, Member States shall promote those that fulfil the minimum requirements of eco-labelling established in Commission Decision 2007/742/EC of 9 November 2007 establishing the ecological criteria for the award of the Community eco-label to electrically driven, gas driven or gas absorption heat pumps [20].

In the case of solar thermal energy, Member States shall promote certified equipment and systems based on European standards where these exist, including eco-labels, energy labels and other technical reference systems established by the European standardisation bodies.

In assessing the conversion efficiency and input/output ratio of systems and equipment for the purposes of this paragraph, Member States shall use Community or, in their absence, international procedures if such procedures exist.

Source: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0028:EN:NOT

Photo: GWEC

4 ANALYSIS OF BARRIERS TO GRID CONNECTION

In the following sections, the main barriers for connecting wind projects to the grid are evaluated and compared with the requirements of Directive 2009/28/CE to promote the use of renewable energy and its Article 16 on grid access and technical operation of the grid.

This article can be found at the end of this chapter (page 53), and its first paragraph defines member states' responsibilities concerning renewable energies and grid connections:

- Developing the transmission and distribution grids.
- Providing access to the grid, including priority or guaranteed access for renewables.
- Giving renewable energies priority when dispatching, especially in the case of curtailments that should be avoided and clearly justified when they occur.

The rest of the content of the article defines the actions to be taken to implement the above objectives and more specifically to develop new requirements or strengthen the ones existing for the TSOs/DSOs. This can be done by modifying the frameworks and rules established in regulations and technical grid codes. These requirements include:

- **Defining and making public the rules for connection and costs.** These rules should not discriminate against new types of electricity production. The article stresses that connection conditions have to be homogeneous for all power generating sources.
- **Defining how the costs of connection are shared** between developers and TSOs/DSOs. In some cases, member states can stipulate that the TSOs/DSOs share costs or even cover them entirely.
- **Making information** on estimated connection costs, planned time frames for the approval of projects and planned deadlines for obtaining connection at a given point available to all producers.
- **The establishment of the distribution and transmission tariffs which should not discriminate against renewable energy sources** and especially not dispersed renewable energy sources. These tariffs should be realistic and in accordance with the expected benefits from the plants.

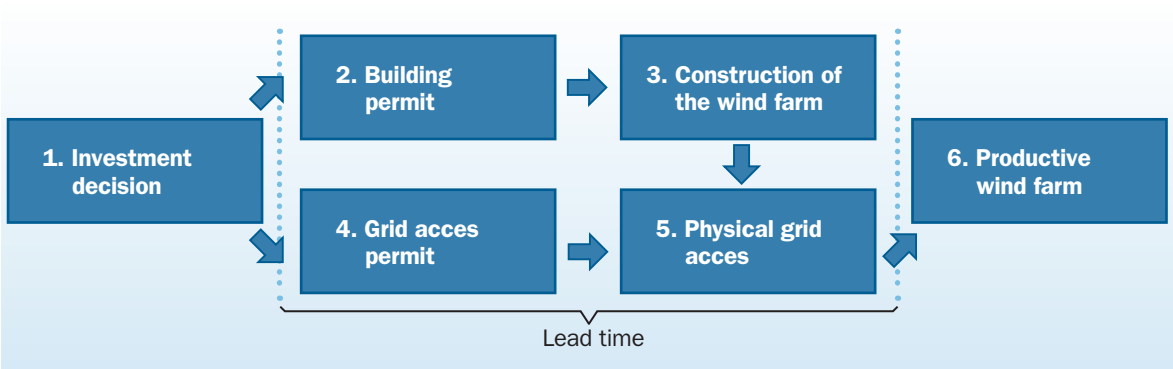
4.1 Generic model of the grid connection process

This procedure was also shown in Chapter 3. The grid access procedure is made up of:

- **Phase 4 - Grid access permit:** once the project developer has a first idea of the available land surface, wind resources and access to the site of the future wind park, he is able to make a draft grid permit application which describes the main technical characteristics of the project: total capacity, layout, chosen point of evacuation and so on.
- **Phase 5 - Physical grid access:** this first draft is analysed by the system operator who can make comments and ask for modification, including a modification of the requested connection point. The system operator defines the connection point but also the connection date.

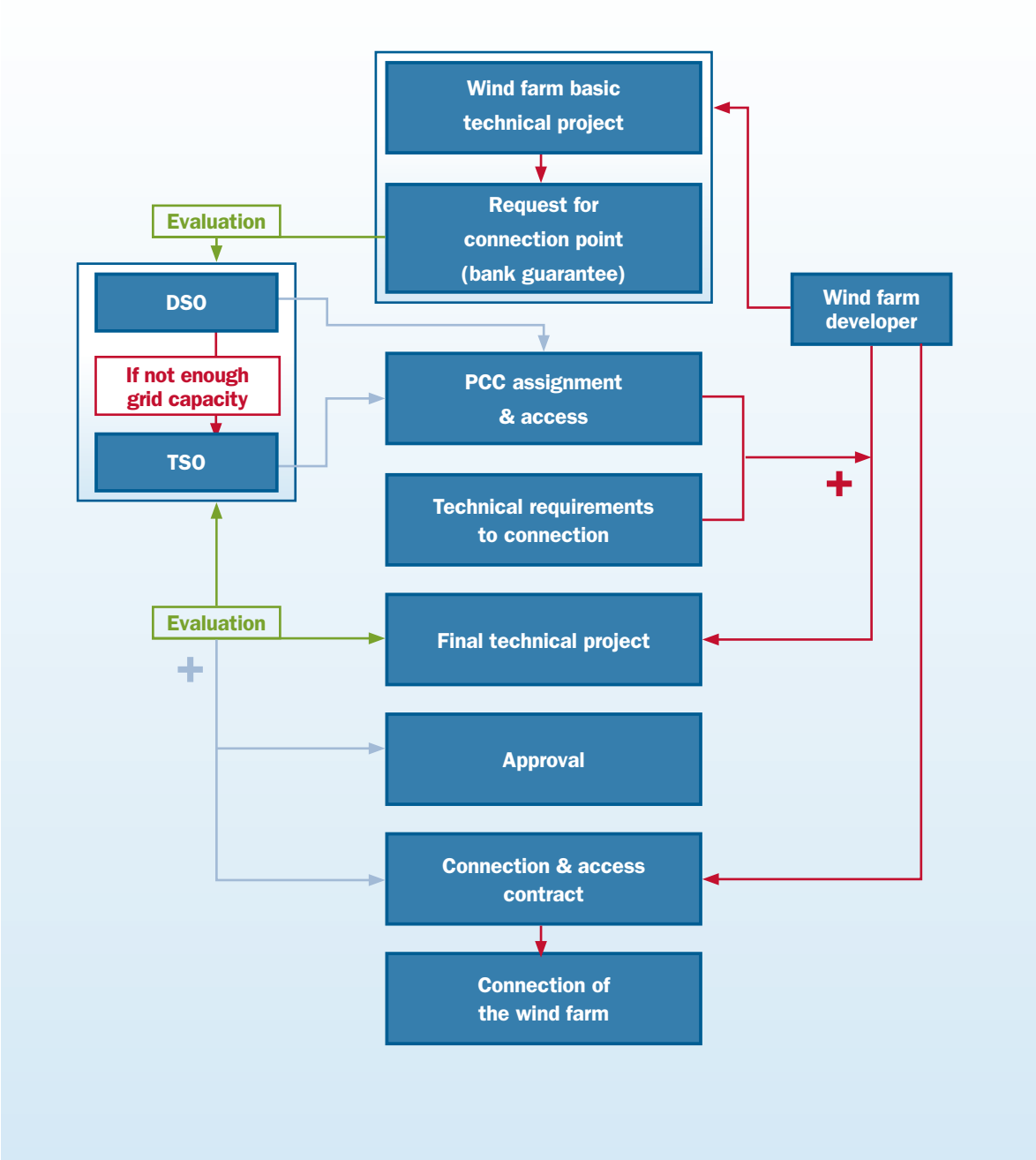
The overall process is described in more detail in Figure 4.1.1:

Figure 4.1.1: Generic scheme of development of a wind farm in Europe



Source: DWIA and Fraunhofer ISI 2010, for WindBarriers

Figure 4.1.2: Generic scheme for grid access in Europe



Source: AEE 2010

The scheme presented in Figure 4.1.2 shows that the grid connection process is complex; barriers to the development of projects can appear at several stages.

At the very start of the wind farm development process, in order to establish the technical basics of the project, it is crucial to have information on the grid conditions around the project site as well as the estimation of costs for grid access. The following barriers are often experienced:

- Lack of clarity on how the costs of connecting projects to the grid are shared between developers and grid owners.
- Lack of public information on the available grid capacity at each common coupling point (PCC).
- Absence of a master plan on grid extensions.
- Existence of a master plan, but no planned monitoring system.

A basic technical project is submitted to the DSO, but can be transferred to the TSO if it requires a higher grid capacity (normally over 132 kV). Whether a wind farm will be connected at transmission level or distribution level will have a significant impact on connection costs.

Before the decision is taken to develop a wind farm, it is important to identify a PCC as near as possible to the proposed wind farm and with enough capacity to absorb its production.

As shown in the previous figure, the decision to connect the wind farm at either the transmission or distribution level will depend not only on the possibility of integrating the amount of proposed power. The final option will have not only technical and economic implications, but also operational ones once the wind farm has been finalised.

The system operator will evaluate the project and, if it complies with all the criteria, will normally assign a connection point and a series of technical requirements to the final project, also known as grid codes. Delays may appear during this phase due to:

- The system operators' lack of experience in countries where wind power is still not well developed.
- A lack of grid capacity, which does not allow for connection at the requested point.
- The connection point being assigned to poorly designed projects, hindering the connection of technically reliable projects.
- Overloading the system operator's treatment capacity due to a high demand for connection.

Practically all EU countries have unbundled their electricity systems, and the transportation of electricity is separated into distribution and transmission, which is handled by different companies. However, the separation is not uniform, and some big countries have several electrical systems. In other cases there is only a legal division, but the companies in the different business areas have the same owner, which could represent a conflict of interest.

The last step is the submission of the finalised technical project, which is evaluated again by the system operator. Grid access contracts will be negotiated on this basis. At this stage, the main barriers are:

- Delays encountered during the final evaluation of the technical report.
- Delay in the negotiation of the grid access contract.
- Conditions of the grid access contract relative to the costs for access, balancing and transport.

As part of the grid access authorisation, the developer has to establish **evacuation lines** from the wind farm to the connection point. These lines most often have to be laid via a parallel project with its own environmental impact assessment studies. For these projects, the question of **land use and local acceptance** is crucial for power lines that cross numerous rural properties over distances of sometimes dozens of kilometres.

4.2 Barriers to grid connection

Table 4.2.1: Grid connection indicators

	Number of TSOs involved	Number of DSOs involved	Number of other parties involved	Grid connection lead time (months)	Grid connection costs (% of overall project costs)	Transparency of the grid connection process (1-5)
Austria	+	-	+	+	-	+
Belgium	0	-	+	+	-	0
Bulgaria	-	-	+	+	-	-
Czech Republic	-	0	+	0	+	0
Denmark	0	-	+	+	+	0
Estonia	-	-	+	-	0	+
Finland	-	-	+	+	+	-
France	-	-	+	+	+	0
Germany	+	+	+	+	-	0
Greece	0	-	+	+	-	-
Hungary	-	-	+	-	-	-
Ireland	0	-	+	-	-	-
Italy	+	+	-	+	+	+
Latvia	-	-	+	+	0	+
Lithuania	-	-	+	-	-	0
Netherlands	+	+	+	+	-	+
Poland	0	-	-	+	+	0
Portugal	0	+	-	-	+	+
Romania	-	-	+	+	+	+
Spain	-	0	-	-	-	-
Sweden	-	-	+	0	+	+
United Kingdom	+	-	+	+	0	+
Offshore EU	0	+	+	+	0	+

Source: EWEA 2010, for WindBarriers

Relative country performance:

- "+" performs 10% or more better than the EU average.
- "-" performs 10% or more below the EU average.
- "0" performs at EU average, within a 10% range.

Offshore: comparison onshore / offshore practices

Country colour codes:

- : Noticeable deviation from the EU average in negative direction (worst cases).
- : Noticeable deviation from the EU average in positive direction (best cases).
- : Emerging market.
- : Growth market.
- : Developed market.

Grid connection lead time

From the results on mean lead times presented in the following figure, it appears that where total lead times are high, it is because of grid connection procedures.

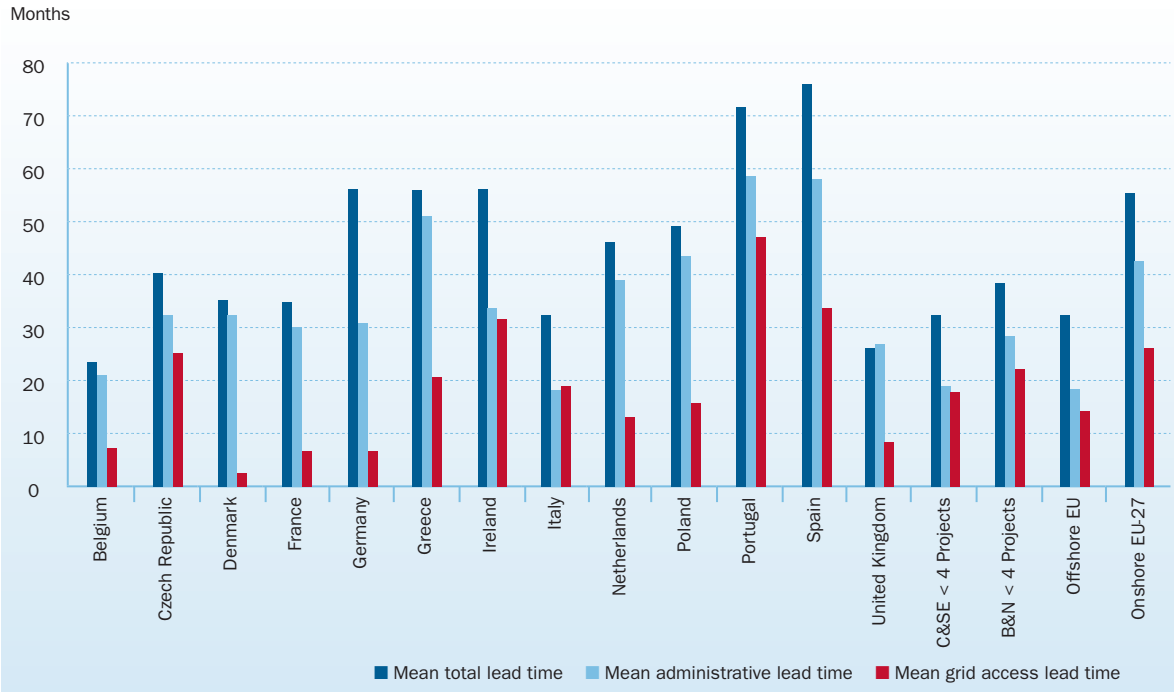
The grid connection lead time is 25.8 months on average for EU onshore projects, and 14 months offshore. For onshore, the grid connection lead time is significantly lower than the administrative lead time (42 months). According to the survey responses eight countries are performing significantly better than average: Denmark, Austria, Finland, France, Germany, Romania, Belgium, and the UK The average for Denmark (two months) is remarkable.

Five countries perform significantly worse than average, namely Ireland, Spain, Estonia, Hungary and Portugal, which each have an average of more than 31 months. For Spain and Portugal this could be because they also have the highest European averages in terms of involved parties, and very high total lead times.

According to survey responses for Estonia, the grid connection lead time is equal to the total lead time, indicating that the grid connection procedure is one of the main bottlenecks in this country. This point should, however, be confirmed with a larger data sample.

At European level, aiming for a grid connection lead time of less than six months seems achievable.

Figure 4.2.1: Survey results: authorisation lead times for connecting wind parks across EU-27



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Number of system operators and other parties involved

At EU level, the average number of TSOs involved in wind power development is 0.85 onshore and 0.92 offshore. This shows that a large share of wind developments is connected to the transmission grid, which is owned by a single, clearly identified operator.

Two countries worth mentioning, both for TSO and DSO involvement, are Finland and Austria. In the case of Austria, all the data collected relates to farms connected to the distribution system. It is the only country in our sample for which this is the case. For Finland, an average of four TSOs and 2.5 DSOs was reported, which could demonstrate a lack of clarity in the procedure and the decision-making process. However the sample size in these countries is low, which means that the recommendations for these countries need to be tested on a larger sample.

In terms of other parties involved in the grid connection procedure (land owners, other technical questions, etc.), the EU average is 24 onshore, and 4.4 offshore. The ideal situation remains the 'one-stop-shop' approach, whereby the applicant would have to contact a single access point in charge of coordinating the application process. This should remain the EU objective both for onshore and offshore.

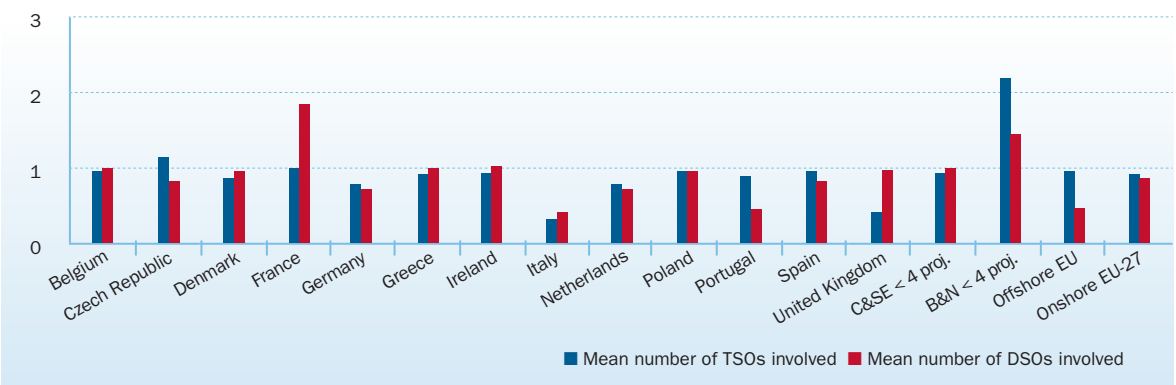
The five best performing countries are Denmark, Estonia, the Netherlands, Romania and UK, with an average of fewer than 3 entities to contact. Considering the low sample size of Estonia and Romania, recommendations cannot be made. The case of Denmark is remarkable, with a value of 0.13, showing a streamlined grid application process.

The next Figure shows the number of grid operators that have to be contacted to obtain a grid connection permit:

Most of the project developers in the EU-27 have only one TSO and one DSO to contact, but there are a few exceptions:

- In the Czech Republic, France and Hungary, the averages are slightly higher. This could be interpreted as a lack of clarity concerning the administrative procedure to be followed and the interlocutors to be contacted.
- In the Baltic countries (Sweden and Finland), the averages are higher still. This is because of the way the national grids are structured. Wind farms will apply to connect to the closest, weakest grid. This request can be transferred up to the next voltage level if the grid capacity is not sufficient.

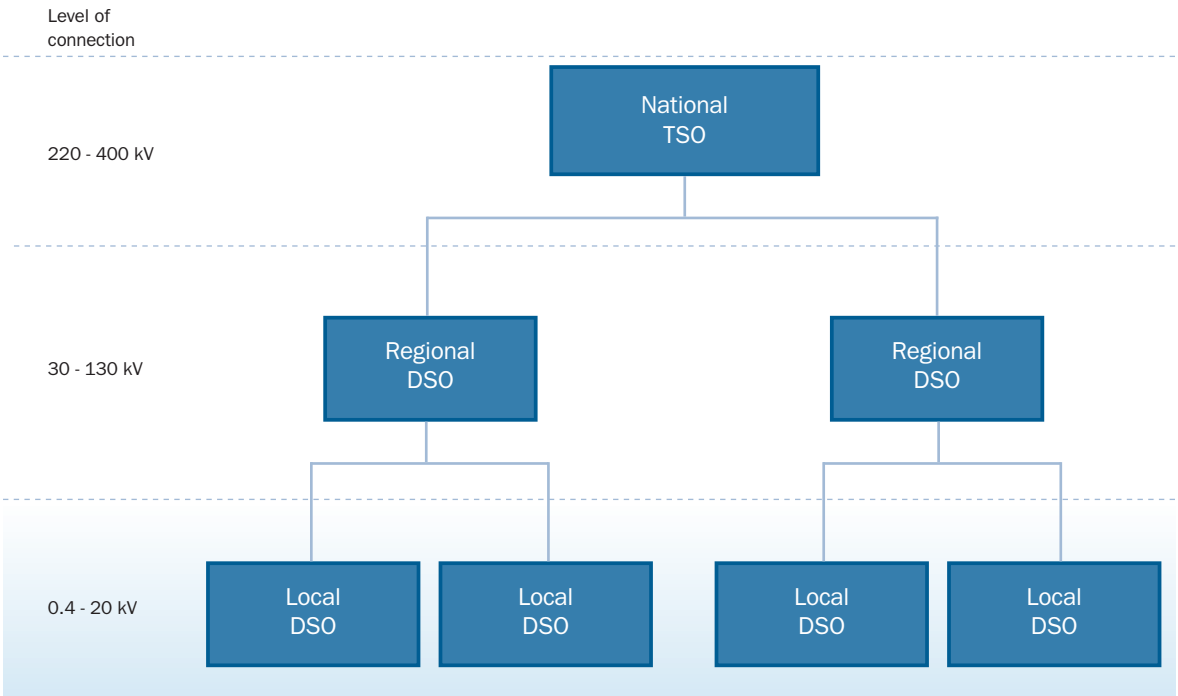
Figure 4.2.2: Number of TSOs and DSOs contacted for wind farm projects across EU-27



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Note 1: Mean equals here with the average number of TSOs/DSOs involved

Figure 4.2.3: Grid organisation schemes for the Baltic countries



Source: AEE 2010

Independently of whether the connection takes place at the transmission or the distribution level, the PCC that is selected will depend on conditions which can be divided into two distinct groups.

Grid connection costs

The average grid connection costs[11] in the EU represent 5.13% of the total project costs onshore and 5.43% offshore. In comparison, the average administrative costs make up 2.9% of the overall project costs onshore and 14% offshore.

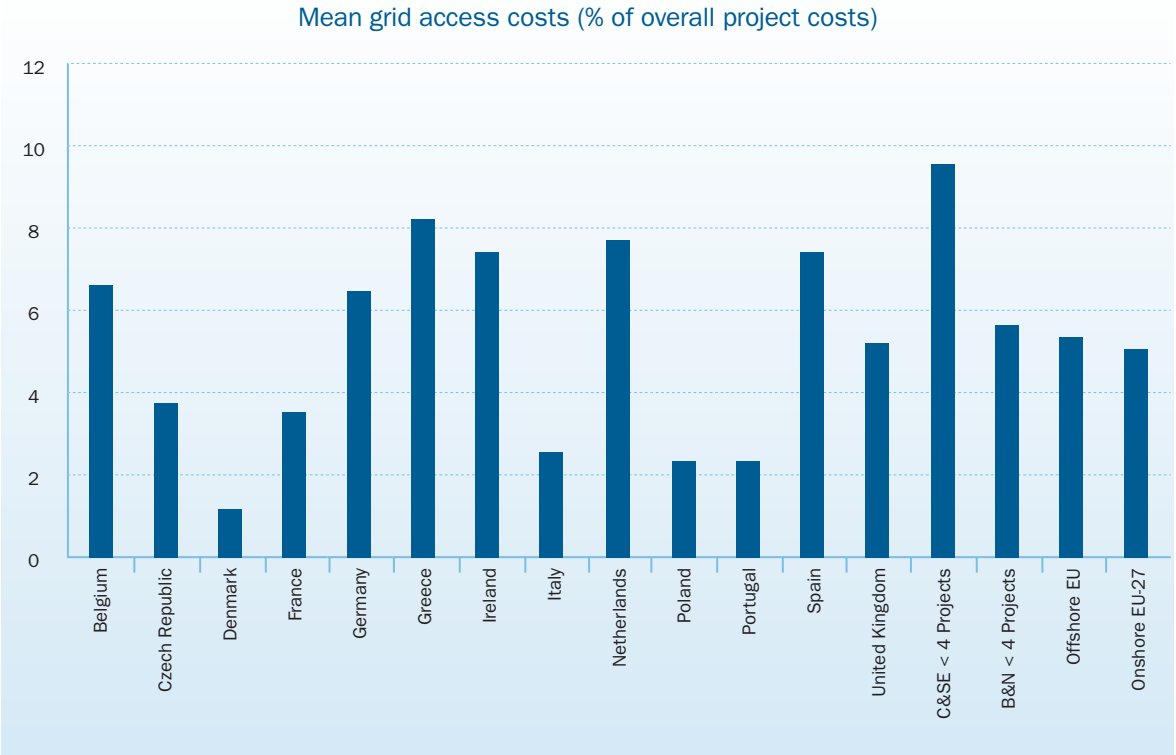
Five countries are performing significantly better than average, namely Sweden, Denmark, Poland, Portugal, and Finland, with an average of below 2.5%. However, the low sample size for Sweden and Finland does not allow definite conclusions to be drawn. The case of Sweden and Denmark is nonetheless remarkable, with a grid cost of respectively 1% and 1.4%. For Denmark, the grid connection costs are covered by the TSO/DSO. In Sweden, connection and transmission fees are capped.

Four countries are performing significantly worse than average: Austria, Hungary, Bulgaria and Lithuania, with grid connection costs of above 10%. These conclusions should however be confirmed with a larger data sample. In Germany, Belgium, Ireland, Spain, the Netherlands, and Greece developers also encounter high grid connection costs, with an average of above 6.5%. In these countries, significant improvements are needed in order to reduce the share of costs.

We recommend aiming to reduce grid connection costs to less than 2.5% of the overall costs across Europe. The next graph shows the results of the survey on grid access costs.

[11] The grid connection costs include costs for grid extensions, staff costs and all related paperwork. "Overall cost" in this context means all costs that are needed in order to realise and build the project, but not the later operation and maintenance costs.

Figure 4.2.4: Relative costs for connecting wind parks across EU-27



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

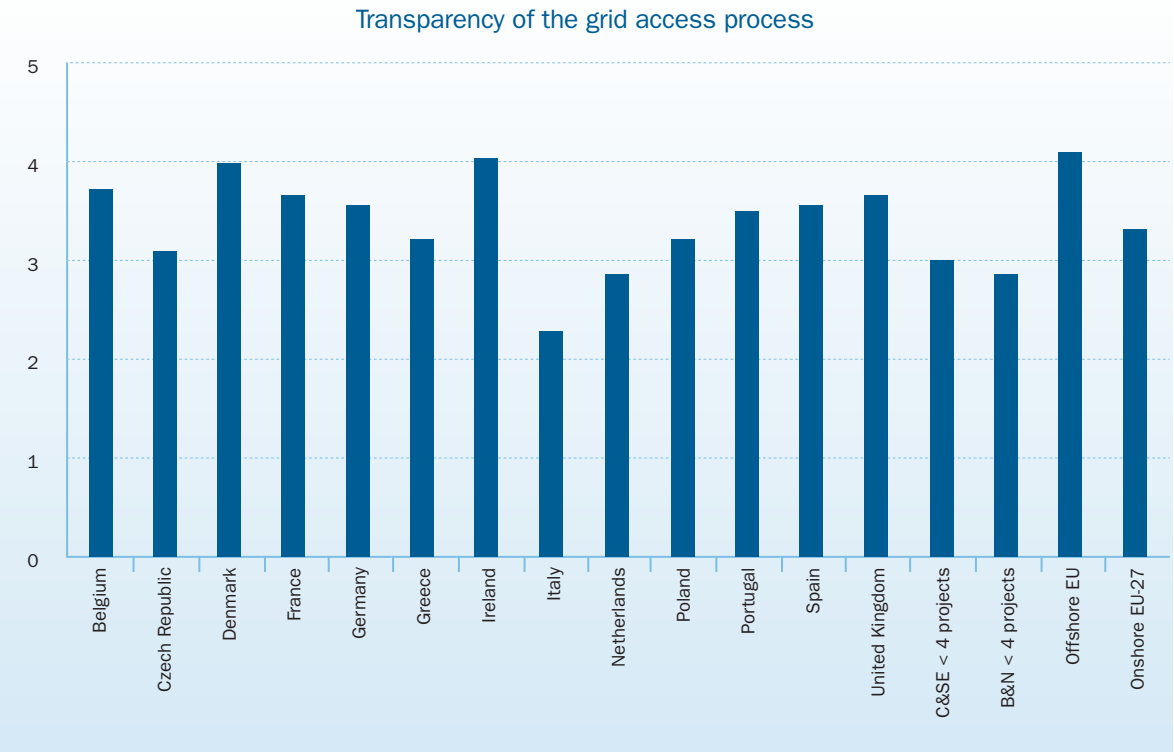
It is common practice in almost all countries to commission a study to evaluate the capacity of the grid in the proposed or an alternate node. The cost is quite variable: in Belgium it costs €2,500 and in other countries it depends on the size of the project. Moreover, it is becoming very common to ask for a bank guarantee in order to avoid speculations from developers intending to obtain the permits and sell them on to other companies, with high profits and low risk.

The execution of the electrical infrastructure extension will depend on the required total investment, how the costs are split between the owner of the grid and the wind developer, and on who owns the land.

Regarding economics, there are two types of problems:

- The lack of a clear procedure for sharing the costs of wind farm connections between the owner of the grid and the project developer. Some countries have reported significant differences in wind farm connection costs depending on the distribution company. In Belgium, for example, costs can vary from €90,000 per km to €800,000 per km. In some cases, wind developers can advance the investments, which once finalised can be transferred to the owners of the electrical grid infrastructure. This case is however unusual.
- The variation of the actual costs between different countries and even within countries, in many cases due to the grid codes and other technical requirements.

Figure 4.2.5: **Transparency of the grid connection procedure.**



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Transparency of decision-making process and deadlines

This section presents the results of the survey on how wind farm developers perceive the attitude of the system operator and grid owners in each European country. At EU level, the transparency of the grid access procedures is high on average, with a value of 3.14 for onshore and 3.86 for offshore, on a range from 1 (non-transparent) to 5 (maximum transparency).

For onshore, nine countries perform significantly better than average, namely Italy, Romania, Austria, the Netherlands, Portugal, Sweden, the United Kingdom and Estonia, with an average of above 3.5.

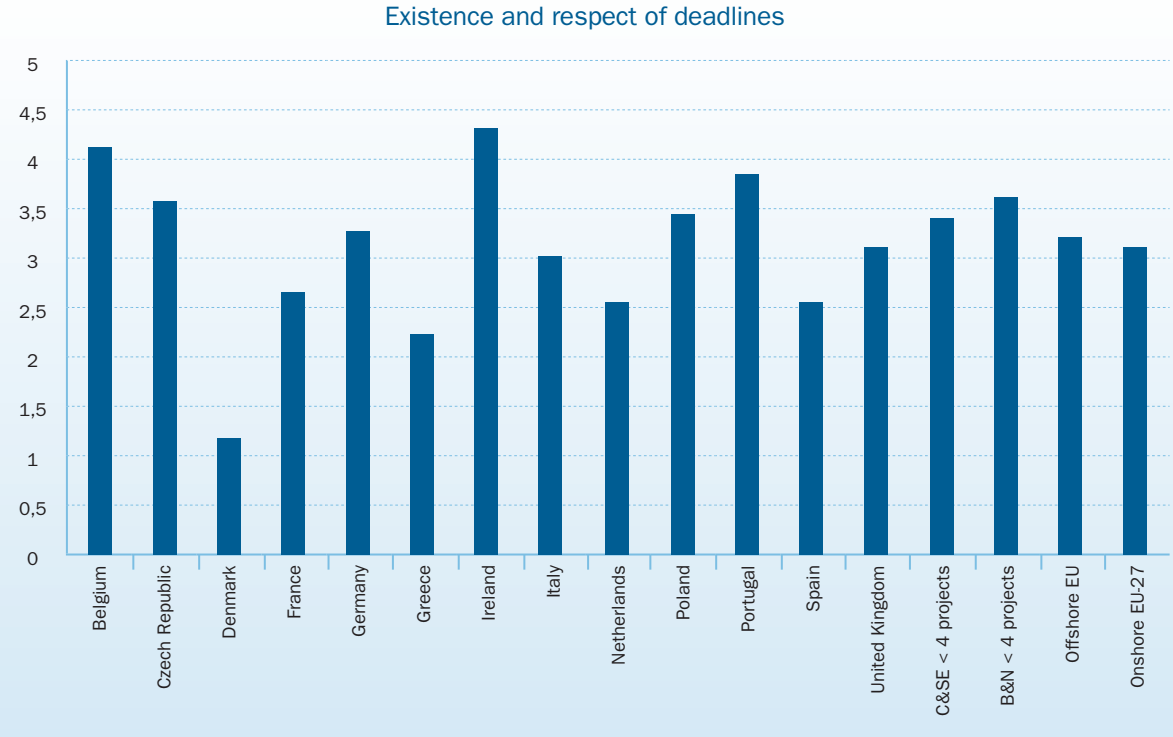
For Romania, Austria, Sweden, Estonia and UK, these conclusions should be assessed with a larger data sample.

Six countries perform worse than average: Hungary, Bulgaria, Greece, Spain, Finland and Ireland, with an average of below 3. In most cases, the low scores are related to a lack of clear deadlines throughout the process and/or lack of respect of these deadlines. Improving the transparency of the grid access process (as recommended by the Directive) will be a real challenge for many countries, especially Italy and the eastern European and Baltic groups.

We recommend at European level an objective of grid connection transparency of 4 out of 5.

The next series of data show the use of deadlines in the procedure, which can be a key barrier.

Figure 4.2.6: Existence and respect of deadlines relative to grid connection



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

The results of the survey show that many countries set effective deadlines and respect them properly. Nevertheless, several countries obtain less satisfactory results: France, Greece, the Netherlands and Spain are especially worrying. These results explain the delay observed and experienced by developers.

Moreover, in countries such as Denmark, where even without deadlines there is very little project delay, it is important to set and stick to deadlines in order to ensure consistent good results.

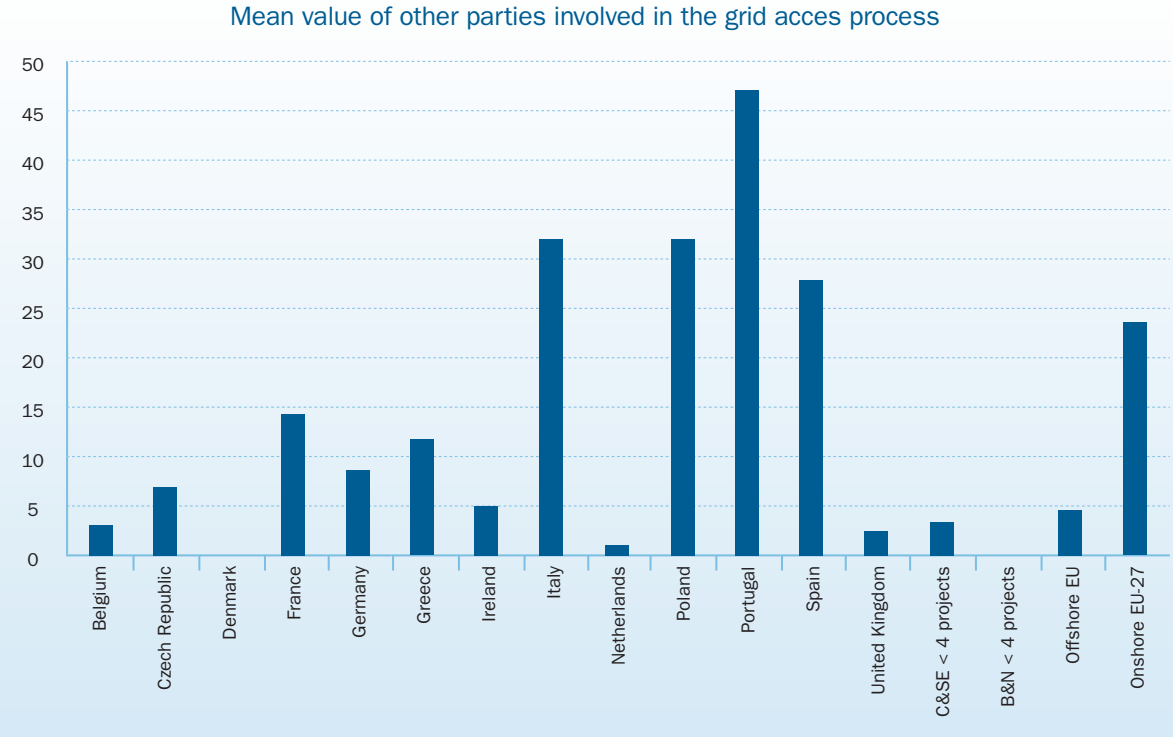
Other types of barriers: the removed social aspects of connecting projects

The next graph presents the number of other parties (other than TSO/DSOs or administrations) that have to be contacted by project developers during the grid access procedure.

According to the graph, the countries that have the highest average number of other parties to be contacted are Italy, Spain, Portugal and Poland. Moreover, one of the challenges encountered in this phase by the project developers is the issue of social acceptance:

- Land ownership: this is especially important in the new member states where land boundaries are sometimes unclear, representing a potential source of con-

Figure 4. 2.7: **Number of other stakeholders that have to be contacted during the grid access process across Europe**



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

flicts with the local population. In some countries, like Belgium, local authorities can block a project by not giving the authorisation to use public land. The opposite case could be Spain, where the strategic interest of the wind project makes it compulsory to concede the land for the electrical infrastructure. The varying land ownership structures are responsible for a range of results observed for the indicator "other parties involved in the grid access process". The southern European countries are especially affected by problems related to land ownership.

- Environmental Impact Assessment (EIA): In some countries, the studies for the wind farm's power line and the EIAs have to be carried out together, while in others they have to be done separately. One of the potential delays is the public consultation part of the EIA because it can result in modifications that will have implications on the costs of the wind farm and how it is built.

Other types of barriers: not enough grid capacity

Across the EU, grid capacity is the main reason projects get stopped, together with EIA issues. Lack of grid capacity was cited as a factor by almost 60% of the respondents that have experienced difficulties in getting projects finished, as shown in the following figure.

The grid capacity is not a purely technical factor. In many cases, projects that do not present good technical guarantees are not filtered out, and so they compete with technically reliable projects, creating delays as the grid capacity is used up by non viable projects.

4.3 A quick look at offshore

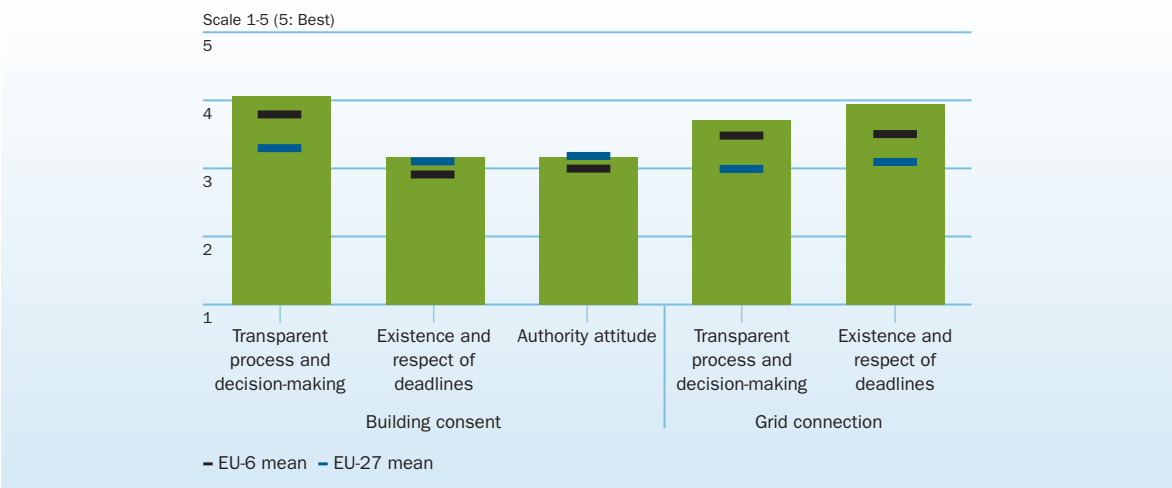
This section presents the survey results for offshore projects from the six northern European countries, called in this report the "EU-6".

The issues related to grid access offshore are relatively complex because the current grids are not adapted to evacuate power from the sea. Delays can occur, as can be seen from the fact that the average times to get offshore grid connection are higher than the observed average grid access lead times for the same countries.

Moreover, the related grid connection costs are higher due to the need for grid improvements. These costs will increase in the future, as the distance from the shore of future wind farms goes up. Most of the costs of the cable linking the wind farm to the connection point onshore or offshore (in the case of the supergrid for instance) should be taken on by the network operator, to ensure it is carried out in a realistic time frame.

The attitude of the authorities and the TSOs is very different for onshore and offshore projects. For the onshore projects, government support was high. However, the offshore part of the survey does not take into account the numerous offshore wind projects expected along European costs in countries like Spain, Greece, France and Italy. At the time of the survey, offshore wind power was still an emerging market. Nevertheless, the WindBarriers methodology has proven to be effective for monitoring offshore projects.

Figure 4.3.1: Transparency of decision process for offshore wind farms



4.4 Recommendations

Some of the barriers for connecting the wind farms to the grid are common to almost all EU countries.

The recommendations for eliminating, or at least reducing, these barriers are listed below:

Grid connection procedures: Article 16 of the 2009 EU Renewable Energy Directive

Grid connection lead time	• Reduce the average grid connection lead time in the EU to six months; • Set deadlines for the administrative process. If the authority is not able to meet the deadline, the project automatically goes to the next stage; • Train and allocate the necessary civil servants to handle the expected applications; • Develop the grid infrastructure: - Provide clear definitions of the grid connection requirements. In particular, develop and implement standardised grid codes across the EU; - Plan and build transnational offshore grid infrastructure to connect the anticipated offshore wind power, and guarantee connection to the grid for offshore wind projects; - Reinforce the onshore and offshore transmission system (through cooperation between different EU member states); - Finding and occupying the land for interconnection infrastructure for wind farms should be made easier, with adequate economic compensation for the land owners; • On the developer's side: - Avoid an excess of requests on the same grid point; the projects should be realistic and based on measured wind data. The use of the land should also be guaranteed for the entire length of the project; - Close collaboration with grid operators is required;
Grid connection costs	• Lower the average grid connection costs in the EU to 2.5% of project costs; • System operators should cover and contribute to the grid connection costs in the countries where this is not yet the case, and adapt these costs to the project size; • Upgrade the public grid infrastructure within reasonable costs; • Limit the technical grid connection requirements to a reasonable level (remain within the scope of the project); • Provide clear definitions of the grid connection requirements. In particular, develop and implement standardised grid codes across the EU. Grid codes have to be realistic and compatible with the latest technology. Harmonisation of grid codes at EU level is important; • The voltage range should be the minimum required according to the short circuit capacity of the grid and the load flows in the common coupling point (PCC). Feasibility studies should identify the voltage range for the connection. This will affect the final line tracing and the costs and time schedule; • Clear information about grid costs should be provided to developers at an early at an early stage of project development, in order to reduce investment risks;

Transparency of the grid connection process

- Improve the transparency of the grid connection process at EU level to an average of 4 out of 5 [12];
- Provide a clear, streamlined procedure and decision-making process for grid connection;
- Unbundling of vertically integrated power companies would make grid access fairer. Plans for the construction and reinforcement of new grid lines should be realistic and effective. It is fundamental to have better coordination between distribution and transmission companies when building new infrastructure and for connection requests. This coordination should also be extended during the wind farm's operation;
- Widely publicise information on the characteristics of the grid. Developers can carry out access capacity studies and propose technical and management solutions. These proposals will allow grid capacity to be increased and a realistic calendar to be set for grid connection;
- Set deadlines for the grid connection process. If the authority is not able to meet the deadline, the project should automatically go to the next stage of the authorisation process.

[12] According to the WindBarriers survey, the transparency of administrative procedures is rated 3.21 on average, on a range from 1 to 5 where 1 means non-transparent and 5 means maximum transparency.

2009 Renewable Energy Directive

Article 16

Access to and operation of the grids

1. Member States shall take the appropriate steps to develop transmission and distribution grid infrastructure, intelligent networks, storage facilities and the electricity system, in order to allow the secure operation of the electricity system as it accommodates the further development of electricity production from renewable energy sources, including interconnection between Member States and between Member States and third countries. Member States shall also take appropriate steps to accelerate authorisation procedures for grid infrastructure and to coordinate approval of grid infrastructure with administrative and planning procedures.

2. Subject to requirements relating to the maintenance of the reliability and safety of the grid, based on transparent and non-discriminatory criteria defined by the competent national authorities:

(a) Member States shall ensure that transmission system operators and distribution system operators in their territory guarantee the transmission and distribution of electricity produced from renewable energy sources;

(b) Member States shall also provide for either priority access or guaranteed access to the grid-system of electricity produced from renewable energy sources;

(c) Member States shall ensure that when dispatching electricity generating installations, transmission system operators shall give priority to generating installations using renewable energy sources in so far as the secure operation of the national electricity system permits and based on transparent and non-discriminatory criteria. Member States shall ensure that appropriate grid and market-related operational measures are taken in order to minimise the curtailment of electricity produced from renewable energy sources. If significant measures are taken to curtail the renewable energy sources in order to guarantee the security of the national electricity system and security of energy supply, Members States shall ensure that the responsible system operators report to the competent regulatory authority on those measures and indicate which corrective measures they intend to take in order to prevent inappropriate curtailments.

3. Member States shall require transmission system operators and distribution system operators to set up and make public their standard rules relating to the bearing and sharing of costs of technical adaptations, such as grid connections and grid reinforcements, improved operation of the grid and rules on the non-discriminatory implementation of the grid codes, which are necessary in order to integrate new producers feeding electricity produced from renewable energy sources into the interconnected grid.

Those rules shall be based on objective, transparent and non-discriminatory criteria taking particular account of all the costs and benefits associated with the connection of those producers to the grid and of the particular circumstances of producers located in peripheral regions and in regions of low population density. Those rules may provide for different types of connection.

4. Where appropriate, Member States may require transmission system operators and distribution system operators to bear, in full or in part, the costs referred to in paragraph 3. Member States shall review and take the necessary measures to improve the frameworks and rules for the bearing and sharing of costs referred to in paragraph 3 by 30 June 2011 and every two years thereafter to ensure the integration of new producers as referred to in that paragraph.

5. Member States shall require transmission system operators and distribution system operators to provide any new producer of energy from renewable sources wishing to be connected to the system with the comprehensive and necessary information required, including:

(a) a comprehensive and detailed estimate of the costs associated with the connection;

(b) a reasonable and precise timetable for receiving and processing the request for grid connection;

(c) a reasonable indicative timetable for any proposed grid connection.

Member States may allow producers of electricity from renewable energy sources wishing to be connected to the grid to issue a call for tender for the connection work.

6. The sharing of costs referred in paragraph 3 shall be enforced by a mechanism based on objective, trans-

parent and non-discriminatory criteria taking into account the benefits which initially and subsequently connected producers as well as transmission system operators and distribution system operators derive from the connections.

7. Member States shall ensure that the charging of transmission and distribution tariffs does not discriminate against electricity from renewable energy sources, including in particular electricity from renewable energy sources produced in peripheral regions, such as island regions, and in regions of low population density. Member States shall ensure that the charging of transmission and distribution tariffs does not discriminate against gas from renewable energy sources.

8. Member States shall ensure that tariffs charged by transmission system operators and distribution system operators for the transmission and distribution of electricity from plants using renewable energy sources reflect realisable cost benefits resulting from the plant's connection to the network. Such cost benefits could arise from the direct use of the low-voltage grid.

9. Where relevant, Member States shall assess the need to extend existing gas network infrastructure to facilitate the integration of gas from renewable energy sources.

10. Where relevant, Member States shall require transmission system operators and distribution system operators in their territory to publish technical rules in line with Article 6 of Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning the common rules for the internal market in natural gas [21], in particular regarding network connection rules that include gas quality, gas odoration and gas pressure requirements. Member States shall also require transmission and distribution system operators to publish the connection tariffs to connect renewable gas sources based on transparent and non-discriminatory criteria.

11. Member States in their national renewable energy action plans shall assess the necessity to build new infrastructure for district heating and cooling produced from renewable energy sources in order to achieve the 2020 national target referred to in Article 3(1). Subject to that assessment, Member States shall, where relevant, take steps with a view to developing a district heating infrastructure to accommodate the development of heating and cooling production from large biomass, solar and geothermal facilities.

Source: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32009L0028:EN:NOT

Ph Siemens

5 MARKET-BASED ANALYSIS

For the analysis of the barriers and the recommendations made in this report, the EU member states are divided by market type, based on total installed capacity, penetration level, and growth potential.

The total installed capacity and penetration level are based on EWEA's 2008 statistics, and the expected growth ratio on EWEA's scenarios from its report 'Pure Power: Wind energy targets for 2020 and 2030' [13], written in consultation with its corporate members and the national wind energy associations.

In the Pure Power report, EWEA provides two scenarios for 2020. The low scenario assumes a total capacity of wind energy in the EU by 2020 of 230 GW, producing 580 TWh of electricity. Based on this scenario, wind energy's share of total EU electricity consumption would increase from 4.1% in 2008 (137TWh) to 14.2% (580TWh) in 2020.

The high scenario in a more optimistic approach, sees wind power more likely to make a much higher contribution to the Renewable Electricity Directive's 2020 target than the European Commission's forecast of 12%. In this scenario, wind power capacity will reach 265 GW by 2020, producing 681 TWh of electricity, which means an increase from providing 4.1% of the EU's electricity consumption (137 TWh) in 2008 to 16.7% (681 TWh) in 2020.

5.1 Types of market

Developed markets

- Denmark
- Germany
- Spain

In 'developed' markets, wind already provides a significant share of electricity. Growth is steady and the necessary transport and grid infrastructure is in place. The market is slowly becoming saturated but there may be opportunities offshore. Repowering will become widespread in these markets.

WindBarriers analysed how the administrative and grid connection procedures can be optimised in the developed markets, so that the deployment that is still possible can be achieved at the lowest possible cost. The analysis focuses on offshore, repowering, and grid requirements.

Growth markets

- Austria
- Belgium
- France
- Greece
- Ireland
- Italy
- Luxembourg
- Netherlands
- Portugal
- Sweden
- United Kingdom

'Growth' markets have high growth combined with a steady project flow, and are Europe's current main driver for growth. In some of these markets, wind has already achieved a good share of electricity, but considerable growth is still possible.

Offshore development has begun in most of these countries.

WindBarriers assessed how these countries can continue to develop wind farms by reducing the administrative and grid connection barriers that may still exist.

[13] EWEA, in 'Pure Power: Wind energy targets for 2020 and 2030', a report produced by the European Wind Energy Association, 2009 update.

Emerging markets

- Bulgaria
- Czech Republic
- Estonia
- Finland
- Hungary
- Latvia
- Lithuania
- Poland
- Romania

'Emerging markets' have a low level of wind energy capacity installed at present, but higher growth has begun, and penetration levels are rising rapidly. However, application processes have not yet been streamlined.

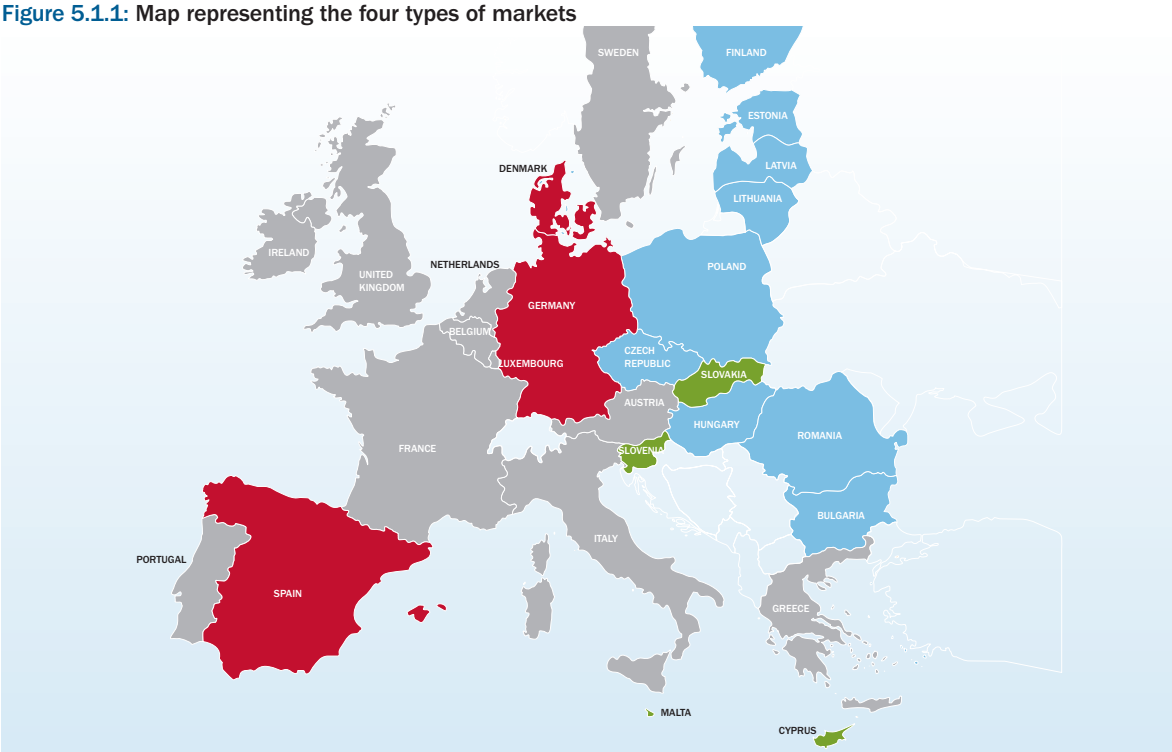
As for the growth markets, WindBarriers made an assessment on how these countries can continue to develop wind farms by reducing the administrative and grid connection barriers that may exist.

Unexploited markets

- Cyprus
- Malta
- Slovakia
- Slovenia

'Unexploited' markets have very low or no wind energy capacity installed at present. There are significant barriers due to the immaturity of the market. These countries are not analysed in this chapter, due to lack of sufficient data.

Figure 5.1.1: Map representing the four types of markets

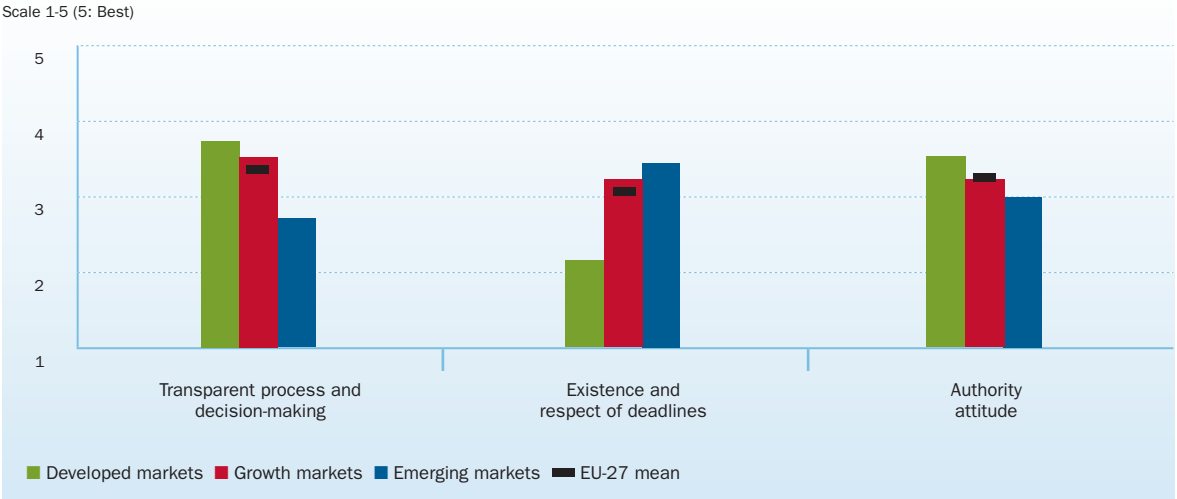


Source: EWEA 2010, WindBarriers survey

- **Developed markets:** In 'developed' markets, wind has already achieved a significant penetration share. Growth is steady and the necessary infrastructure is in place. Opportunities are slowly saturating but there may be opportunities offered by offshore wind. Repowering will become widespread in these markets.
- **Growth markets:** 'Growth' markets boom high growth combined with a steady project flow, and act as Europe's main driver for growth. In some of these markets, wind has already achieved a good penetration share, but high growth is still possible.
- **Emerging markets:** 'Emerging markets' have low capacity installed at present, but high growth levels have started taking off and penetration levels are rising rapidly.
- **Unexploited markets:** 'Unexploited' markets have very low or no capacity installed at present. There are barriers due to immaturity.

5.2 Analysis per type of market

Figure 5.2.1: Decision-making process environment



Source: DWIA and Fraunhofer ISI 2010, WindBarriers survey

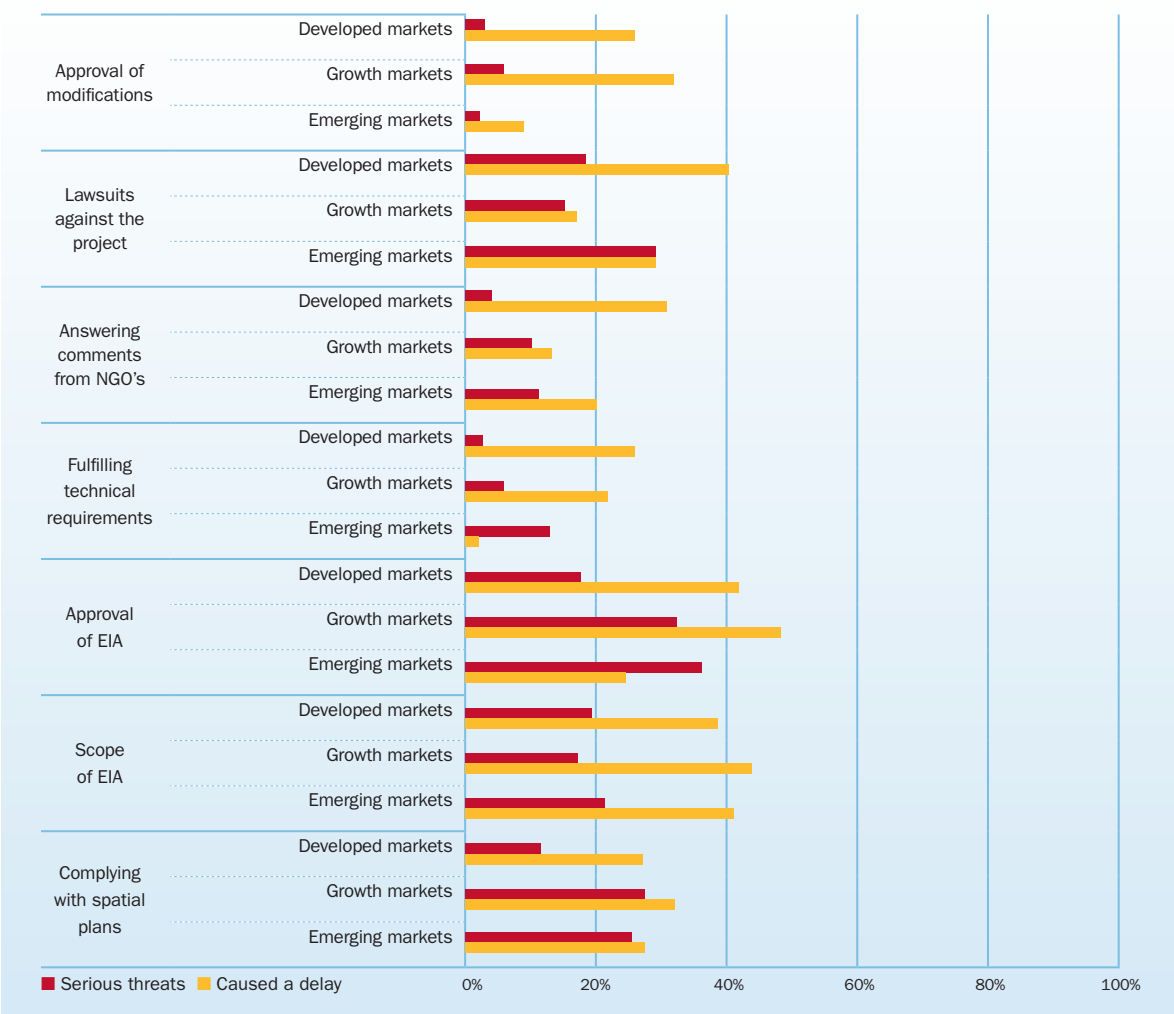
The figures on the decision-making environment clearly show an increasingly transparent process and positive attitude from the authorities' side as markets become more developed.

This indicates that the more developed the market, the more transparent the decision-making process and the requirements for wind farm applications are for all stakeholders: the developer handing in the application as well as the authority handling the application.

However, the developed markets could learn from the growth and emerging markets to use and respect deadlines, especially because some of the developed markets (such as Spain) have a long average lead time for obtaining the needed building consent.

This could be related to a saturation of the administrative services, due to the high number of demands.

Figure 5.2.2: Bottlenecks and obstacles causing delays and serious difficulties



Source: DWIA and Fraunhofer ISI 2010, for WindBarriers

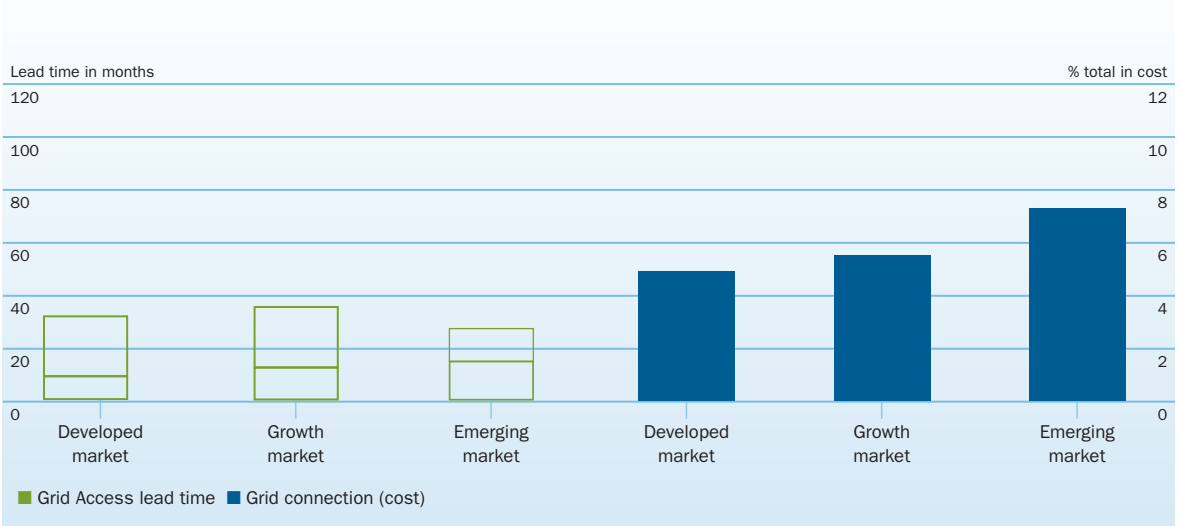
Bottlenecks and obstacles are present in all markets. However, there are a few trends that indicate that there is a learning curve. Developed markets generally seem to be more affected by delays than other markets, and less affected by other types of difficulties.

For emerging markets, the results are the opposite. Compared to the two other types of market, there is a greater possibility of facing serious problems, while the possibility of delays is at the lowest level of the three market types. This indicates that the more developed the markets, the less often developers face serious obstacles to their projects. Nevertheless, there are still many delays that affect the developers in obtaining their building consent.

In terms of grid access, costs are higher in emerging markets, mainly because projects are often connected to high voltage transmission lines.

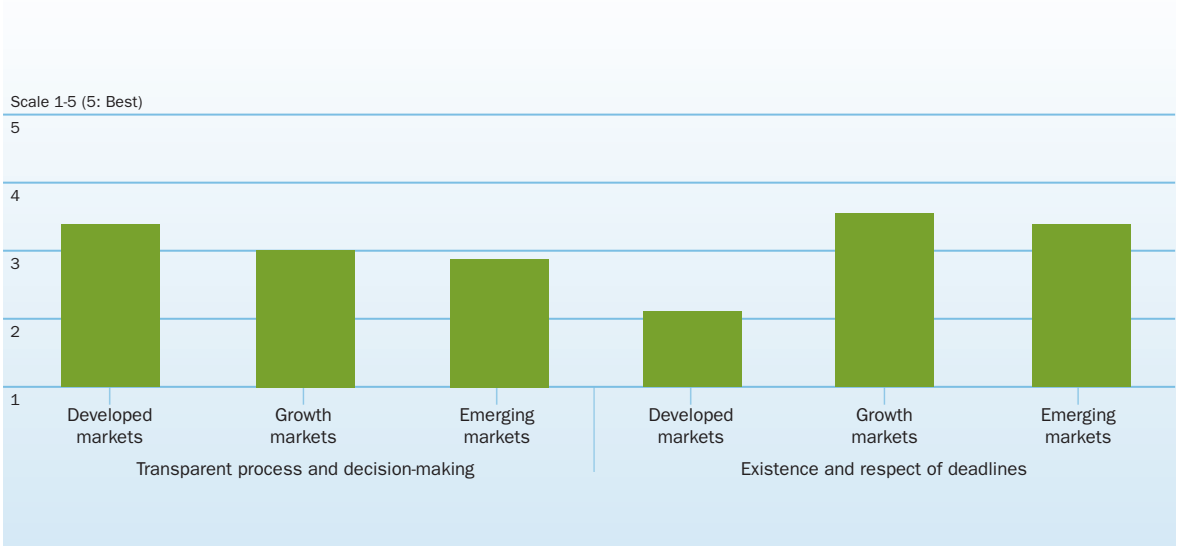
Figures 5.2.3 and 5.2.4 opposite compare the markets in terms of grid access lead times and grid connection costs. The generally bad results for the developed markets could be related to the large number of projects that need to be connected to the same node.

Figure 5.2.3: Comparison of grid access costs and lead times between different types of European markets



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Figure 5.2.4: Comparison of transparency for the grid connection process between different types of European markets



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Developed markets

Denmark, Germany and Spain

Administrative barriers

The developed markets are characterised by a very wide range of total lead times. Denmark has the widest range of all EU countries: from the fastest total lead time of three months to the slowest of 157 months.

The lead times for the administrative procedure in these countries correspond to this range from 1 to 154 months. This indicates that even though the authorities and the developers have much experience in planning and licensing, there are still a large number of barriers that can delay this process. The most commonly experienced barriers in these markets are:

- Approval and scope of the EIAs.
- Complying with spatial plans.
- Lawsuits against the projects.

The developed markets are confronted with growing challenges to find suitable areas for new wind farms. This brings new EIA requirements from the authorities, for example studies on specific species of birds, visual effects on the area and other related issues. Moreover, the survey also shows that different regions have different lead times and barriers, which indicates that the decision-making process varies from region to region and municipality to municipality.

Regarding spatial planning in developed markets, developers face various issues: how to deal with the old turbines? Should they be decommissioned if they are blocking the area for new and more efficient turbines? How can this be carried out if the new developer does not own the old turbines?

The developed markets are equally confronted with barriers such as the social acceptance of new wind farm projects. These lawsuits and complaint processes do not necessarily have deadlines and therefore there is a risk they delay the project without the developers knowing when they will have a final decision from the court or authority in charge.

To sum up, the developed markets are facing barriers related to spatial planning and EIA requirements.

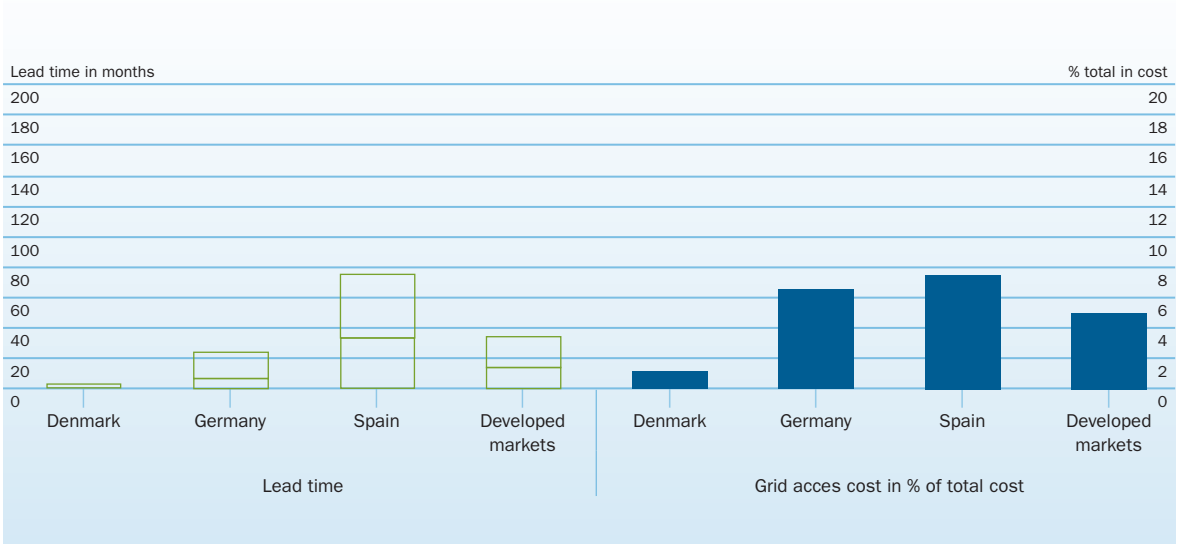
Compared to the growth market group, the danger of a wind farm project being seriously put at risk is in general lower for the developed market group and thus the decision-making process is less risky than in this group. This is partly due to the authorities' greater knowledge on how to handle wind farm applications.

The main reasons for stopping a project in the developed markets are politics, the environment, spatial planning, and lawsuits. Some of these factors came up in more than 50% of the cases, which represents a significant proportion compared to the growth and emerging market groups, where none of the reasons for the projects to get blocked occur in more often than 43% of cases. This indicates a growing challenge with environmental issues, spatial planning and social acceptance for the developed markets.

On the other hand, barriers like an insecure/unstable framework and negative political attitude are experienced less often in the developed markets than in the growth markets. This result also feeds into the developers' evaluation of authorities' attitude and transparency.

This shows that the more developed the market, the more stable and transparent the handling of wind farm applications. However, the developed markets make the least use of fixed deadlines for all the processes mentioned above. This could be an explanation for the high lead times there, but despite this the probability of obtaining the building consent remains high in these markets.

Figure 5.2.5: **Comparison of grid access costs and lead time for the developed markets**



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Grid access barriers

These three countries were the pioneers of wind energy worldwide, they had different approached to grid connection. Whereas in Denmark and Germany, wind facilities were initially a few units connected to the distribution grid, Spain started almost immediately with wind farms of several units, with an average capacity of 25 MW. In Spain, projects were progressively connected to transmission lines.

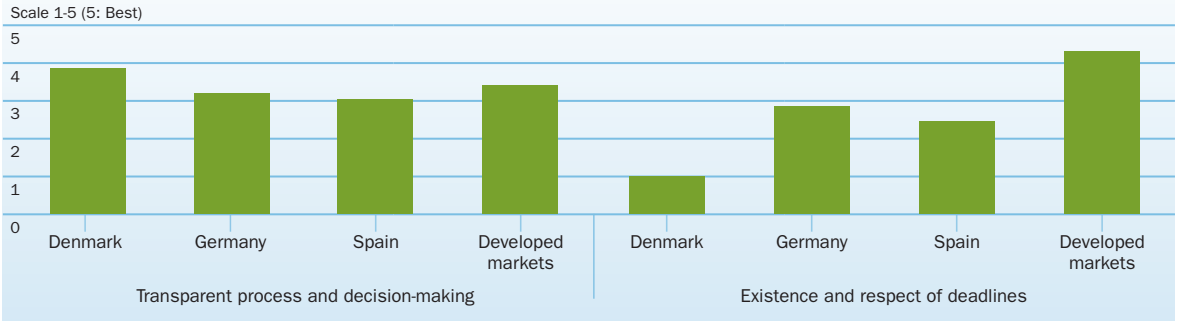
Despite their large installed capacity, Germany and Spain have the longest lead times of all the EU countries, mainly due to the large number of projects for every connection point. This means a second procedure is necessary to select which installations will be connected. Additionally, the high amount of wind power on the grid has led to the implementation of grid codes for the connection and operation of the wind farms, which have brought about additional delays to adapt the wind turbines and the farms.

The trend towards small installations has changed in Germany and Denmark, with the progressive installation of offshore wind farms that have fostered the involvement of electrical companies, which was rare at the beginning of wind energy development in these two countries.

This leadership is also applicable to the grid codes. Some of them, like the LVRT requirements in Germany and Spain, are used as a reference for other electrical systems and the participation of wind energy in the wholesale electric market has also been a useful experience for the other electrical systems. The experience of these countries also explains why they have the lowest connection costs of all the countries analysed.

Each of these countries has developed specific regulatory schemes to promote the repowering of existing wind farms, sometimes through a simplified administrative procedure.

Figure 5.2.6: Comparison of transparency during the grid access process for the developed markets



Source: AEE and Fraunhofer ISI 2010, WindBarriers survey

Growth markets

Austria, Belgium, France, Greece, Ireland, Italy, the Netherlands, Portugal, Sweden, and the United Kingdom

Administrative barriers

Growth markets have in general a shorter lead time for the administrative process than the EU average. The four shortest average administrative lead times according to survey responses are experienced in this group: Italy (18 months), Belgium (20 months), the UK (26 months) and France (30 months). Two other countries in this group have lead times below the EU-27 average of 42 months: Ireland and the Netherlands. The lower administrative lead times may be due to the fact that the authorities are getting more and more experienced in handling the applications and that there is still space for more turbines.

The barriers most frequently experienced in these markets concern:

- Approval and scope of the EIAs;
- Complying with spatial plans;
- Modifications after the building consents are given.

The EIAs and spatial planning are the most frequent barriers in the growth market group. These barriers cause serious obstacles in these markets, more often than in the developed markets. Barriers such as the approval of modifications after a building permit is granted can cause serious financial problems for the developer, due to the proportion of expenses that the developer has already used at this late stage in the project development. This is a challenge that needs to be handled by authorities and developers together.

Social acceptance barriers exist, but are less serious than in the developed markets. The transparency and attitude of the authorities are close to the EU-27 average. Fixed deadlines are also more often used in this type of market. Transparency, the authority's attitude and the use of fixed deadlines have better scores in the growth markets than in the emerging ones.

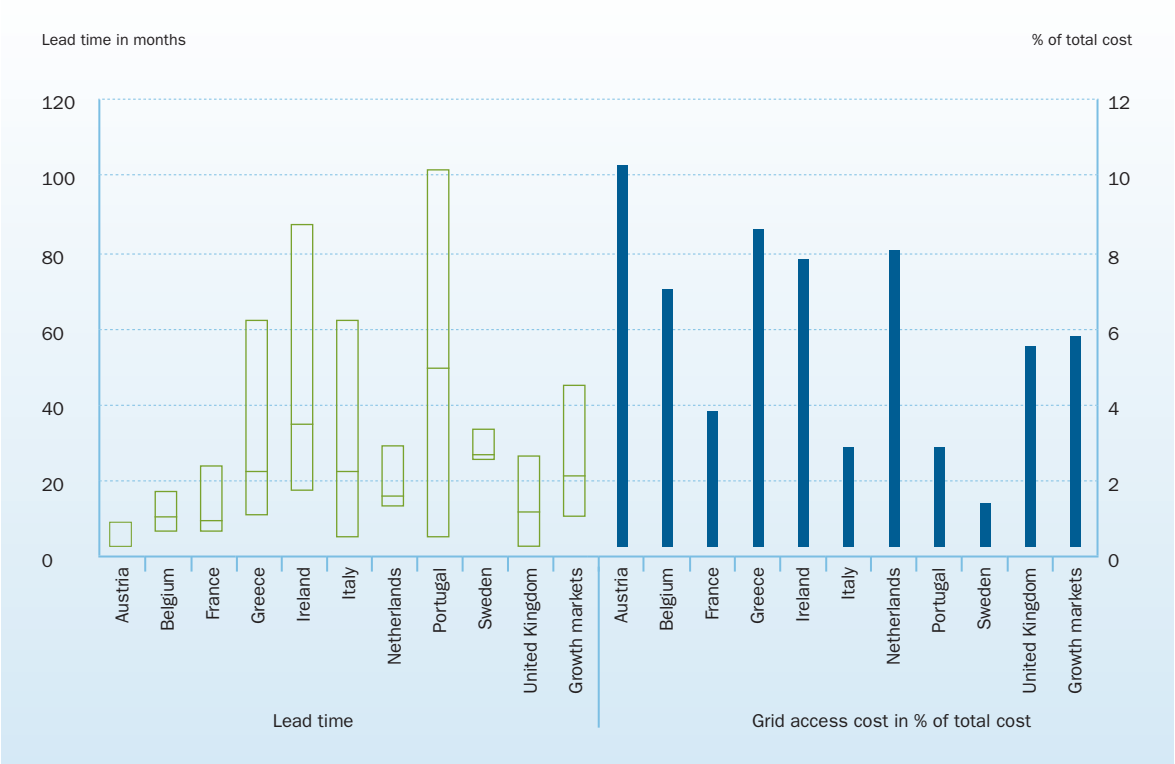
The non-finalised projects were primarily stopped due to environmental and spatial planning issues. Just over 40% of the non-finalised projects were blocked because of these two reasons, plus political ones. An unstable political framework and negative political changes were barriers to 16% and 19% respectively of the non-finalised projects, a higher share than in the developed markets, but lower than in the emerging markets.

Grid connection barriers

The grid conditions are not uniform for the countries in this group, because Ireland, Portugal or Austria have a different level of level of wind power penetration than the other countries in this group, but they are included in this category due to their market size.

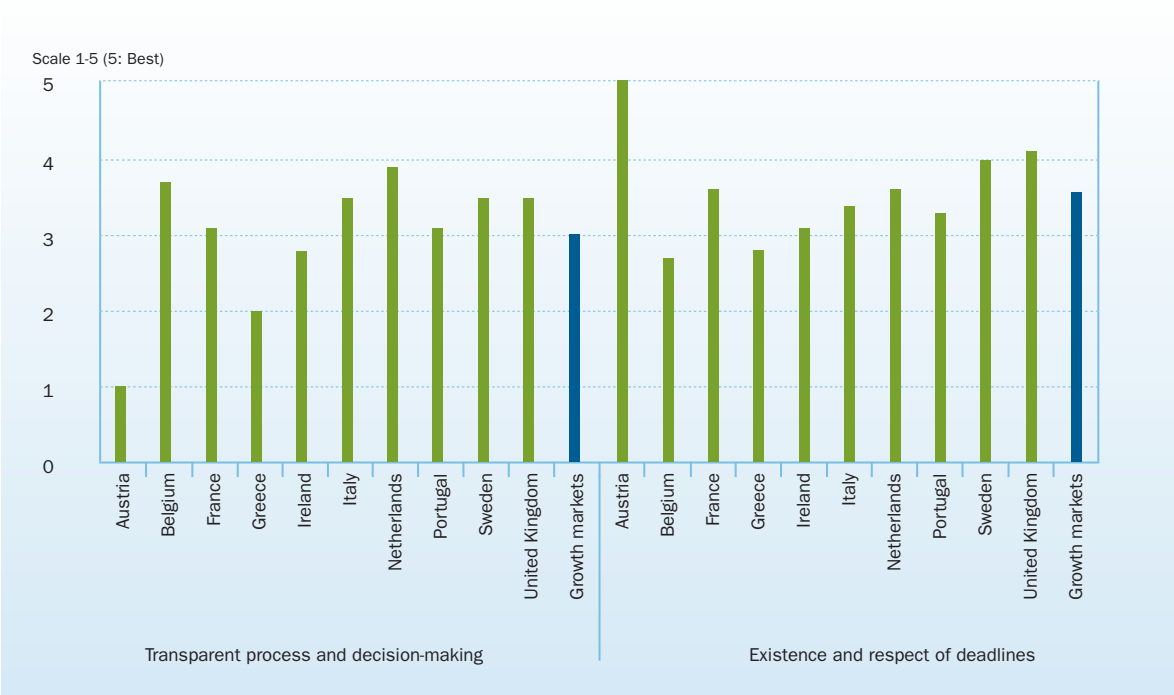
Figure 5.2.7 presents the grid access costs and lead times for the growth markets.

Figure 5.2.7: Comparison of grid access costs and lead time for the growth market



Source: AEE and Fraunhofer ISI 2010, WindBarriers survey

Figure 5.2.8: Comparison of transparency during the grid access process for the growth market



Source: AEE and Fraunhofer ISI 2010, WindBarriers survey

Emerging markets

Bulgaria, Czech Republic, Estonia, Finland, Hungary, Latvia, Lithuania, Poland and Romania

Administrative barriers

The average lead time for the emerging markets is short: for all the emerging markets it is 27 months and the longest lead time is in Poland with 43 months, just one month above the EU-27 average of 42 months.

Despite the short lead times, numerous barriers affected the few projects that were connected in 2008. The main barriers for the emerging markets are:

- Approval and scope of the EIAs.
- Complying with spatial plans.
- Lawsuits, legal complaints against the project.
- A relatively unstable decision-making environment.

The emerging markets are characterised, like other markets, by barriers such as the approval and the scope of the EIAs, spatial plans, and legal complaints against the project. In addition to these barriers, the emerging markets have a relatively unstable decision-making framework due to a low level of transparency and not particularly supportive authorities.

They also run a high risk of facing serious obstacles against the project because the political environment is less stable than for the two other market groups.

However, non-finalised projects in the emerging markets are less often blocked by procedures such as the environmental and spatial planning issues than in the two other market groups.

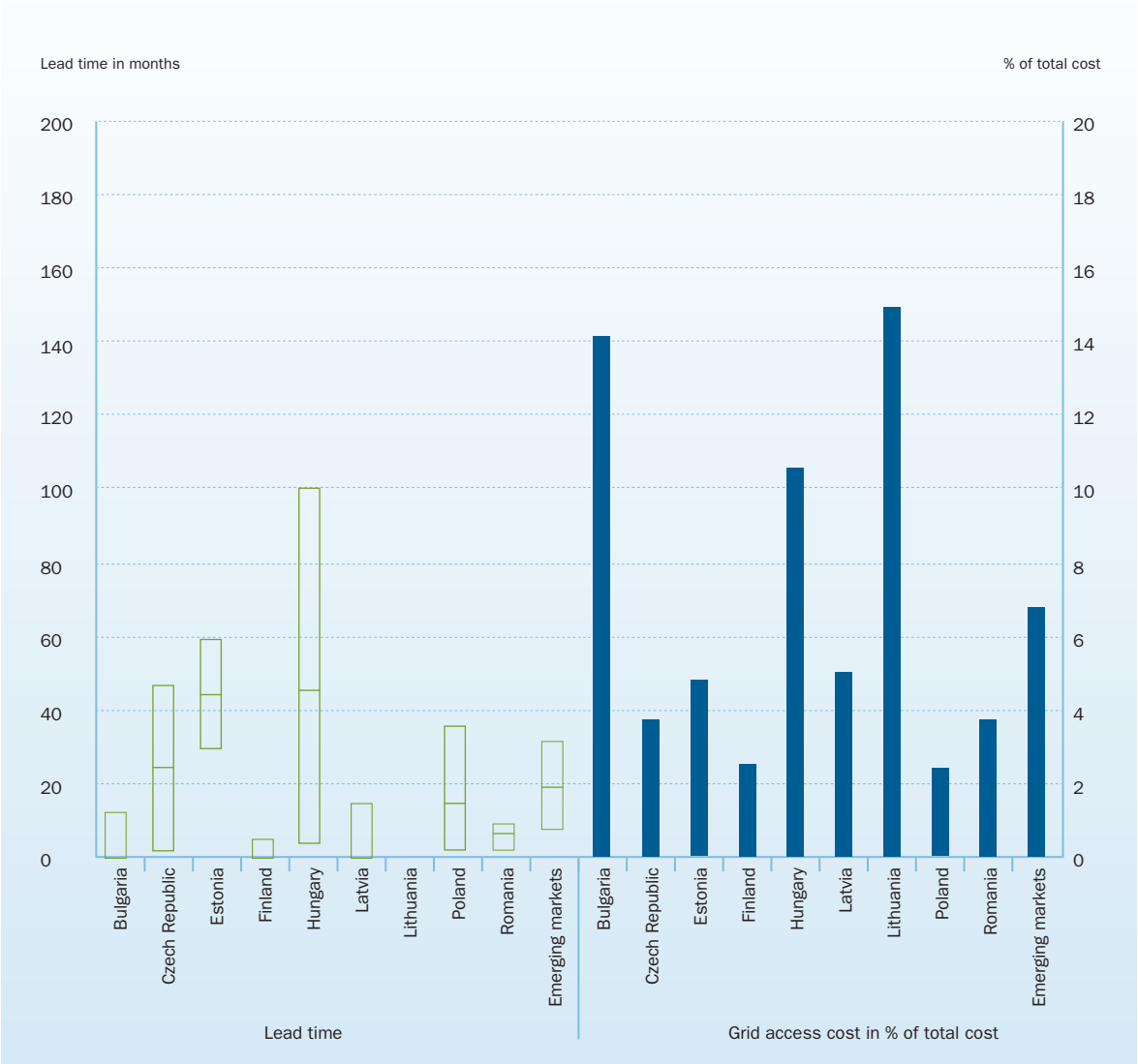
This indicates that when there are fewer wind farms, the risk of having them blocked by environmental and spatial planning issues is smaller.

Grid access barriers

Considering the lack of experience in these countries, the WindBarriers indicator on lead time for wind farm connection cannot be considered representative.

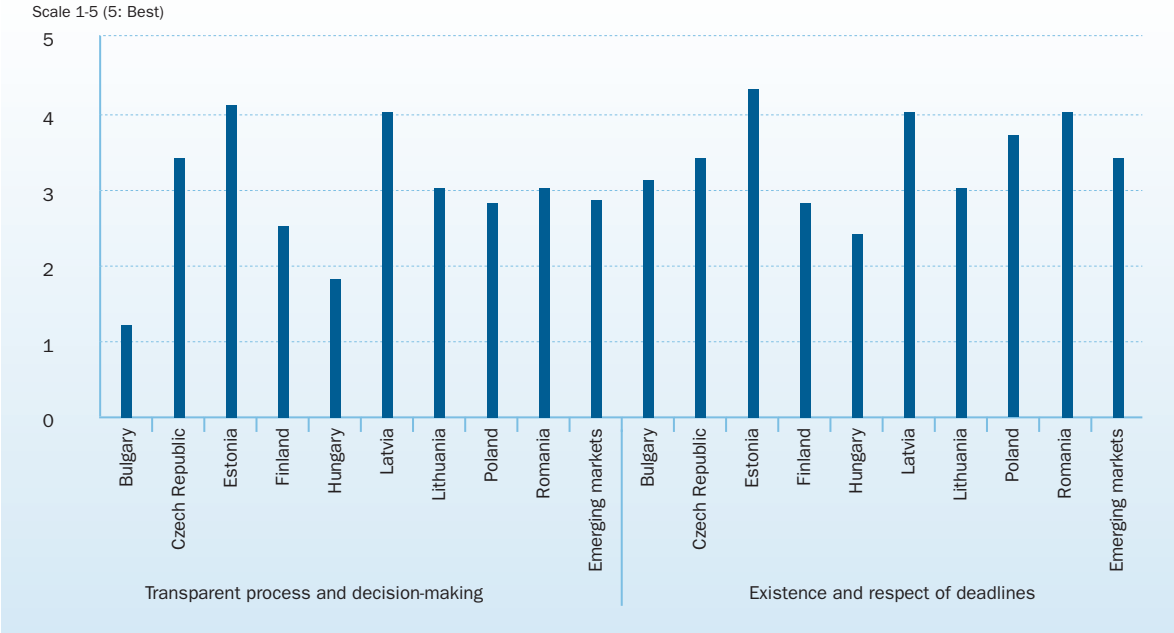
Apart from Bulgaria, all the emerging market countries have a similar level of transparency.

Figure 5.2.9: Comparison of grid access costs and lead time for the emerging markets



Source: AEE and Fraunhofer ISI 2010, WindBarriers survey

Figure 5.2.10: Comparison of transparency during the connection process for the emerging markets



Source: AEE and Fraunhofer ISI 2010, WindBarriers survey

Unexploited markets

The fourth type of market is not analysed due to the absence of sufficient data for the countries that fell into within this category.

5.3 Regional analysis

Barriers concerning administrative procedures - interregional analysis

The analysis above showed the substantial differences in lead times and barriers between the EU-27 countries. In the following short analysis we will look at the regional differences in four of those countries. For Denmark, Poland, Portugal and Spain the survey was large enough to make a regional comparison without compromising the confidentiality of the individual developers. The demand for confidentiality is fulfilled with a minimum representation of four projects per region. The results of this analysis can only be used as an indication of the possible differences that may also exist in other EU countries.

The regional analysis shows substantial differences between lead times and experienced bottlenecks within the same country, legislation and social and administrative environment. The differences are both due to project specific challenges and differences in the way wind farm applications are handled in different regions and municipalities. The regional analysis for Denmark, Poland and Portugal indicates that there is a relationship between short lead times and a good decision-making environment. This is measured by the developers' aggregated evaluation of the transparency, deadlines and the attitude of the authorities in the respective regions.

Denmark

Inside these countries, the average administrative lead time can vary by as much as a factor of two. The Syddanmark region in Denmark has the shortest average lead time of all regions and countries: 10 months. It is less than one third of the average Danish lead time of almost 32 months. The other Danish region in this regional analysis, the Midtjylland region, has an average lead time of 25 months which was more than the double of Syddanmark. The difference in the average lead time can partly be explained by the scope of the EIA in the Midtjylland region, which is one of the main bottlenecks in the two regions.

These short lead times show that the authorities in Denmark and the developers in general can cooperate and ensure that very short lead times are possible if:

- The stakeholders know exactly what is expected of each of them.
- The transparency is high and the authorities have a positive attitude.

It also shows that fixed deadlines are not necessary for ensuring short lead times, but they can indeed be a useful tool because lead times in Denmark can still sometimes be extremely long – 154 months to get a building permit in one instance.

Poland

For Poland, two regions are analysed – Pomorskie and Zachodniopomorskie. The average lead time for obtaining the needed building consents in Poland is 43 months. In Pomorskie it takes on average 23 months to get the building consent, while in Zachodniopomorskie it takes 49 months. This difference in lead times per region also exists in Denmark.

The sum of the evaluation of attitude, transparency and deadline is 20% more positive for the Pomorskie region than the Zachodniopomorskie region. The difference between the two Polish regions can partly be explained by the following elements:

- In the Zachodniopomorskie region, most of the delays that developers face are due to lawsuits, while delays in the Pomorskie region are mostly due to the scope and approval of the EIA.
- In the Pomorskie region, developers have to contact on average 4.2 authorities directly, while in Zachodniopomorskie they have to contact 9.3 authorities directly.

Because there is a higher level of transparency, fixed deadlines and a more supportive attitude from the authorities, as well as a lower number of bodies to be contacted directly, the decision-making environment in the Pomorskie region can be seen to be better.

Portugal

In Portugal there are also two regions that can be compared – the Central region and the Norte region. The average lead time varies here from 41 months in the Central region to 67 months in the Norte region (63%). In Central region, levels of transparency are higher and there are fixed deadlines, unlike in Norte, while the authority's attitude is the same for the two regions. The number of authorities to contact directly does not vary between the regions either.

In the two Portuguese regions the main reasons for delays and serious obstacles are the EIAs and the spatial planning issues, although they are more present in the Norte region. As in the Polish case above, the explanation is similar: a better decision-making environment in the Central region.

Spain

The following three Spanish regions are represented in this regional analysis: Andalucia, Castilla y León and Galicia. The average administrative lead time varies by 30% amongst the regions. Andalucia and Galicia both have a lead time of 45 months, while Castilla y León has a lead time of 58 months. The decision-making environment is perceived by the developers in the regions of Andalucia and Galicia as being 20% better than the one in Castilla y Léon. This is concluded from an aggregated evaluation of transparency, fixed deadlines and the authority's attitude.

Compared to the other regions, Andalucia has the shortest lead time and best decision-making environment but it is also the region where the developers are most affected by delays and serious obstacles against their projects. The delays and serious obstacles are similar all over Spain. This could partly explain the high average administrative lead time for obtaining the needed building consent and other associated consents in Spain and the individual Spanish regions.

Barriers concerning grid connection - interregional analysis

Regarding grid access conditions, there are two types of situations to be seen in the four countries analysed:

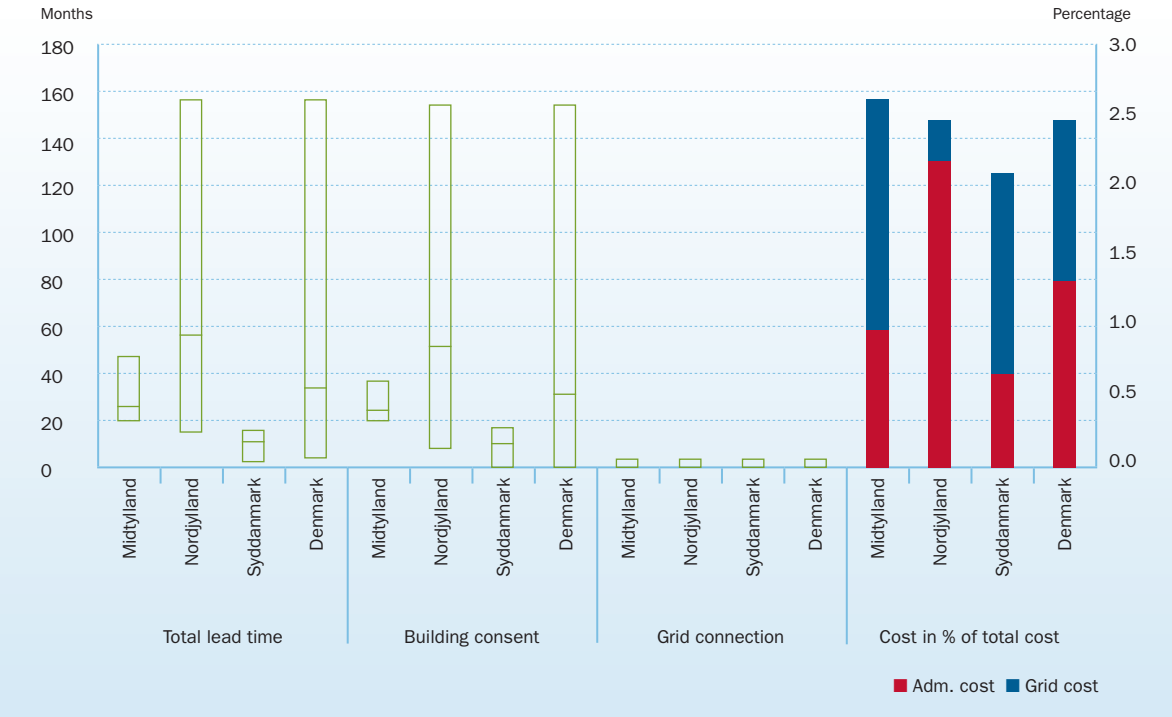
Denmark and Poland: a stable framework

In these two countries, the regions have fairly similar scores for all the indicators related to grid access lead times and costs.

In Denmark, where the overall national situation regarding grid access is already very satisfactory, the grid access lead times are around two months for all regions. This is a fundamental and safe result for developers. It places the country as an example for the rest of Europe regarding fast access to the grid.

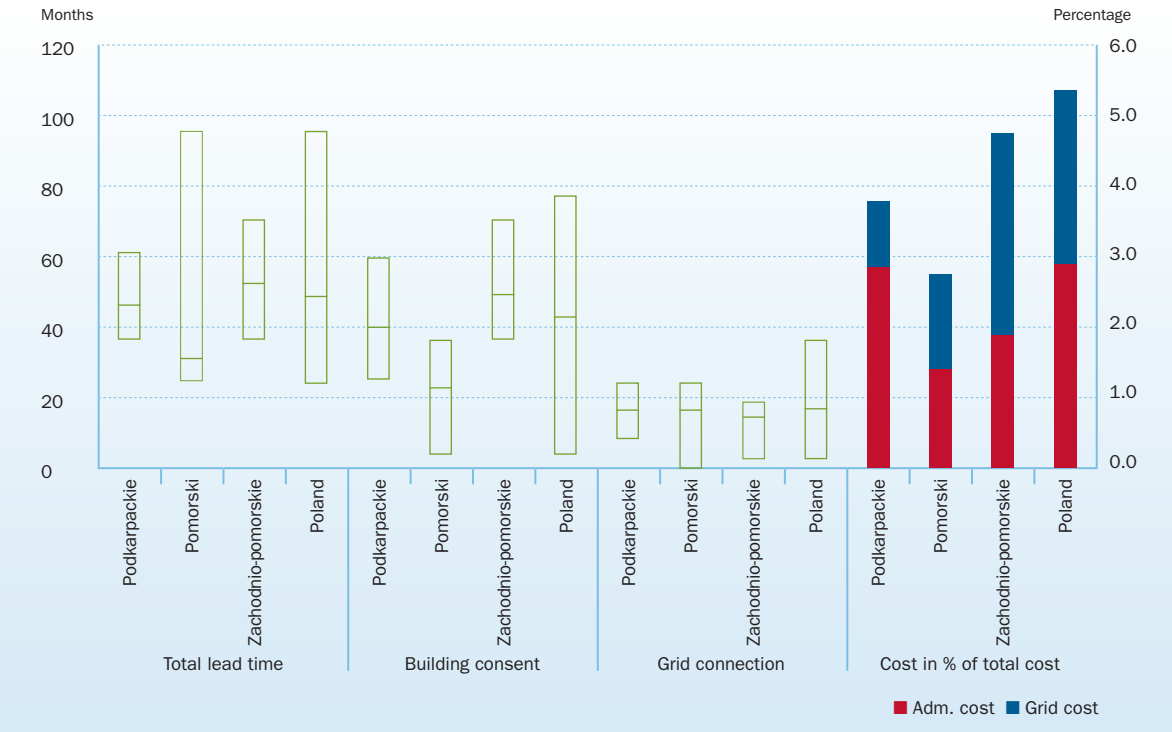
In Poland the average regional grid access lead times are equal to the national average. However, a larger range is observed: from one month to more than 20.

Figure 5.3.1: Interregional comparison for lead times and costs - Denmark



Source: AEE and Fraunhofer ISI 2009, for WindBarriers

Figure 5.3.2: Interregional comparison for lead times and costs - Poland



Source: AEE and Fraunhofer ISI 2010, for WindBarriers

Regarding the costs in both countries, more variations are observed. The costs however depend more on external parameters (distance to the PCC, topography, level of connection defined by the grid development in the region, and so on). Denmark and Poland have relatively low costs for connection compared to the rest of the European countries (in Denmark, connection costs make up around 1% of total costs and in Poland about 2.4%, while the EU average is 5.1%). This low level of costs is similar at regional level.

The transparency indicator follows the same patterns as lead times and costs. In Poland, the Zachodniopomorskie region, which has the highest connection costs, is also the one where the decision process received the lowest score.

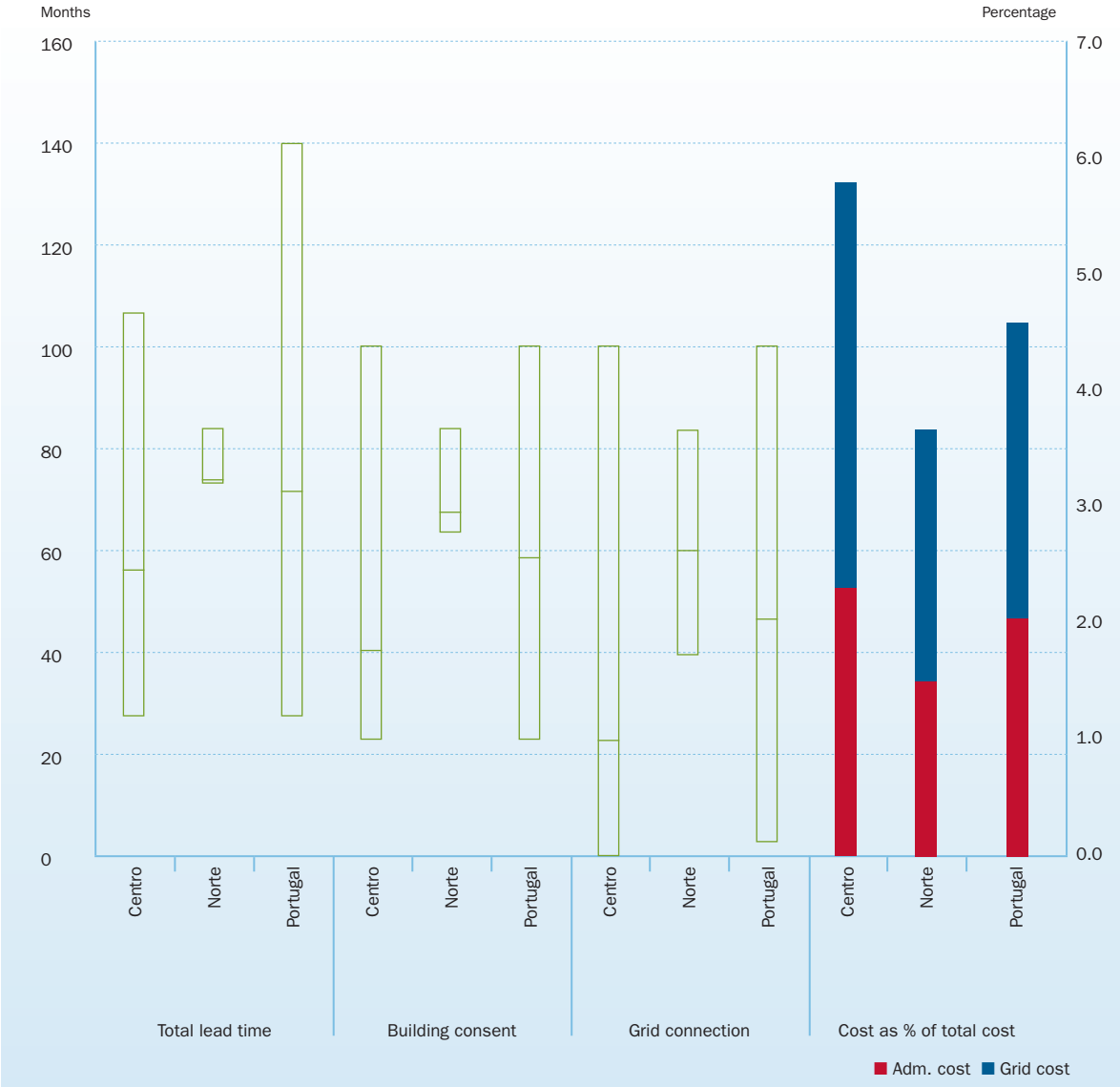
The only indicator that breaks the homogeneity of the Polish case regards the number of other parties involved in the projects.

Spain and Portugal: a variable framework

For grid access lead time or costs, Spain and Portugal present substantial variations from one region to another, not only in terms of average values, but also in terms of ranges. Lead times vary from one month to several years and for every single region (except Portugal's Norte region), there are examples of good results. Any differences can be explained by the quality and the heterogeneity of the electricity system across the country as well as its density, which requires longer evacuation lines and justifies the division of the costs.

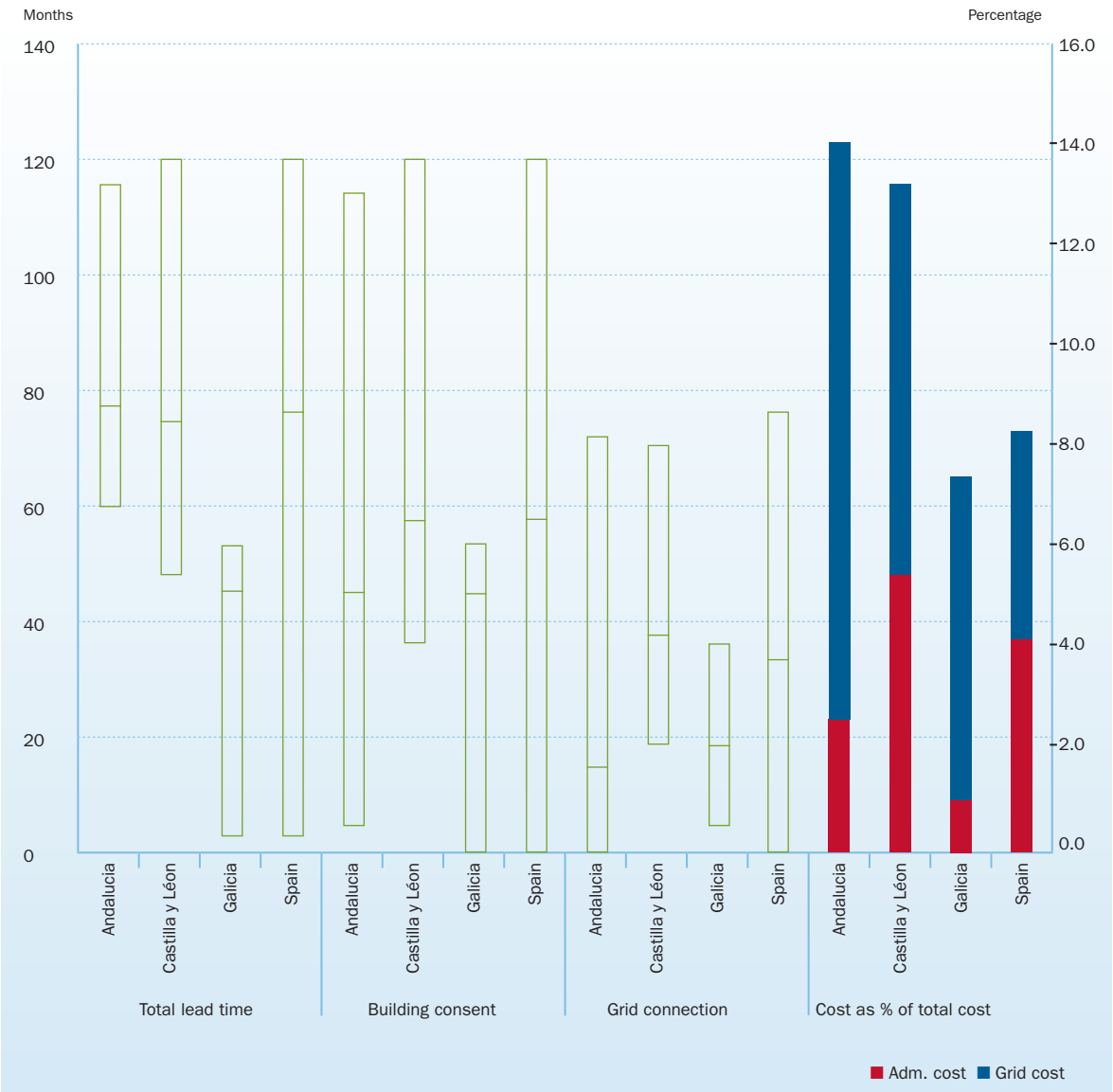
The existence of regional specifications or requirements related to the grid infrastructure should also be considered as a possible way of understanding these variations.

Figure 5.3.3: Interregional comparison for lead times and costs - Portugal



Source: AEE and Fraunhofer ISI 2010, Windbarriers survey

Figure 5.3.4: Interregional comparison for lead times and cost - Spain



In terms of transparency there are high variations, both concerning the transparency of the decision making process, and the existence and respect for deadlines. No clear pattern can be identified from these values but a clear national frame is needed to give orientation at local level.

Grid development schemes are being discussed at European level, and their flexibility and reliability will increase. Future grid developments have to take into account:

- The need to connect more and more decentralised capacity, while maintaining system security.
- The need to improve the grid's efficiency, allowing the development of renewables. In this new scheme, multiscale integration is clearly needed, in which regions have to play an important role as the future production centres of primary energy.

Photo: Shutterstock

6 COUNTRY FACTSHEETS

6.1 Reader's guide to the country factsheets

6.1 Reader's guide to the country factsheets

Key country information

Figures and criteria

For most of the indicators mentioned in Chapter 2, direct quantifications were possible.

It was decided to weight the individual answers according to the size of the project they represented (in MW) when calculating the different indicators. Therefore, answers from larger projects are assigned a higher importance than answers from smaller projects. Thus, measurements per MW are provided, rather than the absolute measurements per wind farm.

The figures used in the country profiles display:

Figure 1.	Lead times (in months): the lead time is divided between the time taken to get the building permit, and the time needed to obtain the grid connection permit. Costs (as a percentage of the overall project costs): the administrative costs include staff costs and costs for the preparation of necessary studies; the grid connection costs contain costs of any grid extension and related paperwork.
Figure 3.	Stakeholders and authorities: the number of parties that had to be contacted to obtain a grid connection permit. The number of authorities involved, and the developer's impression of the extent to which the authorities support wind energy.
Figure 4.	Serious threats (meaning serious obstacles, problems, difficulties etc) and delays to wind farm deployment.
Figures 5 and 6.	Blocked projects/projects that were put on hold: the reasons why projects were stopped/held up.

The sample mean is the average value of all the observations in a data set, characterising the central tendency in the data. In the analysis of the project results, the sample means formed the most important quantification of the barriers and they were calculated at EU, country and regional levels. All calculations were made with the inclusion of the frequency weights described above.

Figures 1 and 5 are boxplots. They show:

- A rectangular box enclosing the middle half of the sample (range in which 50% of the answers fell)
- A line drawn at the sample median (the middle value in the sample)
- The minimum (lowest answer within 1.5 range from the middle half of the sample)
- The maximum (highest answer within 1.5 range from the middle half of the sample)
- Outliers (answers beyond the 1.5 range from the middle half of the sample): the position of the rectangular box between the minimum and maximum, as well as the position of the median, indicate whether or not the answers were equally spread between the minimum and the maximum.

Text

The text boxes in the country profiles contain comments and observations on the administrative barriers and the grid connection process in that country.

Strengths and weaknesses

The strengths and weaknesses describe the best and worst practices observed in each country that feed into the recommendations.

Austria

Annual wind installation in 2008:	**14 MW**
Cumulative wind installation in 2008:	**995 MW**
Penetration level in 2008 in %:	**2.9%**
Type of market:	**Growth market**
Respondents:	**Less than four projects – 14 MW**

Central and southeastern European countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

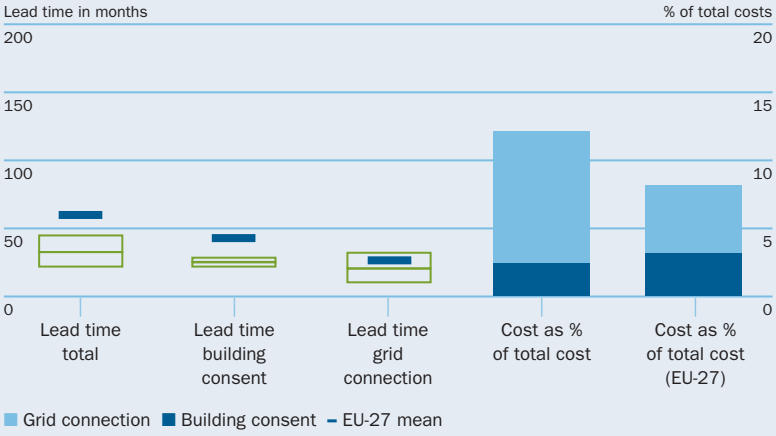
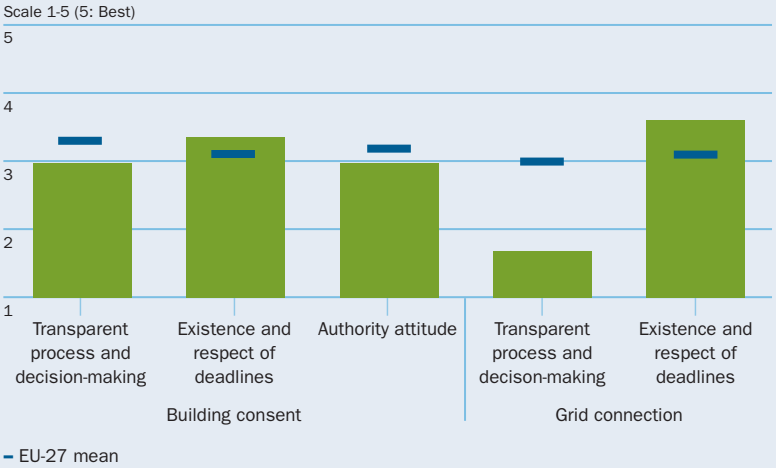


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Create clearer requirements for the Environmental Impact Assessment (EIA).
- Create spatial plans pinpointing development areas for wind farms, to increase investors' confidence.
- Maintain a short lead time.
- Improve the application process so fewer authorities are involved.
- Ensure coordination between administrative bodies.
- Reconsider parts of the legislation and distance requirements.

Recommendations for grid connection procedures

- Reduce grid connection costs.
- Maintain the grid access lead time at its current level.
- Improve the transparency of grid connection requirements and costs.

Building consent - strengths

According to the survey Austria has a relatively short lead time. The building consent, in particular, is lower than the EU average.

The main challenges are the approval of the EIAs, and the compliance with spatial planning.

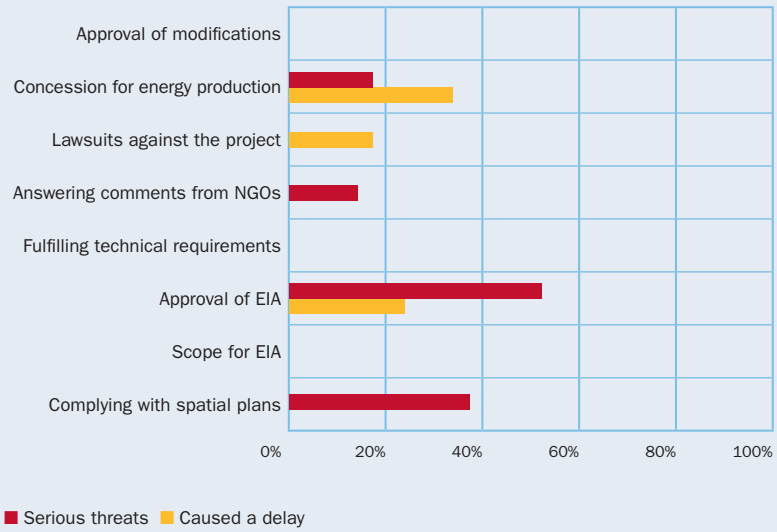
From these results, the administrative approval process does not seem to justify the low wind energy installation level.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

Figure 4: Obstacles to wind farm development

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Building consent - challenges

The number of authorities involved is similar to the EU average.

The Austrian legislation is more restrictive than most EU countries regarding distance requirements and noise limits.

Grid connection - strengths

According to the survey the grid access lead time is not a critical point, as it is six months. The number of third parties involved in grid construction is low in this survey. According to the WindBarriers survey, the deadlines are well set and well kept. Nevertheless, these results should be verified on a larger sample, given the very low number of projects included.

Figure 5: Reasons why non-finalised projects were put 'on hold'

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

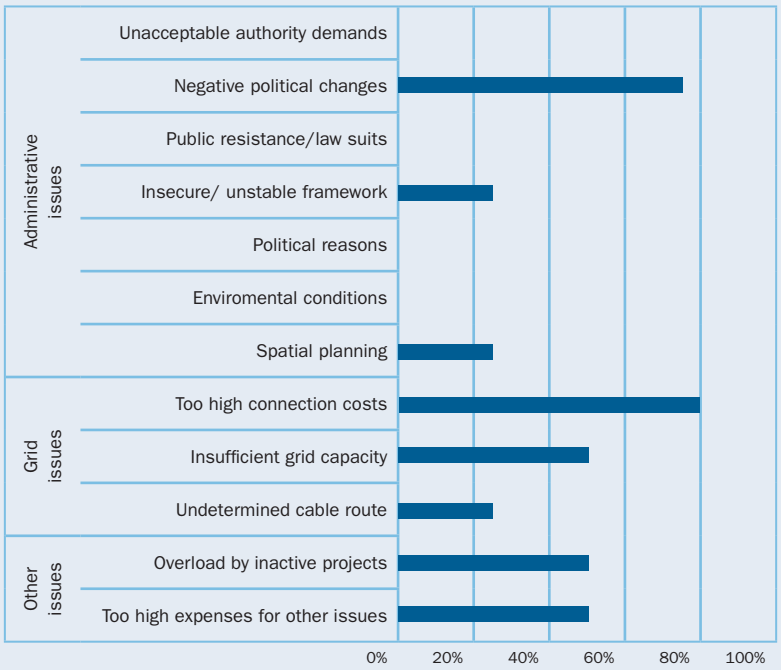
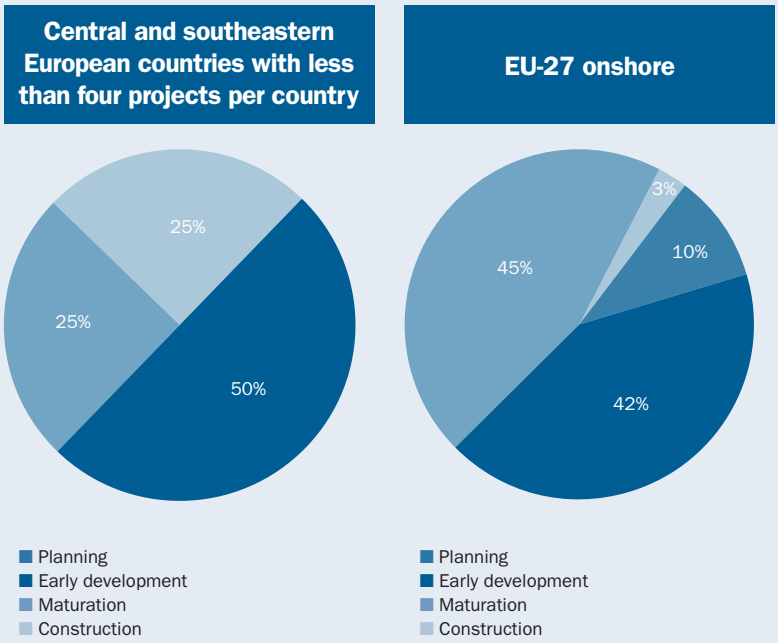


Figure 6: Phase in which non-finalised projects were put 'on hold'

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Grid connection - challenges

The grid connection costs are very high compared to the rest of the EU (10% on average compared to 5.1% for the EU). Austria is mountainous and grid management and extension is a challenge.

The decision-making process for grid extension should be clarified. In particular, the regulations and costs that are applicable are not sufficiently well known. This conclusion is reinforced by the fact that grid connection costs are given as a key reason projects are put on hold.

Belgium

Annual wind installation in 2008:	**104 MW**
Cumulative wind installation in 2008:	**384 MW**
Penetration level in 2008 in %:	**0.9%**
Type of market:	**Growth market**
Respondents:	**Six projects – 99 MW**

Belgium

Figure 1: Lead times and costs

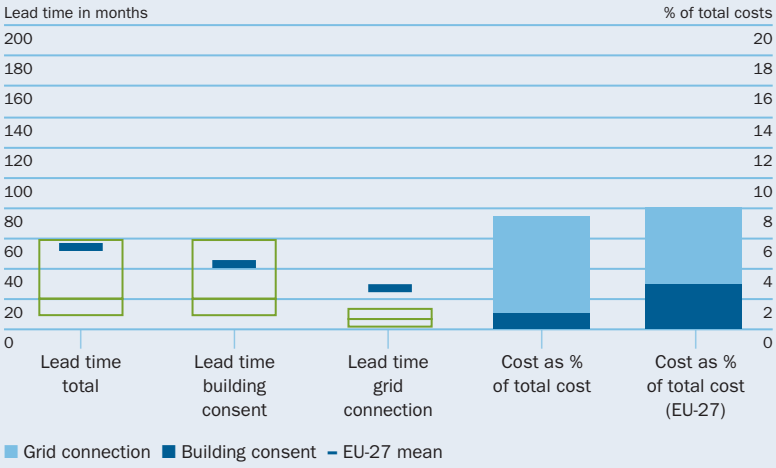
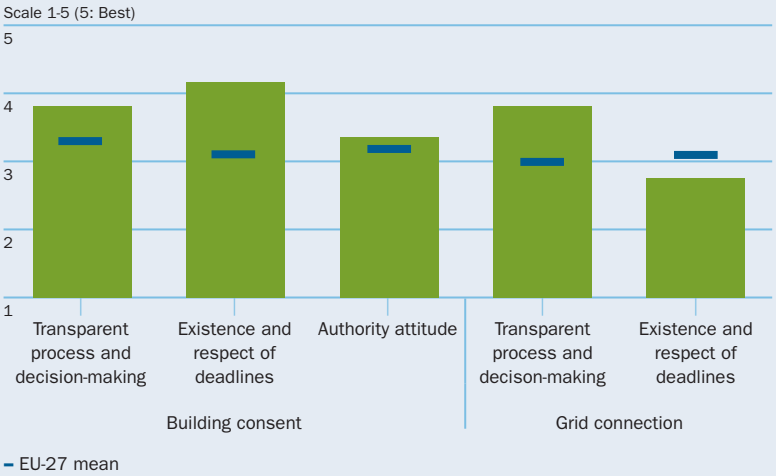


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Establish comprehensive spatial plans.
- Create clear definitions and rules for the Environmental Impact Assessments (EIA).
- Improve the authorities' attitude by providing them with clear information and studies on wind power.
- Maintain the relative short lead times.
- Maintain the good level of coordination between authorities at all levels.

Recommendations for grid connection procedures

- Maintain and clarify the deadlines for grid connection procedures by defining "standard deadlines".
- Improve coordination between neighbouring Transmission System Operators or Distribution System Operators (TSOs/DSOs).
- Develop a master plan for grid reinforcements.
- Reduce the average grid costs.
- Establish a national regulation to avoid a monopoly by the local TSOs.

Building consent – strengths

To some extent, the short lead time is due to the comprehensive studies that developers make before handing in their application to the public authorities.

The average costs for obtaining the building consent – 1.1% of the total costs - are low in Belgium. This is due to an effective application process involving very few authorities.

The decision-making process is transparent in Belgium compared to the EU average. Moreover, the deadlines are well defined and better kept than in other EU countries.

Figure 3: Stakeholders involved in the procedures

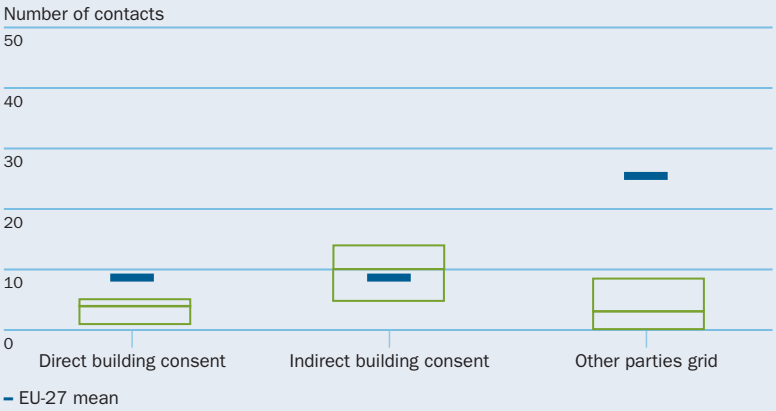
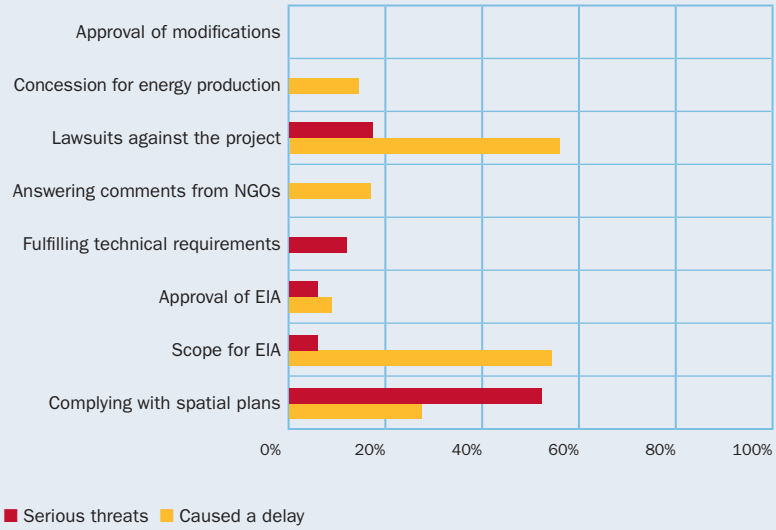


Figure 4: Obstacles to wind farm development



Building consent - challenges

The key obstacles that Belgian projects face are related to the spatial planning. More than half the surveyed projects mentioned spatial planning as a major obstacle for getting the building consent.

Other obstacles creating delays to the building permit process are the scope of the EIA and lawsuits against the projects, caused by social acceptance aspects.

If projects are put 'on hold' in Belgium, it is due to failure to comply with spatial planning requirements. The blocked projects are stopped either in the analysis or the maturation phases, which means a relatively high level of risk for the developers when building a wind farm.

In Belgium there is an informal process whereby the developer contacts the authorities before handing in the formal application. This process has the advantage of getting an early indication of whether the project developer is likely to get the necessary permit consents. On the other hand, this can result in a rejection of the projects without a comprehensive decision-making process.

Figure 5: Reasons why non-finalised projects were put 'on hold'

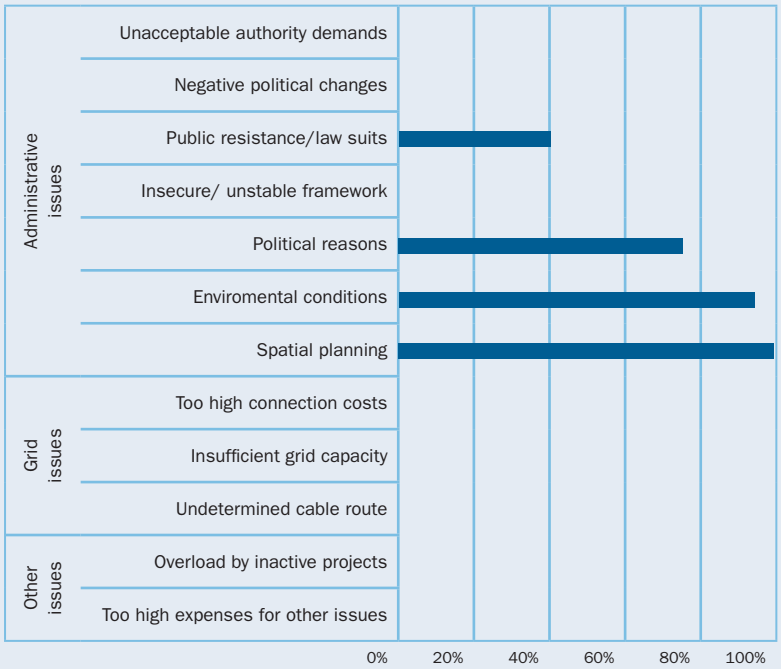
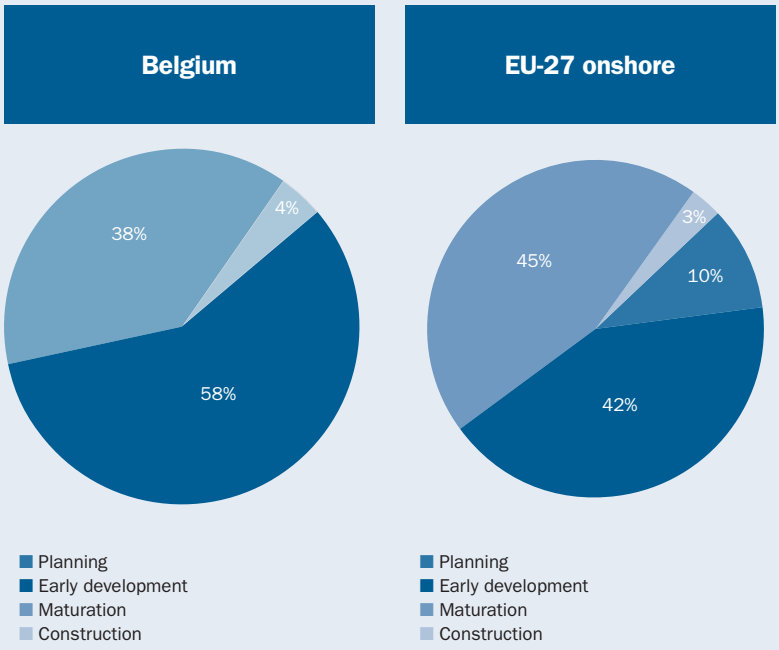


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection - strengths

The Belgian average grid connection time in 2008 was 7.1 months. This is much lower than the EU average (25 months). The transparency level of the decision making process is above the EU average – 3.7 (out of 5) compared to the European average of 3.1.

Moreover, there are only a few other parties to be contacted for the grid permit. It should also be highlighted that none of the reported project delays were caused by grid issues.

Grid connection - challenges

Despite very good results related to the grid connection lead time, developers reported a lack of transparency in the definition and the respect of deadlines for the grid connection process. This issue was also raised as a serious problem by the national associations.

Another important issue concerns the absence of a master plan to manage the grid reinforcement.

The key challenge for Belgium lies in reducing grid connection costs. In 2008 the costs were fixed by the TSO. For a wind farm with a capacity of more than 25 MW, the national TSO was responsible for the permits, whereas for less than 25 MW, the local TSOs had to be contacted.

The grid connection costs vary between the TSOs (from €90,000/km to €800,000/km). The local level monopoly does not provide incentives for System Operators to make efforts to deliver an authorisation in time. The situation becomes even more complicated when the wind park is to be connected to two networks, as two system operators need to be contacted.

Bulgaria

Annual wind installation in 2008:	**101 MW**
Cumulative wind installation in 2008:	**158 MW**
Penetration level in 2008 in %:	**0.9%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 17 MW**

Central and southeastern European countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

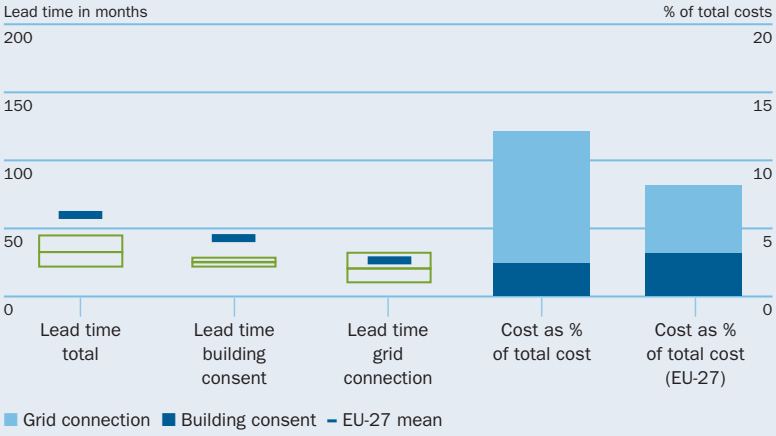
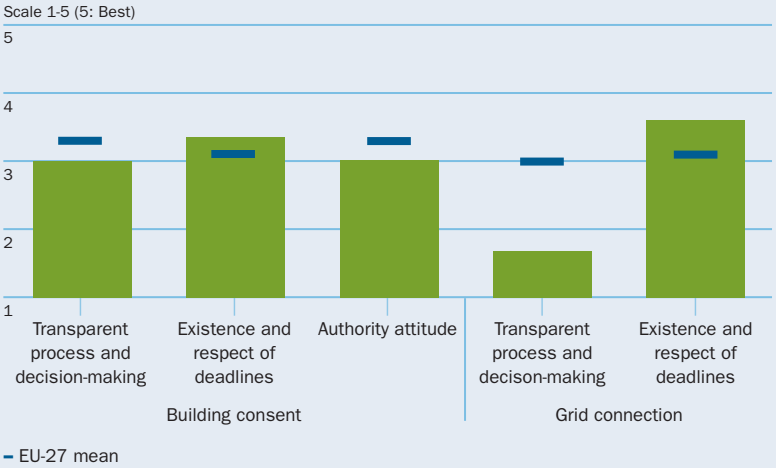


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Provide developers with clear rules on the Environmental Impact Assessment (EIA).
- Implement spatial planning defining the most suitable areas for wind development.
- Improve the transparency of the decision-making process for obtaining the building consent.

Recommendations for the grid connection procedures

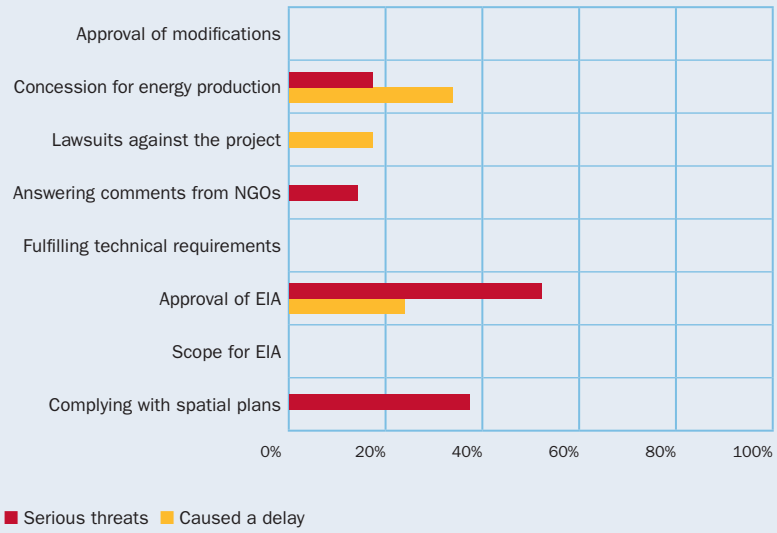
- A realistic plan for the construction and extension of the grid is required from the Transmission System Operators (TSOs) and Distributions System Operators (DSOs).
- Clarify the grid connection requirements, in order to avoid situations where a project cannot be connected to the grid due to too many requests.
- A centralised decision-making process (one-stop-shop) could allow a greater and smoother integration of wind power.
- Introduce a system of bank guarantees which could discourage speculation.
- Transmission and distribution system operators should commit to completing grid upgrades as scheduled.
- Greater coordination between the TSOs and DSOs is required to facilitate the exchange of information on grid connection requests and requirements.
- Clarify the procedures regarding cost sharing of the grid reinforcement investments, especially for those lines which are going to be used by the grid operators.
- Avoid discriminating against those developers not directly linked to electrical companies through ownership unbundling between electricity generation, transport and distribution.
- Develop clear and realistic grid codes for the connection and operation of the wind farms.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

Figure 4: Obstacles to wind farm development

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Building consent - strengths

According to the survey Bulgaria has relatively short lead times compared to the EU average.

The level of wind power installation in Bulgaria in 2008 is relatively high for an emerging market. Together with the short lead times, this could indicate an efficient administrative procedure.

The costs associated with obtaining the building consent (2.5%) are lower than the EU average, which is 2.9% of the total cost.

However, due to a reduced number of replies and a limited market development, these findings should be verified with a larger sample.

Building consent - challenges

The decision-making process is not transparent. This is a main barrier to attracting new developers to Bulgaria.

The projects in Bulgaria and the three other countries are very often blocked at a late stage of the process, i.e. at the maturation or construction phases. This indicates a financial risk for developers.

Delays are mostly caused by unclear rules for the EIA and its scope and the lack of clear spatial plans.

The need for a coherent and transparent administrative procedure has to be stressed to avoid a discriminatory treatment of projects and companies and unjustified delays.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Austria, Bulgaria, Hungary and Romania.

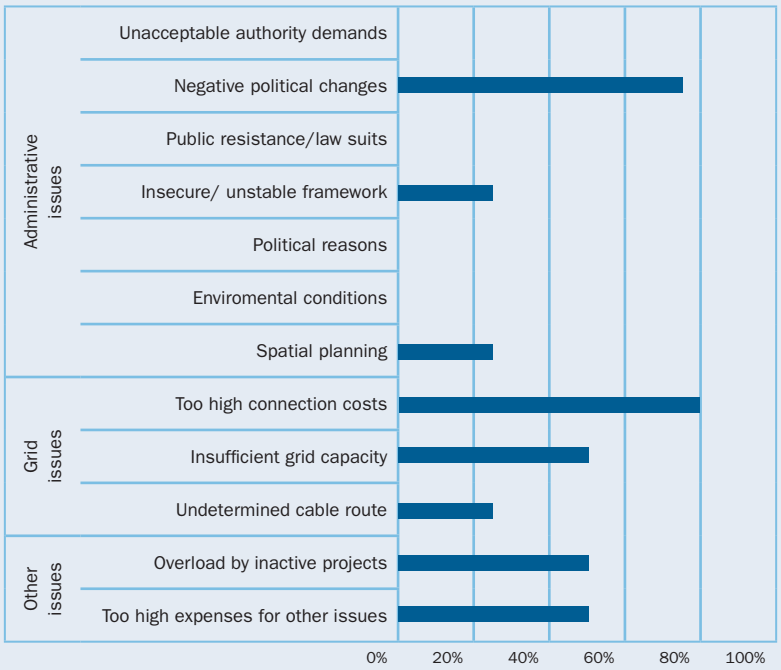
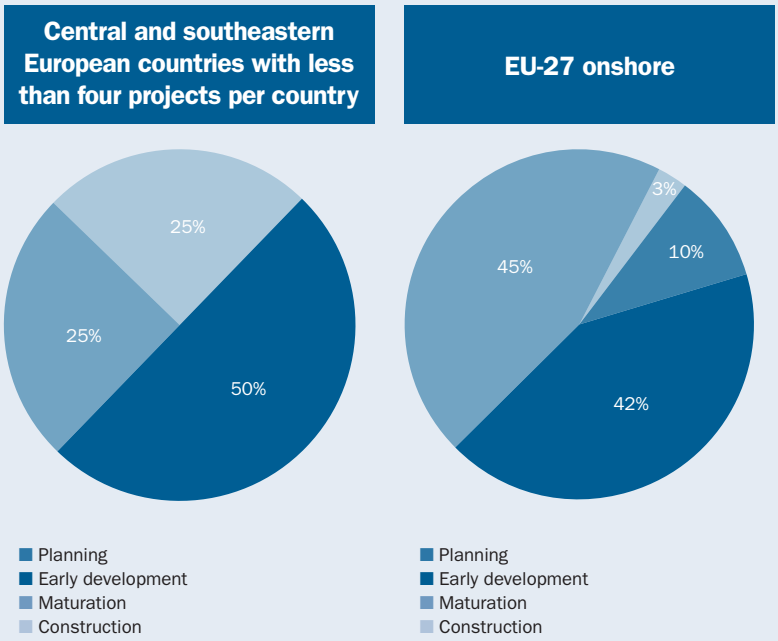


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Grid connection – strengths

The three distribution companies (DSO) - CEZ, EVN and EON - are obliged to provide grid connection for projects under 5 MW or to transfer the grid connection responsibility to the Bulgarian Transmission System Operator (TSO) (NEK AD), if their grid capacity is not sufficient to connect the wind farms.

The extensions and reinforcements of the grid should be paid by the owners of that grid. The existence of the Electricity System Operator (ESO) established on 4 January, 2007 as a subsidiary to the Bulgarian National Electrical Company NEK AD facilitates the exchange of information with the wind power producers and the settlement of the future grid codes.

Grid connection - challenges

The main challenge in Bulgaria is the number of demands for grid connection (over 11,000 MW in 2008) compared to the available capacity.

These requests were mostly addressed to the TSO (80%), and the rest to the DSOs (20%). Even if only 1,500 MW had a preliminary interconnection agreement, important investments are needed to extend the lines and reinforce the electrical nodes.

Furthermore, the distribution companies are requesting a greater level of coordination with NEK AD to be able to identify the requests and the wind projects which should be connected.

Clear and realistic grid codes should be developed, that can be fulfilled by wind project owners without jeopardising investments or affecting the wind farm operators (i.e. curtailments).

A procedure is required to share the investments in new lines and the reinforcement of the existing ones, as well as to allocate the fees related to their operation.

Czech Republic

Annual wind installation in 2008:	**34 MW**
Cumulative wind installation in 2008:	**150 MW**
Penetration level in 2008 in %:	**0.4%**
Type of market:	**Emerging market**
Respondents:	**Six projects – 36 MW**

Czech Republic

Figure 1: Lead times and costs

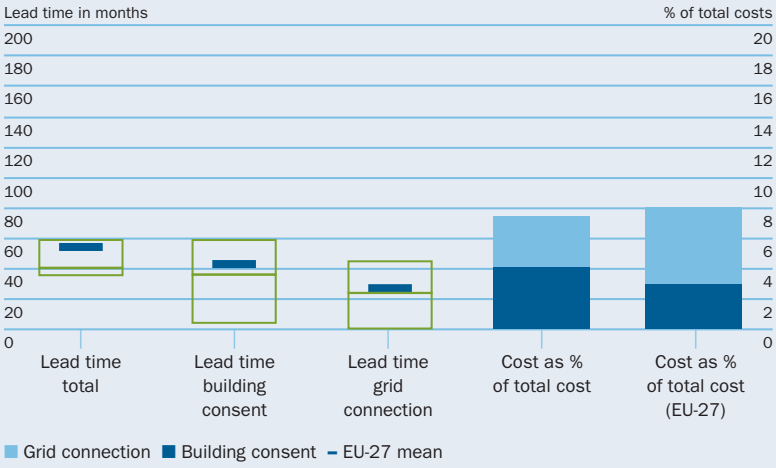
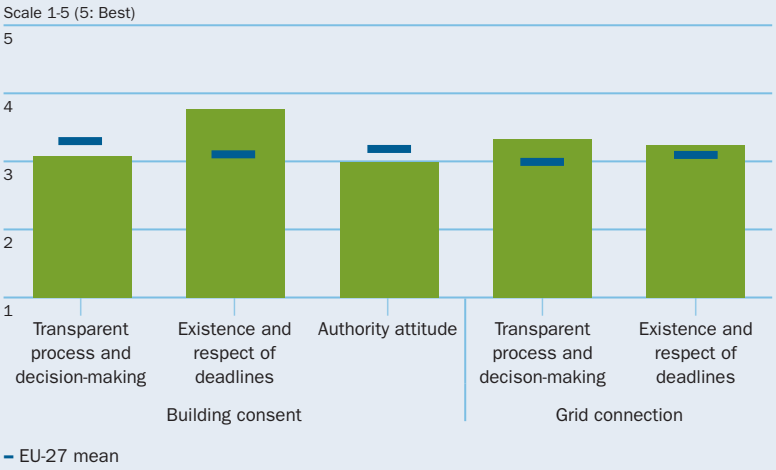


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency. Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

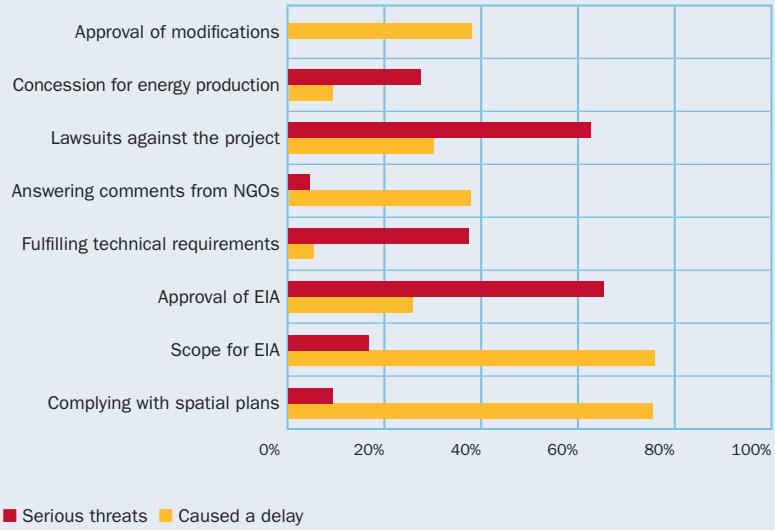
- Improve all relevant parties' knowledge of wind energy - developers, local residents, NGOs and authorities - in order to secure the authorisation process.
- Share experiences on the Environmental Impact Assessment procedures (EIA), on environmental studies, involvement of local authorities and communities in the decision-making process.
- Create comprehensive spatial plans designing the most suitable areas for wind power development.
- Provide clear rules and definitions for the EIA procedures and related technical requirements.
- Reduce the number of authorities to contact directly.
- Ensure there is a good level of coordination between the authorities involved.
- Maintain or improve the administrative timeline.

Requirements for grid connection procedures

- Maintain low costs for grid connection procedures including the connection of large wind farms.
- Maintain or improve the current level of transparency for grid connection procedures including the connection of large wind farms.
- Reduce the average grid connection lead time.
- Coordinate the administrative and grid access procedures in order to reduce total project lead times.
- Develop a master plan for grid reinforcement, taking into account the further development of renewable energies.

Figure 3: Stakeholders involved in the procedures

Figure 4: Obstacles to wind farm development



Building consent - strengths

The average project lead time for most projects was 40 months in 2008. This is below the EU average (54.8 months).

Thanks to well respected deadlines, the wind parks received their building and grid connection permits in a relatively short time. This is partly due to the fact that the vast majority of the projects developed in 2008 are small in terms of megawatts installed.

However, the relatively short lead time does not necessarily apply to wind farms of a larger size.

Building consent - challenges

The high costs of the administrative procedures are an issue for developers in this country. The average costs represent 4.1% of the total project costs, well above the EU average of 2.9%. The transparency level is lower than the EU average.

Too many authorities have to be contacted directly and indirectly (an average of 22.69 while the EU average is 18 (directly and indirectly). A lack of coordination between authorities was underlined by the different developers.

The Czech developers faced two main obstacles in getting the building consent: the scope and the approval of the EIA, and complying with spatial planning.

Projects are put 'on hold' mainly because of EIA requirements and spatial planning regulations, a low transparency level for the decision-making process, and a lack of knowledge of the elements required.

Most delays in getting the building consent are caused by social acceptance issues from the local communities.

Figure 5: Reasons why non-finalised projects were put 'on hold'

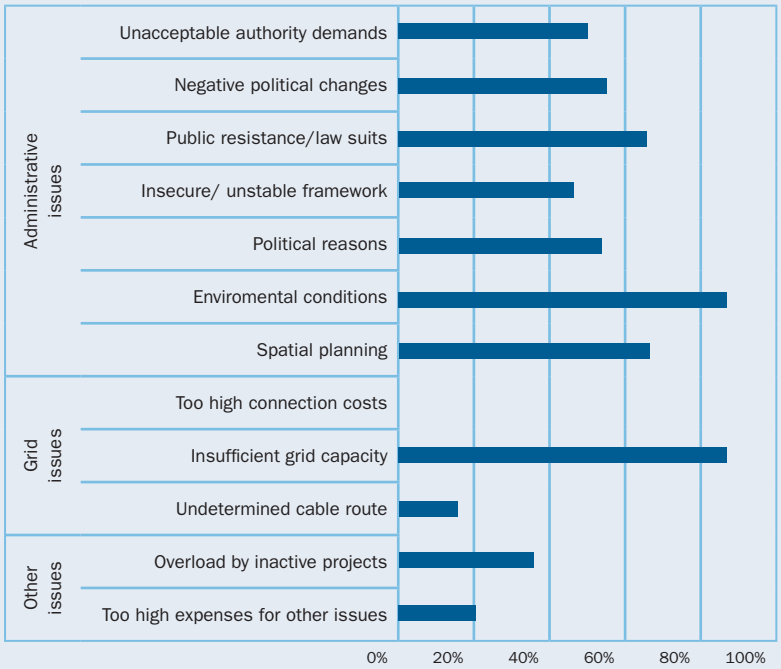
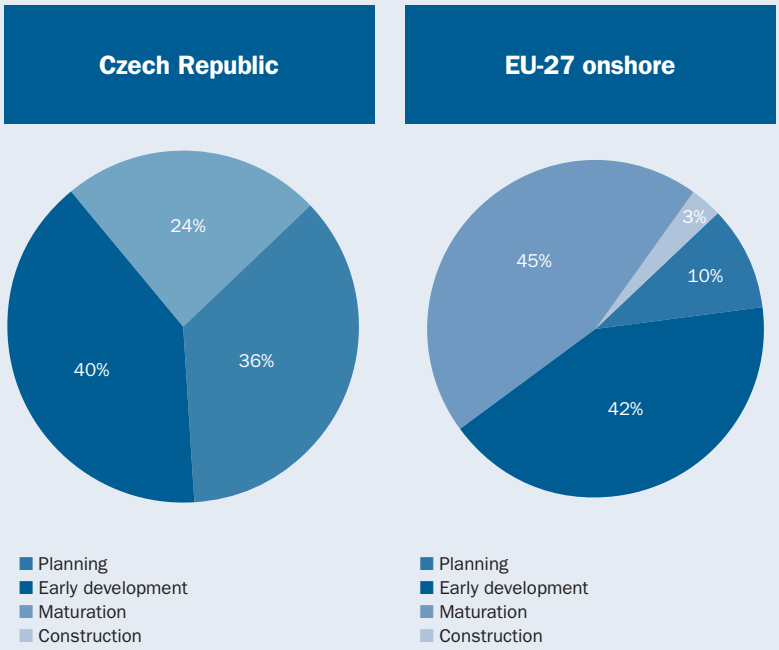


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection procedures - strengths

The grid connection costs are not a major issue. The average grid connection costs (2.9%) are lower than the EU average (5.13%).

A possible explanation for these low costs could be that connections are relatively cheap below 4 MW.

The decision-making process is almost as transparent as the EU average (3.03 in the country compared to the average of 3.14).

Grid connection procedures - challenges

The average grid connection time is similar to the EU average: 24.8 months versus 25.8.

Nevertheless, a lack of clarity concerning the procedures in the beginning of the project was reported by the developers.

Grid operation is one of the most important issues hindering the development of decentralised generation capacity. The grid capacity is one of the main factors responsible for projects that are being put 'on hold'.

Denmark

Annual wind installation in 2008:	**77 MW**
Cumulative wind installation in 2008:	**3,180 MW**
Penetration level in 2008 in %:	**20.3%**
Type of market:	**Developed market**
Respondents:	**12 projects – 72 MW**

Denmark

Figure 1: Lead times and costs

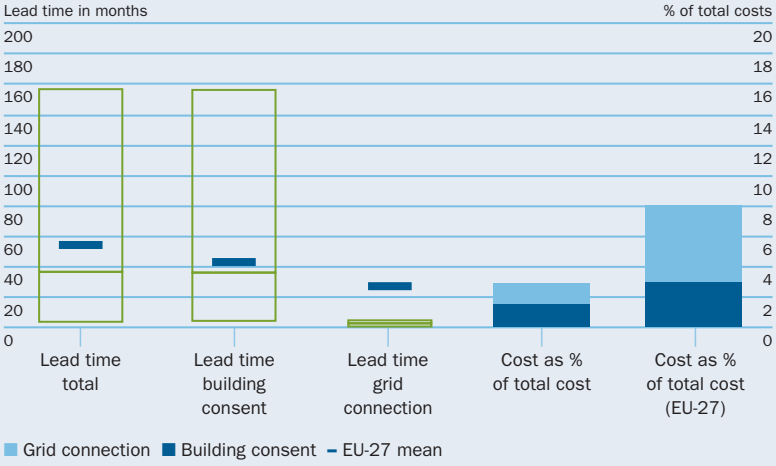
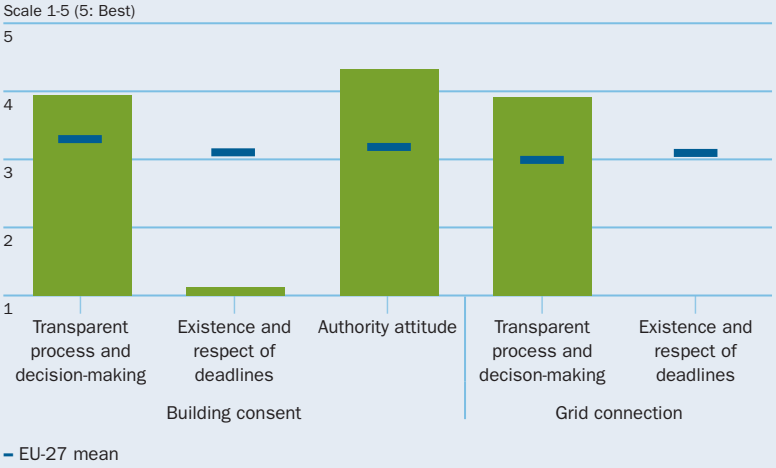


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency. Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for the administrative procedures

- Maintain the process for the building consent and enable possible complaint processes.
- Create comprehensive spatial plans in advance.
- Maintain and/or improve the low level of costs associated with obtaining the building consent.

Recommendations for the grid connection procedures

- Maintain and improve the current level of transparency and the authorities' supportive attitude.
- Maintain and/or improve the low level of costs associated with obtaining the grid connection permit.
- Ensure that the necessary grid extension is coordinated with the current and future deployment of wind power to avoid obstacles such as insufficient and/or grid congestions.

Building consent - strengths

It takes on average 34 months in Denmark to obtain the building permit, below the EU average of 42 months.

There are few stakeholders/authorities to be contacted in order to get the permit. In addition to this, the transparency level is amongst the best in EU-27.

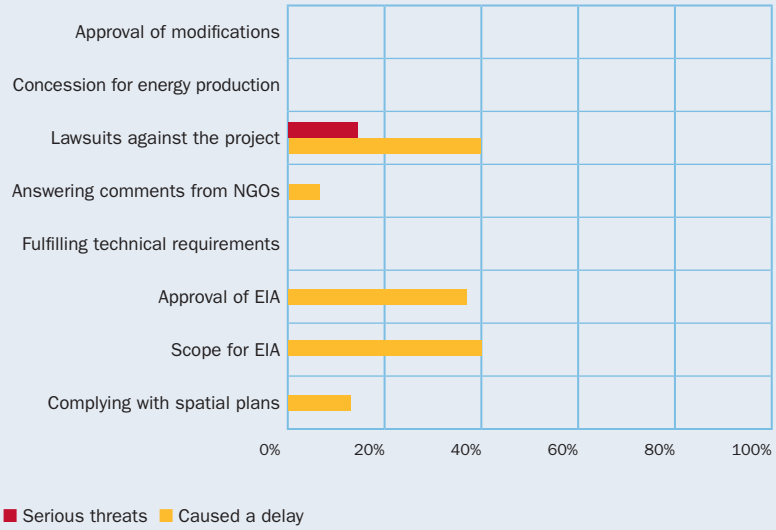
Globally, the surveyed projects indicate that the administrative process in Denmark functions well.

Building consent - challenges

There are hardly any deadlines fixed by law for the building consent approval. The lack of deadlines could be a reason for the sometimes very long lead times – at least for the building consent (Denmark is one of the countries with the longest lead times for the building consent).

Figure 3: Stakeholders involved in the procedures

Figure 4: Obstacles to wind farm development



In Denmark, in terms of building consent, the major obstacle are lawsuits against the project – nearly 14% of the wind farms had to go through a complaint procedure before being approved. This indicates that social acceptance issues can cause delays.

Another reason delays are caused is the lack of agreement on the scope of the Environmental Impact Assessment (EIA) and complying with the spatial planning requirements.

As regards projects that are put 'on hold', they face problems of planning issues, political reasons and public resistance. These three obstacles are given almost equal weight by developers.

Grid connection – strengths

Concerning the grid connection procedures, Denmark appears to have an efficient system, compared to other European countries.

Despite the absence of deadlines fixed by the authorities for the grid connection procedure, the lead time for getting a grid permit is the quickest in the EU, with an average of 2.1 months (EU average: 25.8 months).

The average connection costs (1.14% of total project costs compared to the EU average of 5.1%) in Denmark are the lowest in the EU. This can be explained by the fact that the grid reinforcement costs are covered by the Transmission and Distribution System Operators - TSO(s)/DSO(s).

The grid interlocutors are well defined (an average of 0.78 TSOs have to be contacted and 0.92 DSOs).

Figure 5: Reasons why non-finalised projects were put 'on hold'

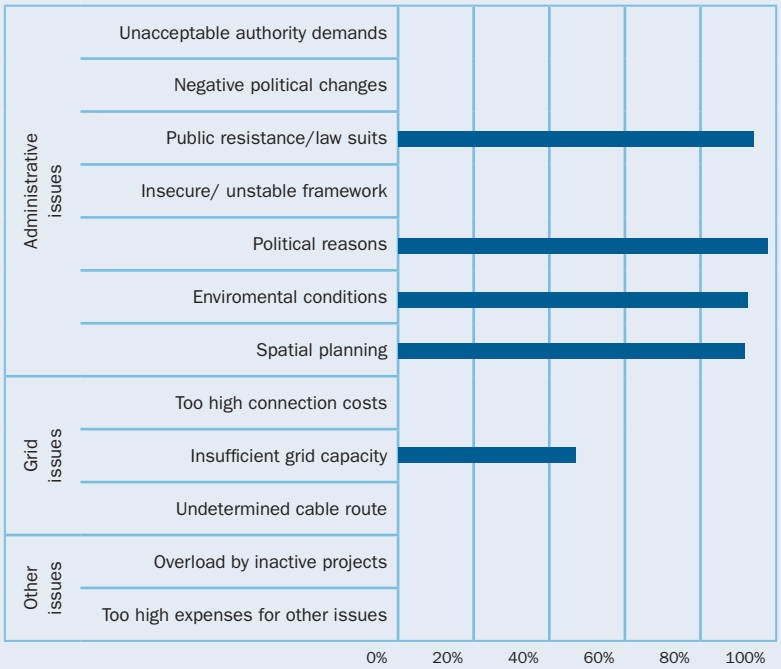
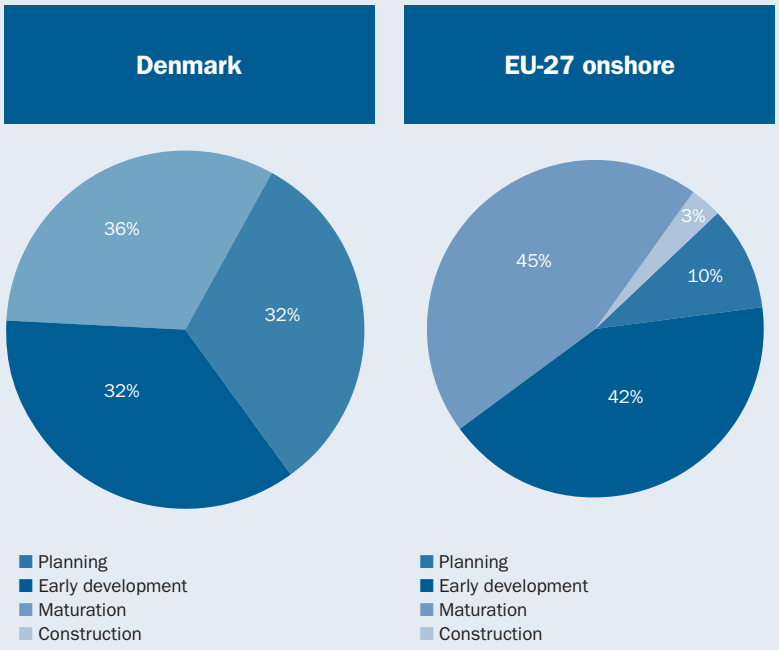


Figure 6: Phase in which non-finalised projects were put 'on hold'



The part of the grid permitting process related to rules and costs is judged as being transparent by the developers; though a bit higher than the EU average, at 3.6 compared to 3.2 in the EU.

There are normally only a few other parties involved in the grid connection process (0.13 on average). One reason for this is that the TSOs/DSOs are responsible for obtaining the building consent for the grid connection.

The cooperation between the TSO/DSO and the developer seems to be very efficient and transparent even without formal legal deadlines.

Grid connection – challenges

In general the grid and the TSOs/DSOs were able to integrate the newly installed turbines in 2008, but problems related to grid capacity were reported in this survey.

Equal numbers of projects are put 'on hold' in the early development, planning and maturation phases.

The main obstacles faced by projects 'on hold' are related to the administrative processes; the issue of insufficient grid capacity is mentioned in almost 50% of cases.

As regards the transparency of the grid permitting process, the results show an average which is exactly the same as the EU -27, 3.14%, which indicates a smooth process, in line with the very short grid lead time of 2.1 months.

Estonia

Annual wind installation in 2008:	**20 MW**
Cumulative wind installation in 2008:	**78 MW**
Penetration level in 2008 in %:	**1.8%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 57 MW**

Baltic and nordic countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

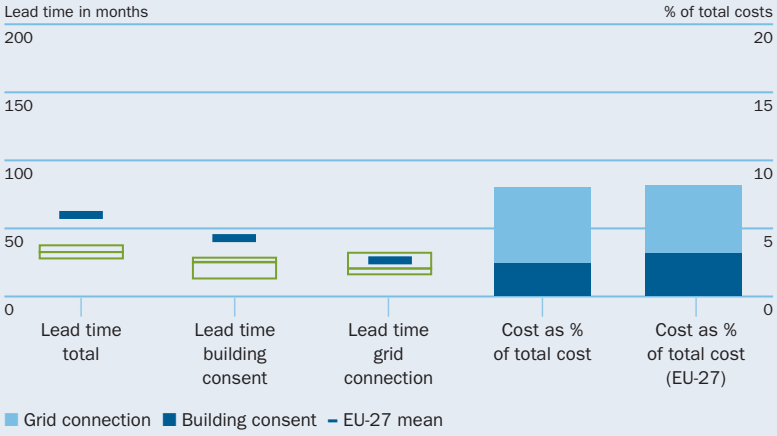
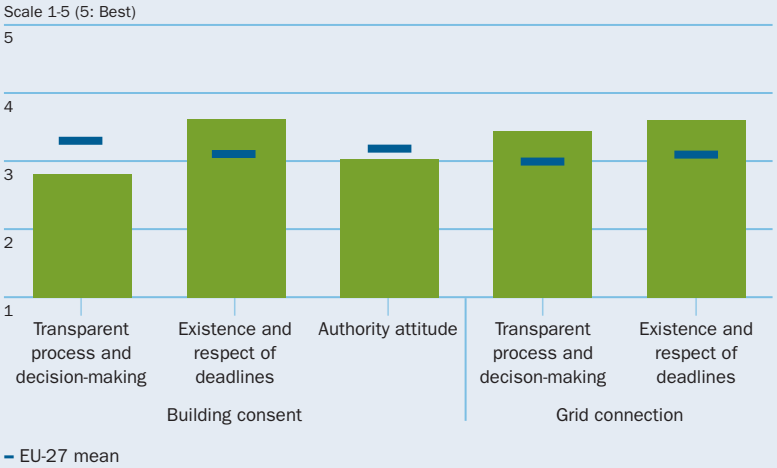


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Provide clear requirements regarding the scope of the Environmental Impact Assessments (EIAs).
- Create comprehensive spatial plans defining the most appropriate areas for the development of wind farms in order to encourage wind power developers onto the Estonian market.
- Improve the level of transparency of the decision-making process.
- Maintain and improve the generally short lead times.
- Ensure coordination between authorities at all levels.
- Ensure access to documents regarding the decision-making process.
- Maintain and/or improve the current level of costs and try to homogenise them in order to avoid small projects being blocked.

Recommendations for grid connection procedures

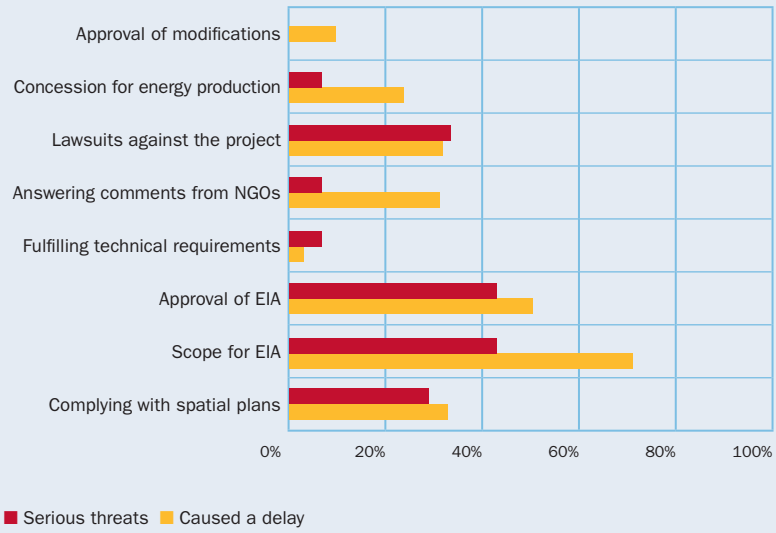
- Reduce lead times for the grid connection process.
- Create a master plan for grid reinforcement that takes into account the level of wind energy penetration.
- Create a centralised control centre for renewable energies to smoothen their integration into the energy market.
- Make it possible to carry out joint studies by Transmission System Operators and the other stakeholders of the wind power sector in order to improve general knowledge of wind energy.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

Figure 4: Obstacles to wind farm development

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Building consent - strengths

Estonia has a low lead time for the building consent (24.35 months), as well as a low total lead time (44.92 months).

The administrative framework for the approval of the building consent seems to be relatively efficient, according to the results of this survey

Deadlines seem to be well defined and met accordingly.

Building consent - challenges

Despite the good average for the administrative lead time, developers have faced obstacles which delayed their projects: the scope and the approval of the EIAs, addressing concerns of NGOs, complying with spatial planning, etc. (see Figure 4).

The average high number of indirect authorities involved (15) proves that the approval of the building consents is not so well coordinated and needs to go through several stages.

In terms of the transparency of the administrative decision-making process, the average is 3.92 (slightly higher than the EU average), while for the authorities' attitude the average number is 3 (slightly lower than the EU average of 3.36).

Projects are often blocked due to Environmental Impact Assessments, their scope and approval, and the lack of spatial planning. They are also often blocked early in the process, which means there is a lower financial risk for developers.

Despite the relative short lead times, wind energy is developing slowly in Estonia. This is most probably due to barriers that were not analysed in this project, such as low and/or unstable remuneration for wind power investments and the lack of political support.

Figure 5: Reasons why non-finalised projects were put 'on hold'

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

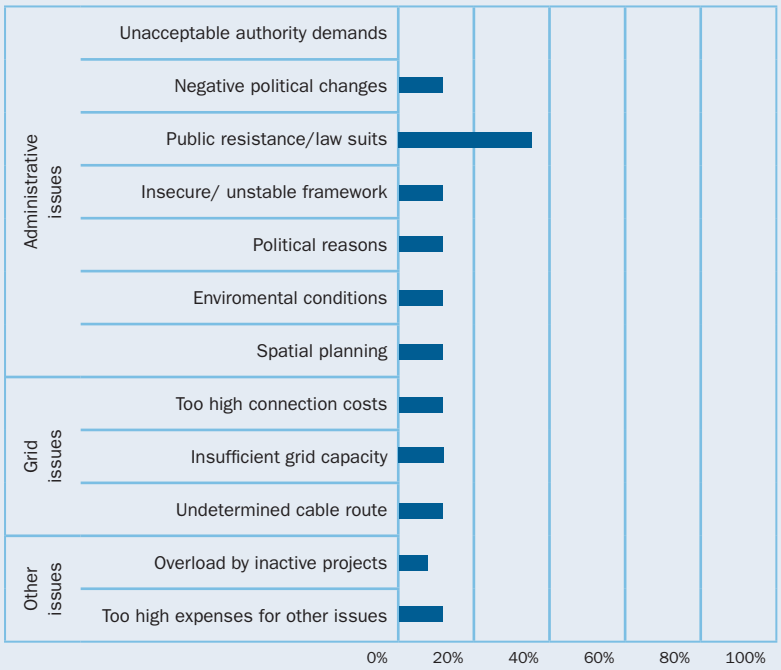
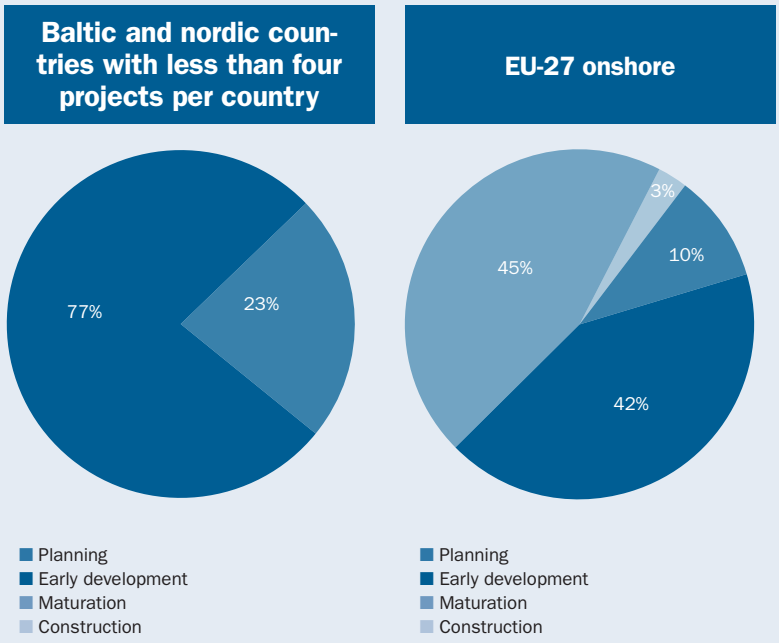


Figure 6: Phase in which non-finalised projects were put 'on hold'

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Grid connection - strengths

The two positive aspects of the grid procedure shown by the WindBarriers survey are:

- The transparency of the decision-making process and the deadlines.
- The share of the costs for the grid connection permit (4.9%), which is similar to the EU-27 average (5.1%).

The transparency of the process seems to be good, but the problem lies in the number of grid connection applications to the TSO and the lack of capacity; currently there are 4,000 megawatts (MW) of wind projects in the pipeline.

Grid connection - challenges

In Estonia, the key challenge is the lead time for grid connection (44.9 months), which is higher than the EU average (25.8 months) and, most importantly, almost equal to the total lead time in this country. This shows that the grid connection procedure is a real barrier which slows down the entire process.

The grid capacity, grid connection costs, and the route for cables are the main reasons for projects to be blocked.

An important recommendation is to build a control centre for renewable energies in order to improve the integration of renewable energies into the Estonian power market.

Finland

Annual wind installation in 2008:	**33 MW**
Cumulative wind installation in 2008:	**143 MW**
Penetration level in 2008 in %:	**0.4%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 16 MW**

Baltic and nordic countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

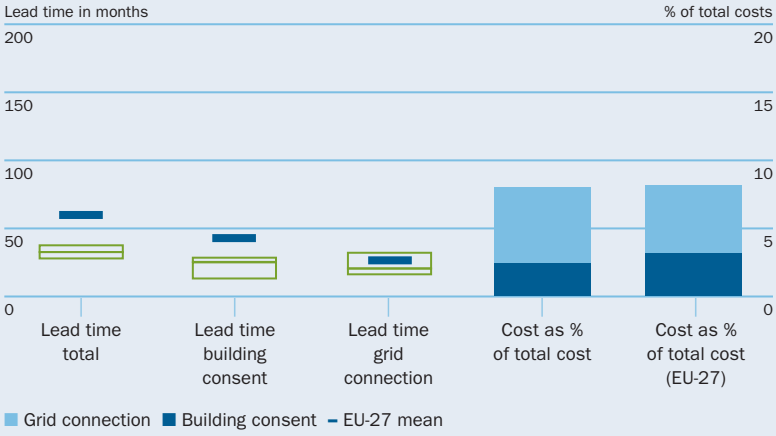
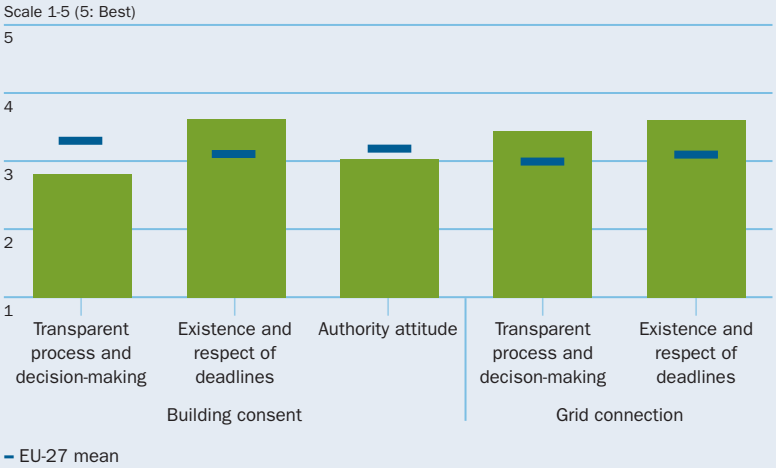


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Create more precise rules regarding the scope of the Environmental Impact Assessments (EIAs).
- Create comprehensive spatial plans clearly describing the most appropriate areas for developing wind parks to make it easier for developers to enter the wind power market.
- Maintain and improve the current lead times.
- Ensure good coordination between authorities at all levels.
- Ensure developers have access to documents regarding the decision-making process of a wind farm application.

Recommendations for grid connection procedures

- Maintain the current grid connection lead time for future larger projects.
- Provide clear cost evaluation and calculations.
- Develop a master plan for grid reinforcements.
- Allow the relevant Transmission and Distribution System Operators (TSOs/DSOs) to be easily identified as the right contact points and implement the "one-stop-shop" approach for the grid connection authorisation procedure.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

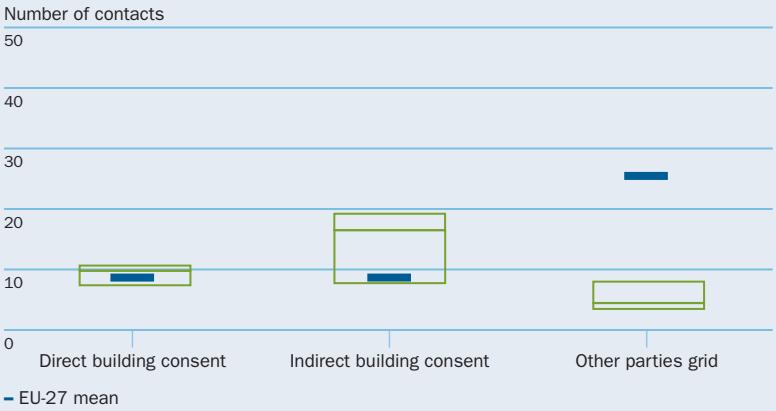
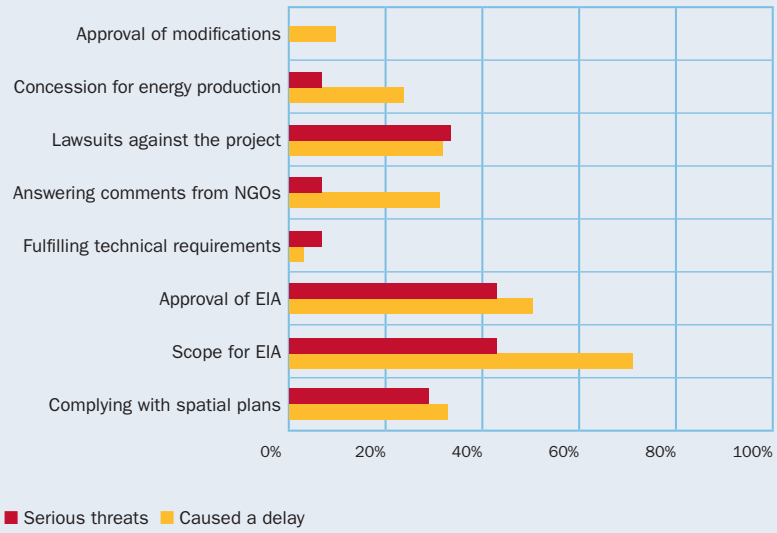


Figure 4: Obstacles to wind farm development

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Building consent – strengths

According to the survey Finland has a low lead time compared to the EU average for both the total lead time (17 months for Finland versus 54.8 months for the EU) and the building consent (8.25 versus 42.8 months). Nevertheless, the low wind power penetration level in 2008, the low number of projects installed in 2008 and the small size of those projects does not allow any generalised conclusions to be drawn. A larger sample would be needed.

The administrative framework for the approval of the building consent seems to be rather efficient. In addition, there are well defined and respected deadlines for both processes.

Building consent - challenges

Developers have experienced widespread obstacles which caused delays to their wind projects.

According to the WindBarriers survey, Finland has a high average number of indirect authorities involved (25 versus an average of nine in the EU), which means that the approval of the building consent application goes through many authorities in an efficient manner.

The transparency of the decision making process and the authorities' attitude concerning the building permits are at a good level, lower than the EU average.

The reasons for projects to be put 'on hold' are widespread, but none of the reasons recur too often except for public resistance/ law suits (40%). The projects seem to be blocked early in the process, which indicates a low financial risk.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

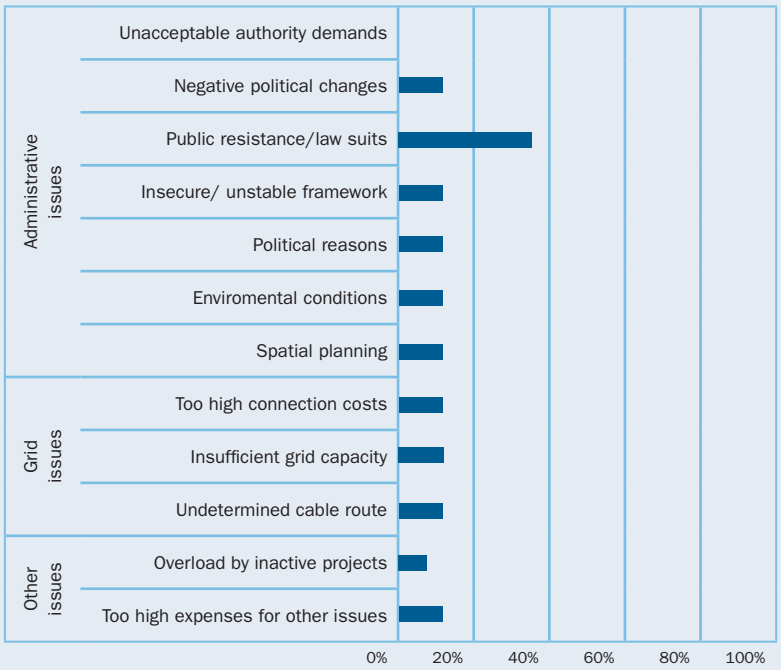
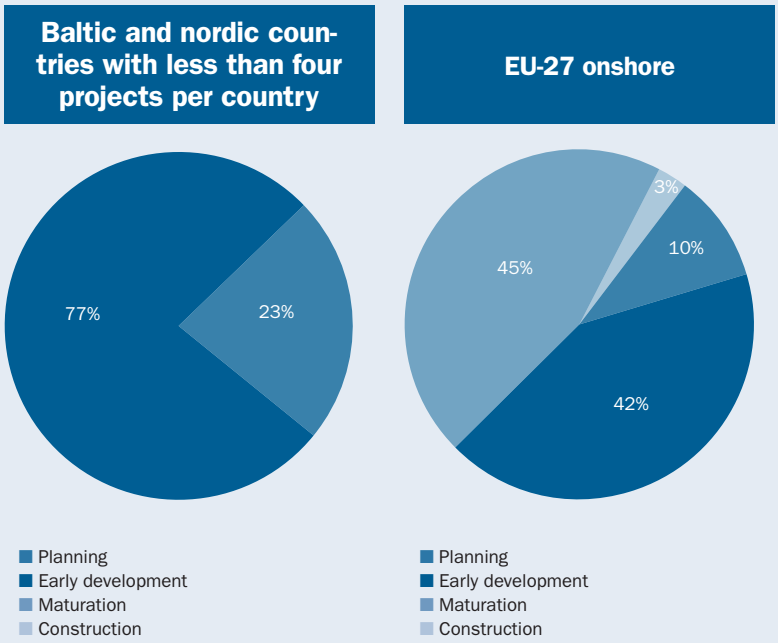


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Despite the relative short lead time, wind energy is still developing very slowly in Finland. The reasons for this slow development could be due to barriers other than the ones analysed by this project, such as support mechanisms, financial incentives for developers, etc.

Grid connection - strengths

In Finland, the grid connection lead time (six months) and costs (2.5% of total project costs) are amongst the lowest in the EU; these findings show that the system is efficient.

Nevertheless, the analysis of the perceived barriers indicated there is a problem with high costs that could be responsible for "paralysing" small projects. These costs are related to grid reinforcement.

The results of the survey show that there are few other parties - less than 10 - involved in the grid connection process.

Grid connection - challenges

The lack of transparency of the grid connection procedure has been pointed out as a bottleneck, in particular with regards to the reinforcement costs.

Finland has the highest number of contacts for TSOs/DSOs, respectively four and 2.5. This situation shows the difficulty of finding the right interlocutor.

France

Annual wind installation in 2008:	**950 MW**
Cumulative wind installation in 2008:	**3,404 MW**
Penetration level in 2008 in %:	**1.6%**
Type of market:	**Growth market**
Respondents:	**10 projects – 207 MW**

France

Figure 1: Lead times and costs

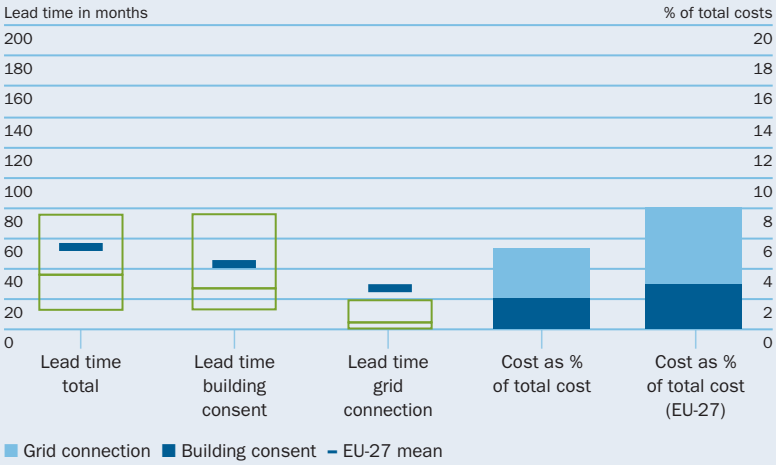
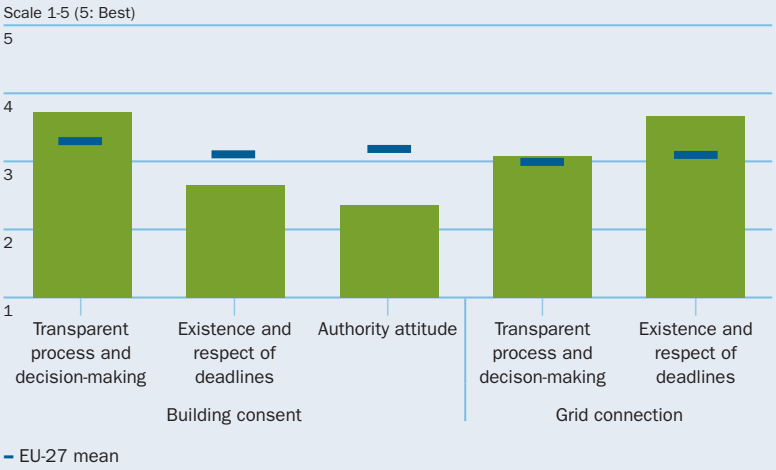


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Create comprehensive spatial plans in advance, rather than imposing regulatory frameworks, such as Wind Energy Development Zones (ZDE) and IPCE.
- Ensure the ZDEs are approved quickly.
- Improve the approach towards wind power by sharing knowledge of the decision-making process between the authorities and local politicians.
- Improve the involvement of the local community and the NGOs in the approval process.
- Reduce the number of authorities to be contacted directly by the developer.
- Maintain and/or improve the low level of costs associated with obtaining the building consent.

Recommendations for the grid connection barriers

- Maintain and/or improve the low level of costs associated with obtaining the grid connection.
- Reduce the percentage of projects which are put 'on hold' in the maturation phase.
- Increase the involvement of Transmission and Distribution System Operators (TSOs/DSOs) in order to benefit from their experience in establishing connection lines.

Figure 3: Stakeholders involved in the procedures

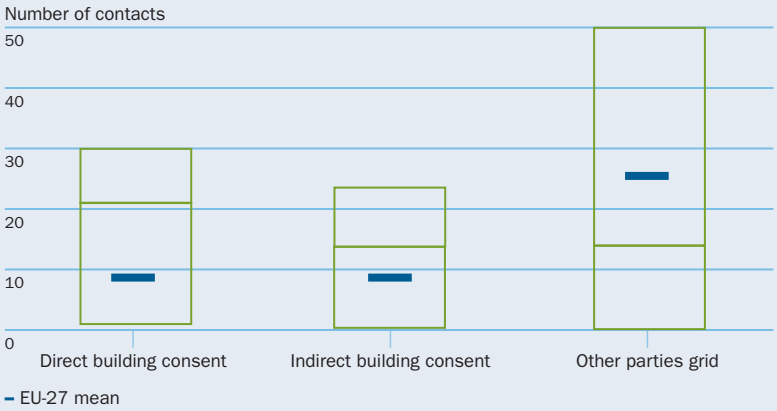
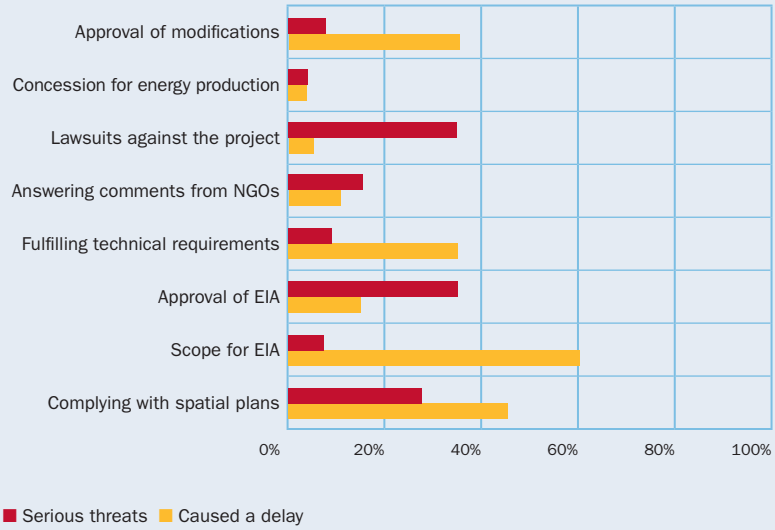


Figure 4: Obstacles to wind farm development



Building consent - strengths

The total lead time in France is 34 months on average, which places France in the top five for EU-27 countries. The project lead time is situated below the EU average (29.5 months compared to 42 months).

The costs for obtaining the building consent are at 1.9%, below the EU average (2.9%).

Building consent - challenges

Onshore developers have to contact more direct authorities than the EU average (22.06 in France versus nine in the EU). The number of authorities involved indirectly is also higher than the EU average (14.22 versus nine in the EU). Generally, the authorities' attitude is negative, and deadlines are poorly defined and respected during the building consent process.

Lawsuits, Environmental Impact Assessments (EIAs) and compliance with spatial planning are the main barriers to the deployment of onshore wind farms in France. 36% of the projects surveyed are delayed due to modifications once the building consent is approved.

The projects are primarily put 'on hold' due to obstacles which concern environmental requirements, spatial planning and political environment. More than 20% of the projects were blocked due to unstable frameworks. The general framework should therefore be stabilised in order to improve the confidence of the developers, and reduce the risk for them.

Almost half of the projects were blocked during the maturation phase, after a considerable part of the work had taken place.

Figure 5: Reasons why non-finalised projects were put 'on hold'

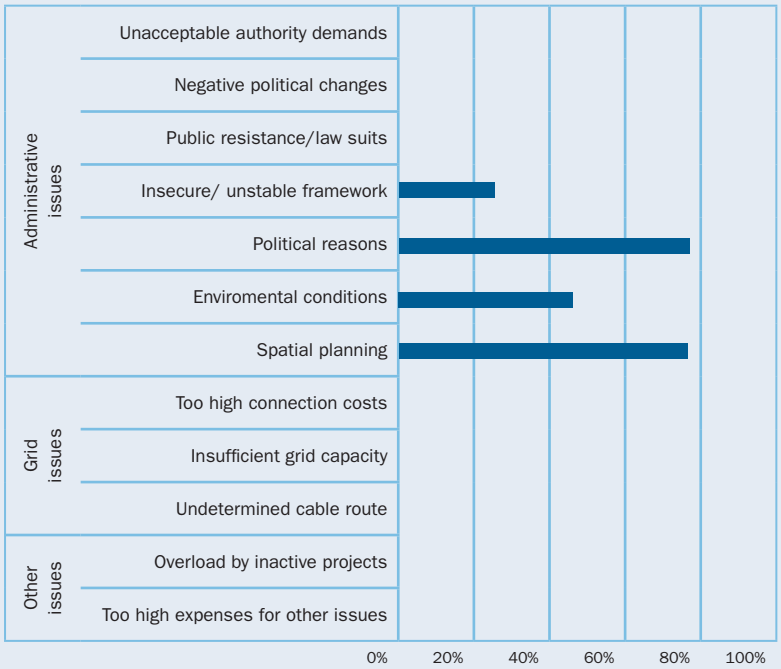
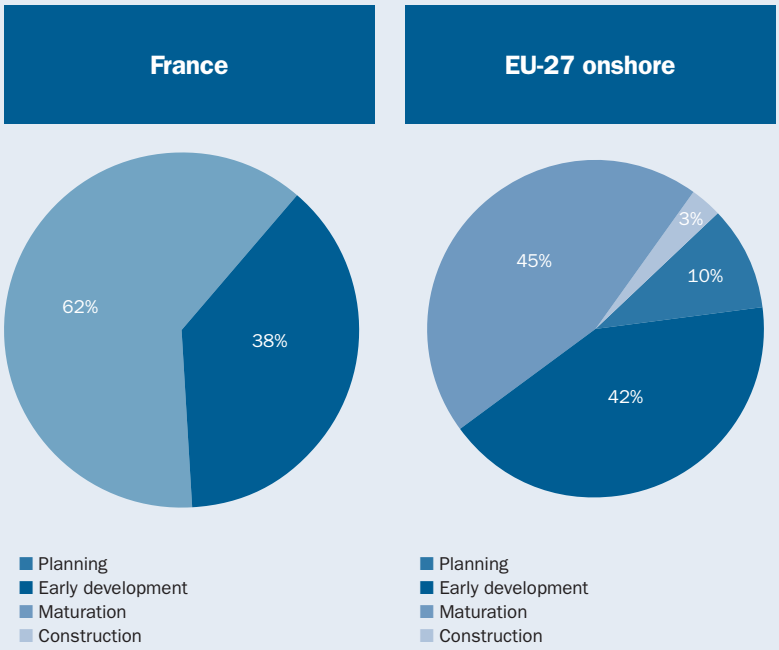


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection – strengths

The grid access lead time is satisfactory in France. A developer can obtain a connection in 6.4 months on average, compared to the EU average of 25.8 months.

The connection procedures are mostly carried out by the DSOs and in some cases by the TSOs. These are efficient and are considered as very transparent by the developers, especially regarding deadlines.

The grid access costs (3.5%) are lower than the EU average (5.13%). However, since 2008, a modification in the national law has obliged developers to pay for grid reinforcements during both the project extension step and the next phases.

Grid connection - challenges

There is a lack of forward planning in terms of grid extension. It is not often clear who is the right body to contact in order to get access to the grid, even though the process is seen as transparent. This is either due to the way the management responsibilities are divided geographically, or a lack of experience on the French market of some of the DSOs, who tell developers to contact other DSOs.

Regarding the other parties involved in the grid access procedure, it is worth noting that the French average (14.4, with an EU average of 23.9) is relatively good, but some outlying projects have much higher values (as much as 50). The role of the DSO/TSO could be strengthened in order to reduce the risk resulting from direct opposition from stakeholders to grid connection.

NB: The new proposed law "Grenelle 2" is likely to change the current situation in the near future.

Germany

Annual wind installation in 2008:	**1,665 MW**
Cumulative wind installation in 2008:	**23,903 MW**
Penetration level in 2008 in %:	**6.9%**
Type of market:	**Developed market**
Respondents:	**12 projects – 141 MW**

Germany

Figure 1: Lead times and costs

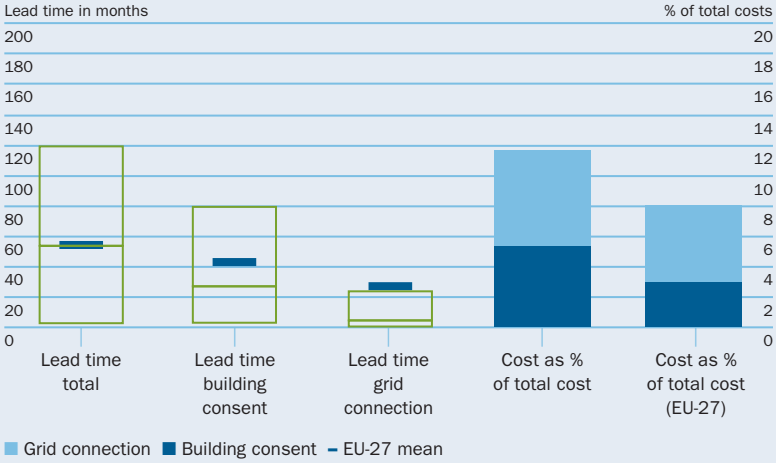
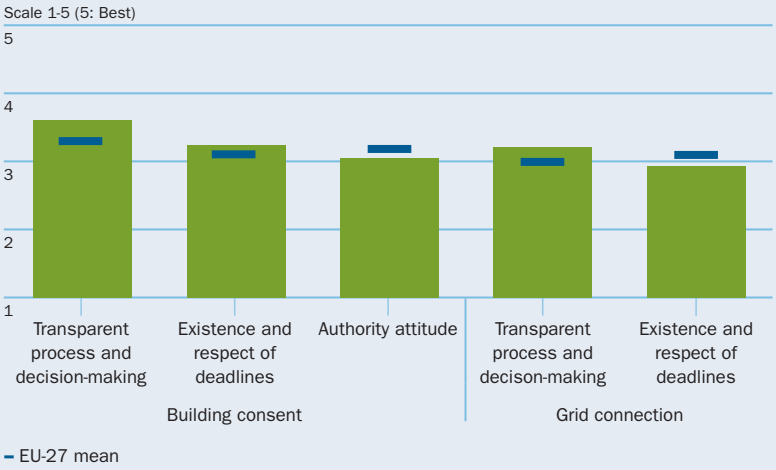


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Coordinate the administrative and grid connection processes.
- Ensure efficient collaboration between authorities.
- Increase the involvement of local communities and NGOs during the approval process.
- Give clear information on requirements and costs for technical issues and Environmental Impact Assessments (EIA).
- Set and keep deadlines for all processes.
- Create comprehensive spatial plans in advance.
- Improve the authorities' attitude towards wind power by sharing knowledge amongst authorities.

Recommendations for grid connection procedures

- Reduce connection costs, by creating simplified processes for smaller wind farms.
- Centralise land property management in order to avoid having to contact too many other parties.
- Enable the administrative and grid access procedures to run in parallel.
- Clarify the method used for selecting connection points.

Building consent – strengths

Germany has both the highest growth in 2008, as well as the highest installed capacity of all EU-27 countries.

The approval processes are slightly more transparent than the EU average. Although only a limited number of directly involved authorities have to be contacted, a high number of authorities are indirectly involved – on average 20.

Figure 3: Stakeholders involved in the procedures

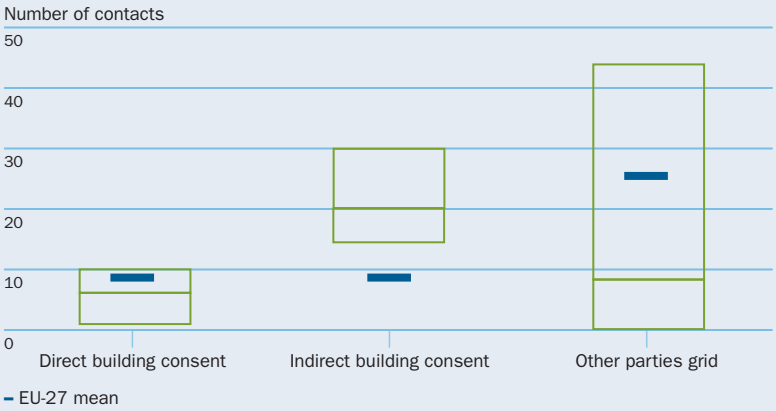
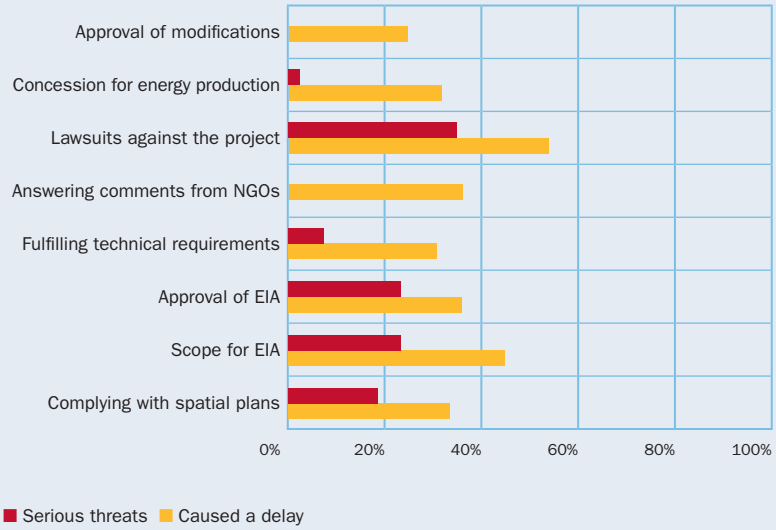


Figure 4: Obstacles to wind farm development



Building consent - challenges

The average total lead time in Germany is equal to the EU average of 55 months. However, lead times both for obtaining a building permit and for the grid connection authorisation are below the EU average. The grid connection lead time is amongst the shortest in the EU, at 6.6 months.

This indicates that there is an unintended "pause" between the building consent approval and the start of the grid connection process. It could also be because there are deadlines for the administrative process which are relatively well kept, but authorities can postpone them by asking for new documentation.

The costs associated with obtaining the consents and connection authorisations are substantially higher in Germany than in the rest of the EU-27.

The bottlenecks in Germany are the same as in the rest of the EU: EIAs, spatial planning, and law suits. There are no major reasons for delays.

The non-finalised projects get held up for various reasons. In Germany, developers face more challenges such as authority demands, political changes, and high connection costs than in the rest of the EU-27. Projects get put 'on hold' either in the analysis or the maturation phase; in the latter case this can be costly for the developer.

The reasons for delays, threats and putting projects on hold indicate that the framework for obtaining the necessary consents might be unstable, and this risk could partly explain the high cost associated with obtaining consents and connections.

Figure 5: Reasons why non-finalised projects were put 'on hold'

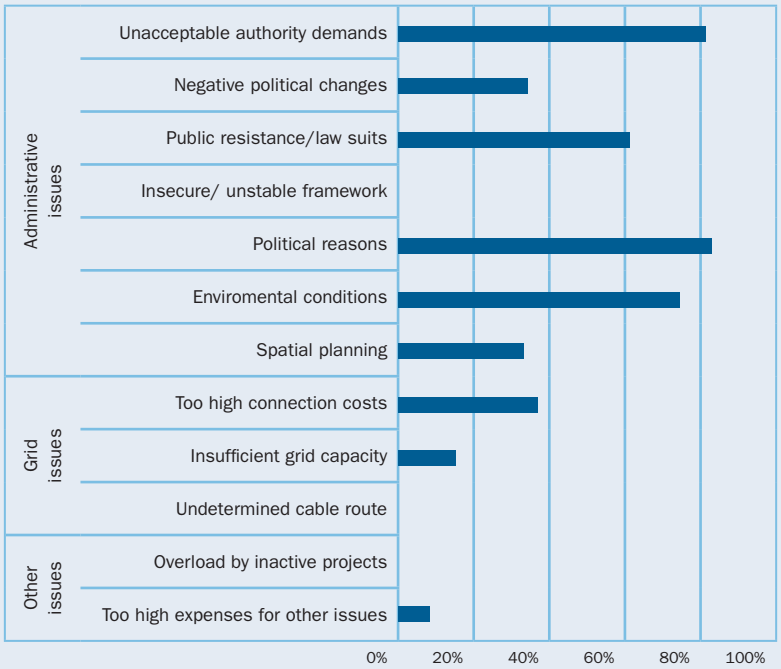
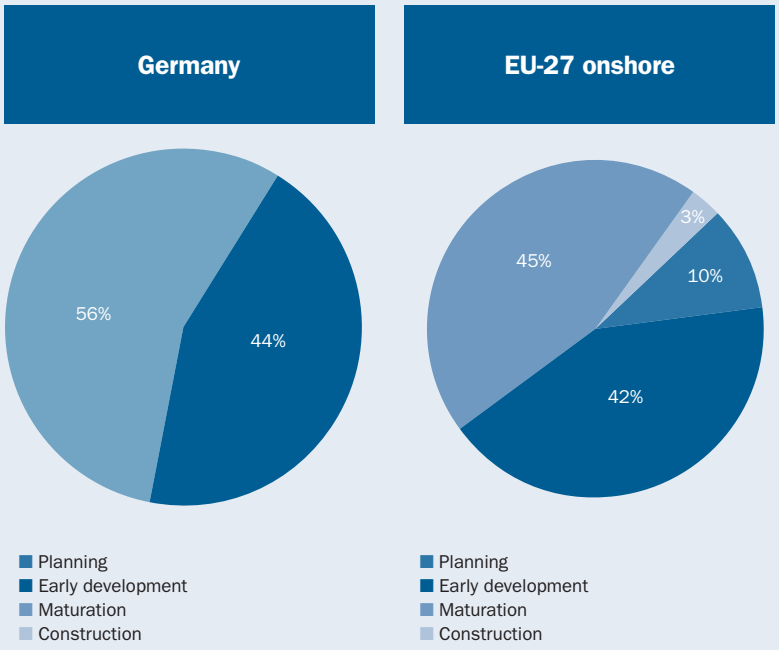


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection – strengths

The lead time for obtaining grid access authorisation is short in Germany (6.6 months), while dealing with probably the highest number of projects in EU.

The reasons why projects are put on hold are almost all related to administrative issues; the connection does not appear to be a problem.

It should be noted that the transparency of the decision-making process is relatively high, especially concerning costs and how they are shared between grid operator and wind farm developer.

System operators are obliged to prioritise renewables and to strengthen the grid for their development. Reports on the status of the grid and grid extensions are drawn up every two years.

Grid connection – challenges

Grid connection costs (6.5%) are higher than the EU average (5.1%). This can be explained by the need to comply with technical requirements that result in higher costs for equipment. This is a similar situation to other countries with a high penetration of wind power. The relative costs may also be higher in Germany due to the fact that projects tend to be smaller.

The survey reports a low average number of other parties involved in the connection process, but there are some exceptions with high values (up to 45 parties involved).

Finally, deadlines for grid connection seem to be unclear or less well respected than the administrative deadlines.

Greece

Annual wind installation in 2008:	**114 MW**
Cumulative wind installation in 2008:	**985 MW**
Penetration level in 2008 in %:	**3.7%**
Type of market:	**Growth market**
Respondents:	**Nine projects – 237 MW**

Greece

Figure 1: Lead times and costs

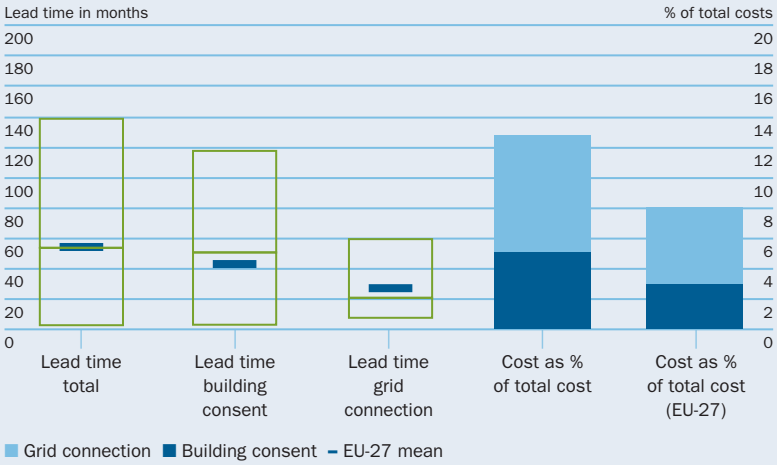
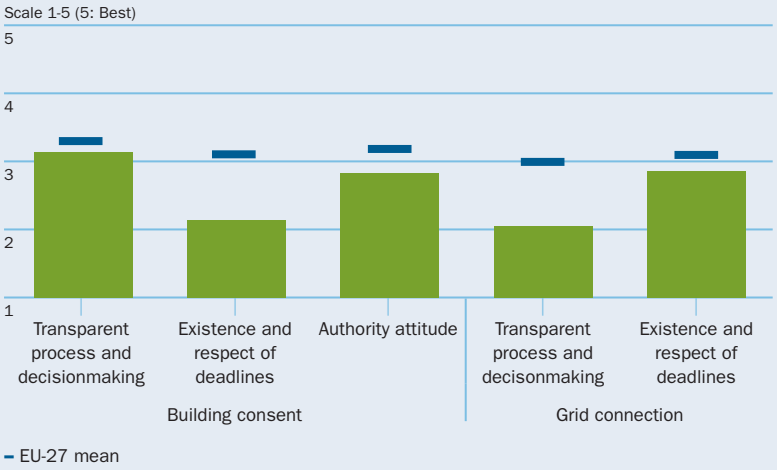


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Provide clear requirements regarding the scope and costs of the Environmental Impact Assessments (EIAs).
- Train and allocate enough staff to handle the number of applications.
- Increase the level of transparency and secure a stable legislative framework for renewables.
- Create and respect fixed deadlines.
- Provide clear rules for the spatial planning of wind farm projects.
- Improve attitudes towards wind power by sharing knowledge on the decision-making process and the information required between authorities and politicians.
- Ensure effective co-ordination between authorities at all levels.

Recommendations on grid connection procedures

- Reduce the average grid lead times.
- Reduce the costs for the grid permitting procedures.
- Develop a master plan for grid reinforcement including provisions for large scale infrastructure to support a high level of wind penetration.
- Increase communication and transparency during the connection process.
- Improve the mechanism for detecting critical issues that could block projects and, thus, reduce the percentage of projects that get blocked during the maturation phase.
- Reduce the average number of other parties involved in the grid connection process.

Building consent – strengths

No strengths can be defined from the survey results.

Figure 3: Stakeholders involved in the procedures

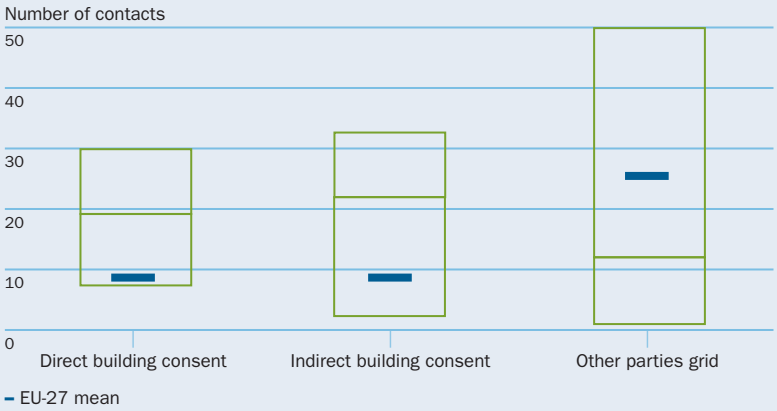
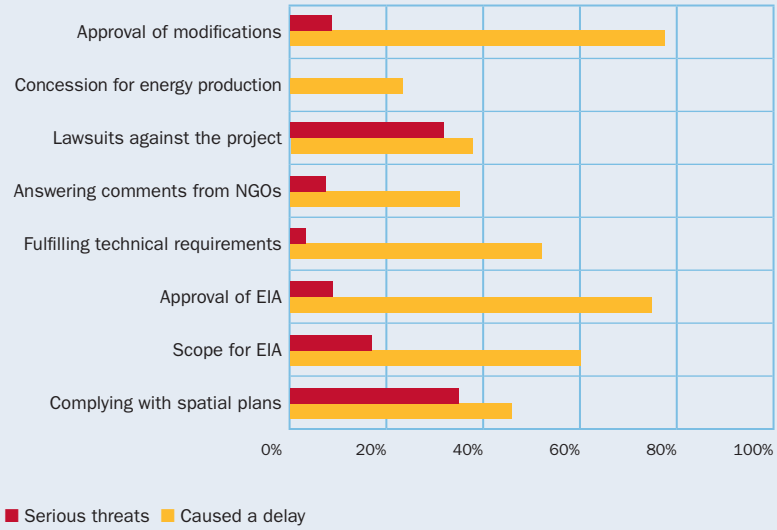


Figure 4: Obstacles to wind farm development



Building consent - challenges

The total lead time in Greece is equal to the EU average (54.6 months in Greece versus 54.8 as an EU average). The administrative lead time is part of the whole lead time, which is higher than the EU average (50.09 as opposed to 42 months).

The average costs are more than 50% higher in Greece than in the rest of the EU.

The widespread distribution of obstacles as shown by Figure 4 - EIAs (approval and scope), answering questions from NGOs, lawsuits, complying with spatial planning - explains why getting a building consent in Greece is expensive and difficult.

Another problem in Greece that holds back projects is the large pipeline of applications that are overloading the administration.

In Greece, authorities tend to ask for unnecessary documentation, while at the same time the legislative framework is unstable, leaving the developers with a higher risk. Finally, if projects are put 'on hold' it is mostly in the maturation phase, when a substantial part of the project preparation has already been carried out.

Developers in Greece have to contact many parties directly and indirectly to obtain the building consent – an average of 41.01 compared to 18 parties at EU level.

Another reason for the numerous bottlenecks is the negative approach of the authorities to wind power, as well as a low level of transparency, regarding both the building consent and, particularly, the grid connection processes.

Figure 5: Reasons why non-finalised projects were put 'on hold'

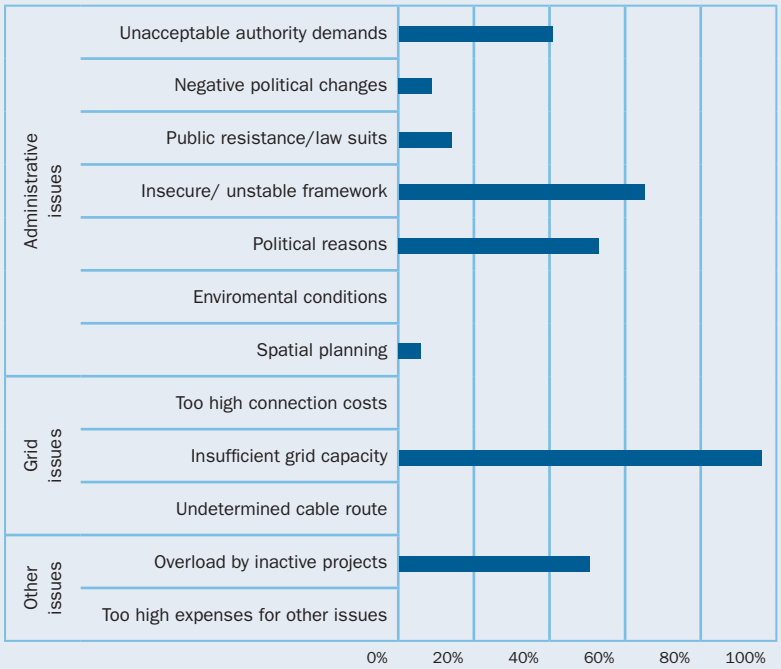
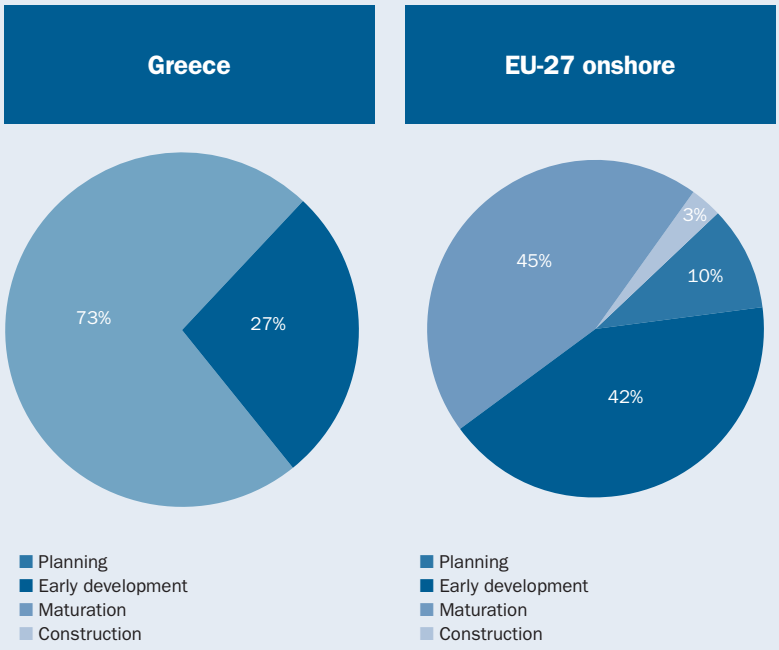


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection - strengths

No strengths can be defined from the results of this survey.

Grid connection - challenges

The projects put 'on hold' are mainly blocked by the insufficient grid capacity. The average lead time for obtaining grid access (20.2 months) seems high, but still below the EU average (25.8). However, some projects took up to 58 months to get the permit, which shows that in some parts of Greece the procedure is less efficient. The connection to the grid does not have such a significant impact on the overall lead time; the building consent lead time needs to go down first.

The lack of grid or relevant grid infrastructure will be a significant barrier to large scale wind penetration. The grid connection costs are amongst the highest of the sampled countries (8.2%) and could be explained by the poor grid infrastructure, especially in windy areas.

This insufficient grid capacity is also reported as being one of the main factors responsible for projects being put 'on hold' (mentioned by 96% of the developers). The fulfilment of technical requirements was underlined by 50% of developers as a reason for delays, and it pushes up costs as well. The developers' experience of contacts with the authorities pinpoints the lack of transparency and the definition and respect of deadlines as real issues during the decision process.

According to the WindBarriers survey, Greece is in last place of all the 22 countries replying to the questionnaire. As for almost all the countries in southern Europe, the number of other parties involved in the grid access process can be very high compared to the EU average (69 for Greece). The projects put 'on hold' are mainly blocked due to insufficient grid capacity.

Hungary

Annual wind installation in 2008:	**62 MW**
Cumulative wind installation in 2008:	**127 MW**
Penetration level in 2008 in %:	**0.6%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 118 MW**

Central and southeastern European countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

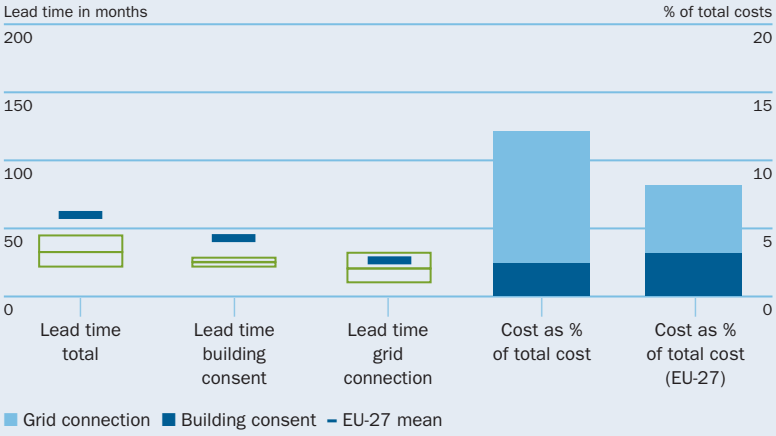
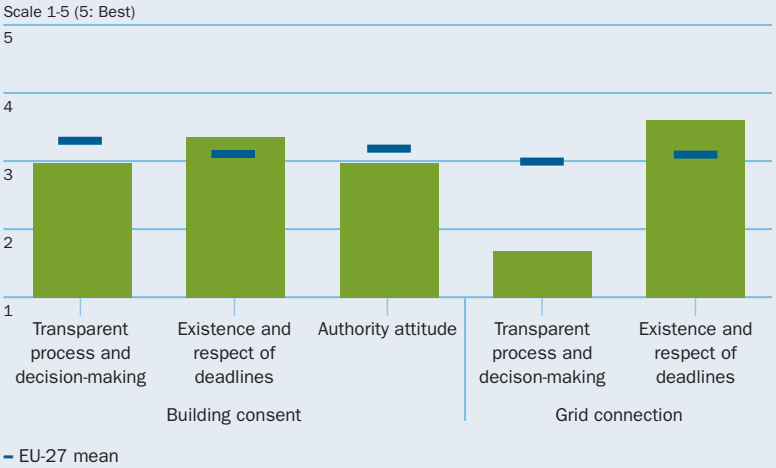


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures:

- Improve the clarity of the requirements for the Environmental Impact Assessment (EIA), particularly in terms of technical requirements and deadlines.
- Develop spatial planning, defining the areas for developing wind farms.
- Make the building consent application process more transparent.
- Maintain and improve the short lead time.

Recommendations for grid connection procedures

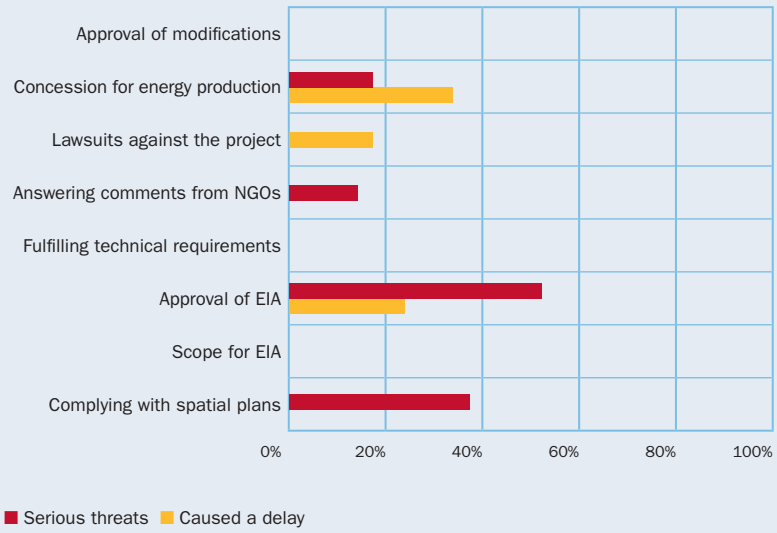
- Reduce the average grid connection lead time and improve respect for deadlines.
- Reduce the average grid connection costs by providing clear and objective rules for the tender and selection processes.
- Develop a master plan for grid reinforcement.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

Figure 4: Obstacles to wind farm development

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Building consent – strengths

Hungary has relatively short lead times compared to the EU average. The costs for obtaining the building consent are 2.5% of the total project costs, just below the EU average (2.9%). Nevertheless, given the small size of projects represented in the survey, these findings need to be verified with a larger sample.

Building consent - challenges

The decision-making process is non-transparent, which indicates that there are some obstacles to be overcome by developers in Hungary.

The projects in Hungary and the other three countries in this group are often blocked very late in the process – during the maturation or the construction phase. This indicates a financial risk for developers.

This group of countries faces different reasons for delays, particularly the approval of the EIA, complying with spatial plans and getting the concession for energy production.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Austria, Bulgaria, Hungary and Romania.

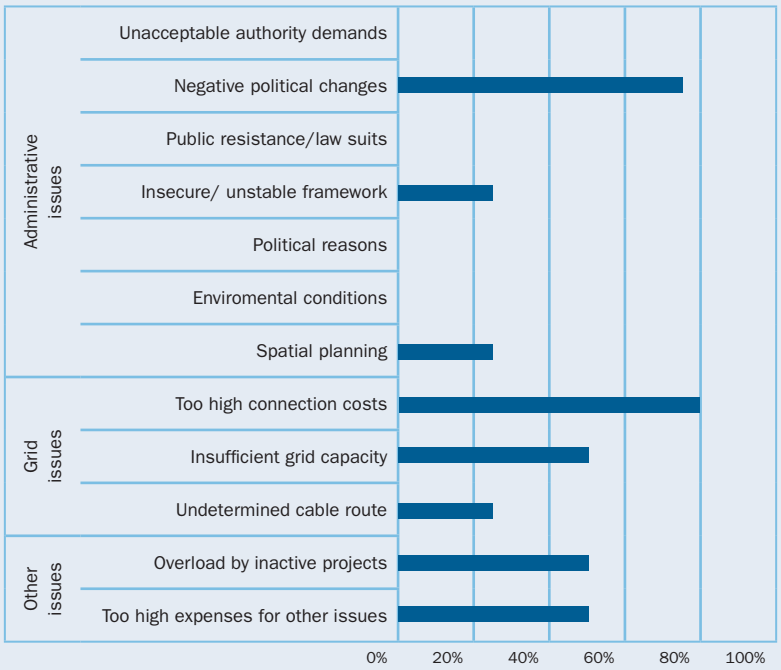
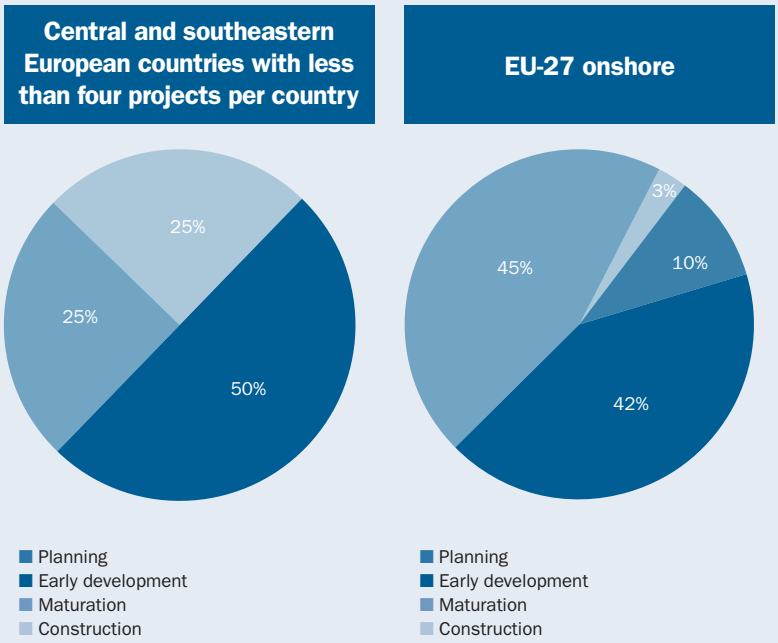


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Grid connection - strengths

The positive aspect of the Hungarian grid connection framework is the small number of other parties to be contacted for the grid connection.

Grid connection - challenges

The time frame for the average grid connection procedures is not well defined. The average grid connection lead time of 45 months and the lack of fixed deadlines - rated 2.4 out of 5 - are ranked amongst the worst-performing countries according to the survey.

The average total lead time shows that the process for getting the building permits is highly critical. The costs for the grid connection are amongst the highest in EU, and represent 10.6% of the total costs. The high costs for connecting to the grid are systematically mentioned as the reason projects are put on hold. These connection costs are due to complex technical requirements in relation with the grid codes.

The lack of grid capacity was reported as a major issue as well.

Moreover, the overall decision-making process for grid connection got a low score: 1.8 out of 5.

Ireland

Annual wind installation in 2008:	**208 MW**
Cumulative wind installation in 2008:	**1,002 MW**
Penetration level in 2008 in %:	**9.3%**
Type of market:	**Growth market**
Respondents:	**10 projects – 175 MW**

Ireland

Figure 1: Lead times and costs

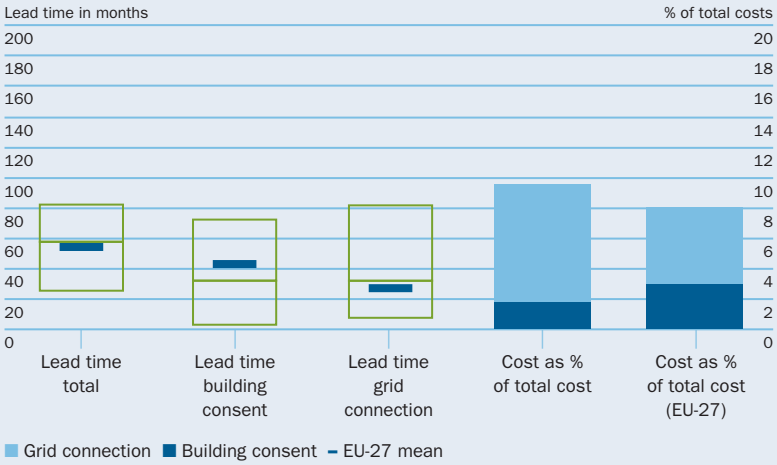
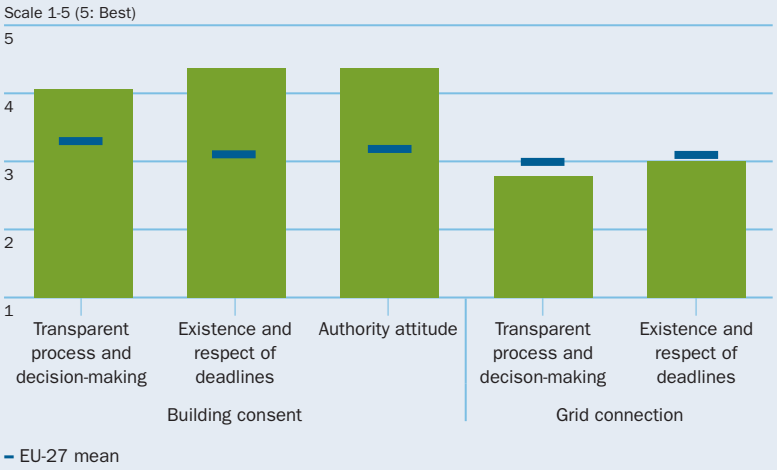


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Improve the total lead time and ensure good coordination between the authorities.
- Share knowledge between authorities in order to improve their attitude to wind energy.
- Improve and shorten the administrative lead time.
- Reduce the number of modifications that can be made to a wind farm after the building consent is approved.

Recommendations for grid connection procedures

- Reduce the grid access lead time.
- Reduce the uncertainty in relation to the approval of the grid access lead times by creating fixed deadlines and introducing the "one–stop-shop" approach.
- Reduce the grid connection costs by decreasing the proportion paid by the power plant generator.
- Provide monitoring mechanisms enabling the detection of problems at an early stage to avoid projects getting blocked in later phases.

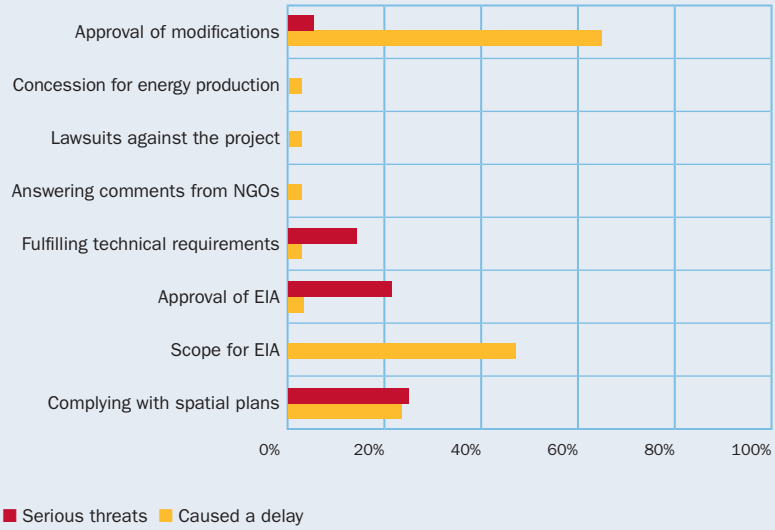
Building consent - strengths

The level of transparency and attitude in Ireland are among the best in the EU-27. The developers do not have to contact many different authorities - this makes it easier for the developer to get through the administrative processes.

The approval of the building consent, according to the results of this survey, is faster and stands at 33 months compared to the EU average which is 42 months.
The costs for this phase are lower than the EU average.

Figure 3: Stakeholders involved in the procedures

Figure 4: Obstacles to wind farm development



Building consent - challenges

The total lead time in Ireland is close to the EU average of 55 months. The developers operating in Ireland have faced delays as a result of problems with the approval of modifications /extensions after an approved building consent. Besides this, the other typical barriers are: the scope of Environmental Impact Assessment (EIA) and complying with spatial planning.

Projects are put "on hold" mostly due to administrative issues, public resistance or an unstable policy framework. Together with the reasons for delays, this indicates that social acceptance is not a major issue for the blocked projects.

Projects put 'on hold' were held up in either the analysis or the maturation phase, which indicates a financial risk for the developers.

Grid connection - strengths

The number of TSOs – one - and DSOs – less than one - shows that the grid ownership is clearly defined.

The average – five - for other parties involved in the grid connection process is low compared to the EU average.

According to the findings of the "perceived barriers" phase (where national associations were asked about barriers that hinder the development of wind deployment), the Irish System Operators are aware of the lack of spare capacity in the grid and recently set up a Grid Development Strategy (GDS) to address this problem.

Figure 5: Reasons why non-finalised projects were put 'on hold'

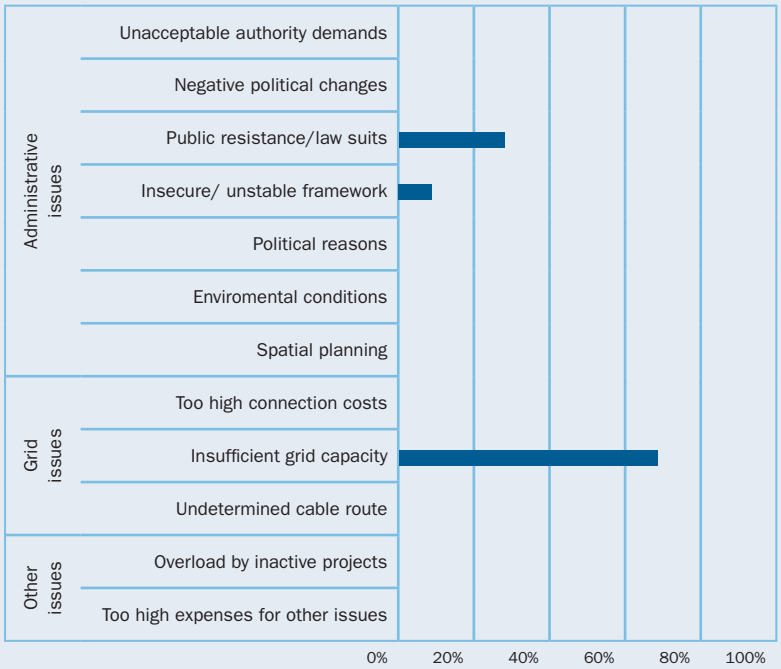
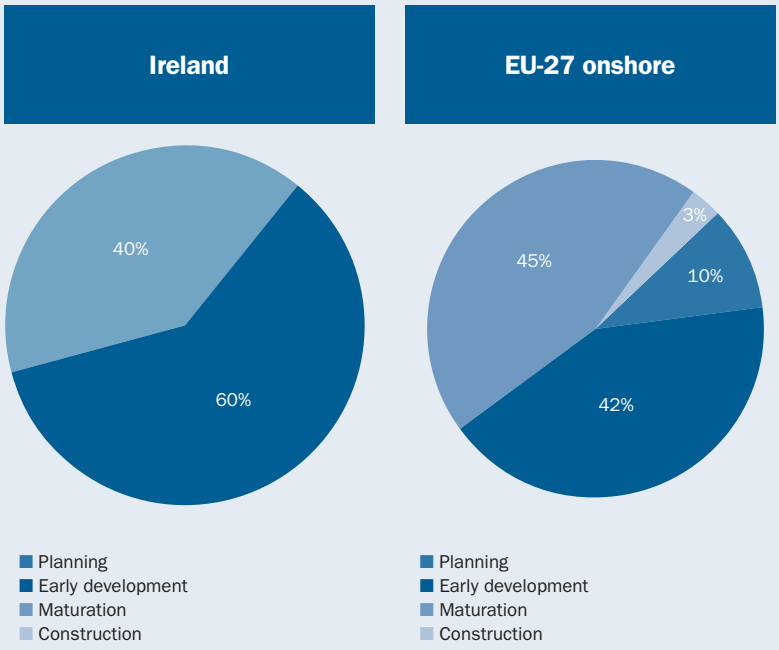


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection - challenges

The average grid connection time which is 31.4 months is higher than the European one which is 25.8 months.

The costs of the grid access, which represent 7.5% of the total projects costs, are higher than the EU average of 5.13% and the average share of costs spent on the administrative procedure. Compared to the rest of Europe, the lead time and the costs of the grid access procedures seem to be a key challenge in Ireland.

The projects which are put 'on hold' are often held up in the analysis phase (60%) and the maturation phase (40%). None of the projects put 'on hold' were held up in the early phase or in the construction phase. Insufficient grid capacity seems to be the main reason for this. This result corroborates the findings shown in Figures 1 and 2 and confirms once again that the management of the grid is a critical aspect in the Irish case.

Despite complex grid management, the grid connection process is characterised by a by a transparent decision-making process with an average of 2.72 out of 5, which is very close to the European average of 3.21 out of 5.

Italy

Annual wind installation in 2008:	**1,010 MW**
Cumulative wind installation in 2008:	**3,736 MW**
Penetration level in 2008 in %:	**2.2%**
Type of market:	**Growth market**
Respondents:	**Nine projects – 387 MW**

Italy

Figure 1: Lead times and costs

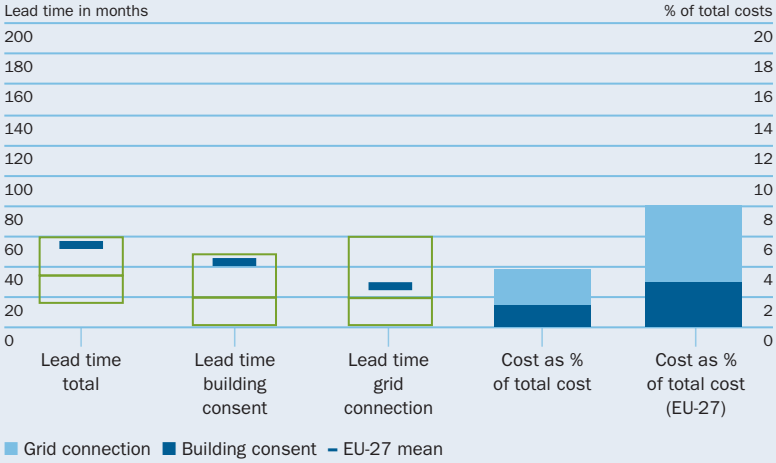
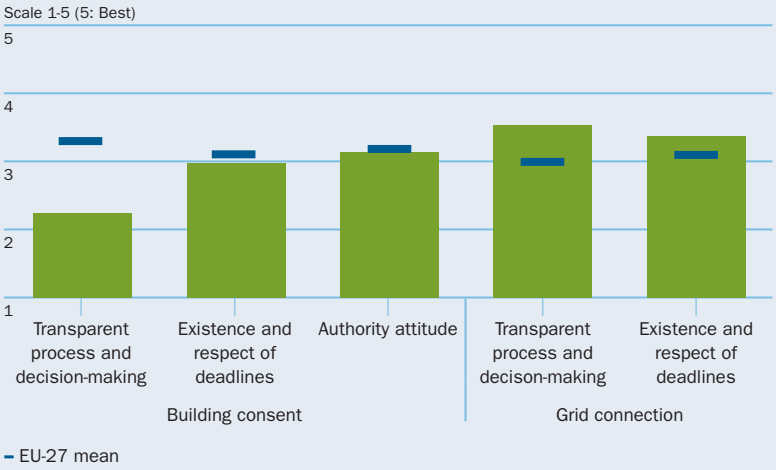


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency. Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Ensure a more stable framework for the approval of building consent.
- Create clear rules on the scope of the Environmental Impact Assessments (EIAs).
- Create comprehensive spatial plans pinpointing useable areas for wind farms to ease wind energy developers' entry onto the market.
- Reduce the number of authorities directly involved in the process.
- Ensure co-ordination between authorities.
- Share knowledge between authorities in order to improve their attitude to wind development.
- Improve and shorten the lead time for the approval of modifications after the building consent has been obtained.
- Maintain the current level of results for lead times, costs and transparency.

Recommendation for grid connection procedures

- Provide clear deadlines for grid connection procedures.
- Put in place a monitoring mechanism to allow reasons why projects get stuck due to grid issues.
- Improve the grid capacity.
- Ensure renewable energy needs are incorporated into 10 year grid planning. Create a monitoring structure for the 10 year grid planning.
- Reduce the number of other parties involved.
- Develop and introduce the "one-stop-shop" approach.

Building consent - strengths

In terms of total lead times, Italy has an average of 32 months. In terms of capacity installed in 2008, the Italian market was the third largest market in the EU. The building consent takes 18 months on average. Nevertheless, this is the best case scenario, as the results for Italy are based on a restricted sample. As regards the costs, they are situated at the lower end of the EU scale with an average of 1.4% of total project costs.

Figure 3: Stakeholders involved in the procedures

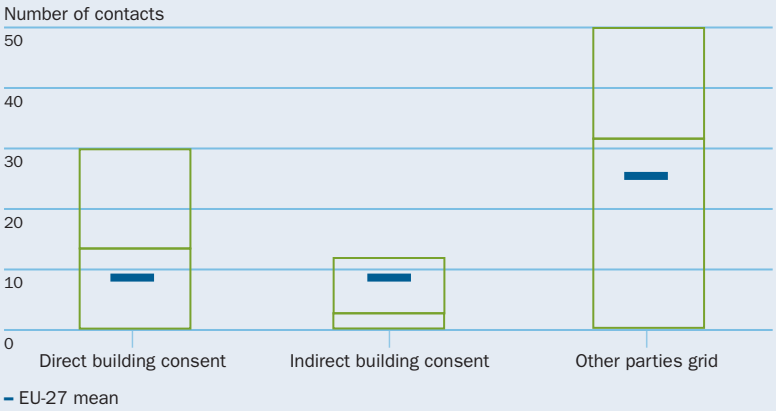
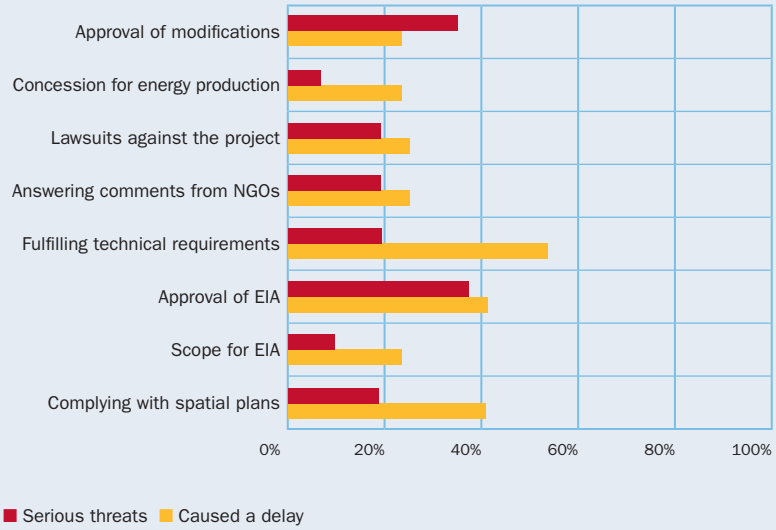


Figure 4: Obstacles to wind farm development



Building consent – challenges

Before the start of the administrative process, an informal process takes place between developers and authorities: wind developers usually have to reach an agreement with the administrative authorities on the project. This negotiation takes a long time, and avoids further difficulties during the building consent process.

As regards authorisation, every region has its own procedures, so it is possible that the national average for obtaining the building consent does not correspond to the time frame in each region. In some parts of Italy, obtaining this permit can take more than 18 months and some developers can wait for more than two years to get a building consent. The developers operating in Italy face delays which can be correlated to a low level of transparency, despite the existence of a number of fixed deadlines and an open attitude of the authorities. Projects can be put 'on hold' due to administrative issues, including negative political changes, unnecessary authority requests and an unstable framework (according to Figure 5). Projects get blocked either during the analysis or the maturation phase.

Grid connection - strengths

The average grid connection time is 19 months, relatively low in comparison to the European average of 25.8 months. In terms of the average total share of costs, grid connection costs are at 2.5%, lower than the EU average of 5.1%. The number of Transmission System Operators (TSOs) and of Distribution System Operators (DSOs) involved in the grid access process present an average value of 1.45. This shows that the interlocutor is clearly defined. The transparency indicator shows a relatively transparent grid connection process, with an average of 3.5, slightly above the EU average of 3.14.

Figure 5: Reasons why non-finalised projects were put 'on hold'

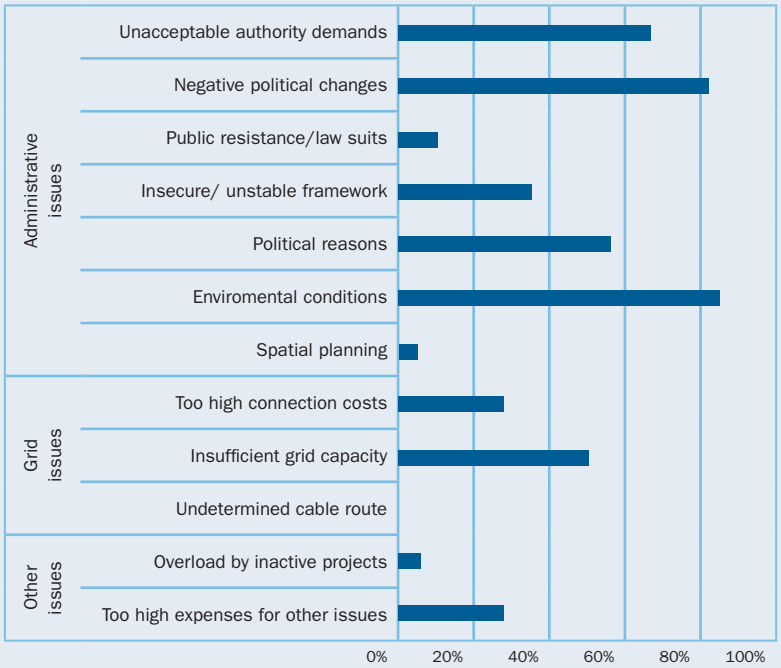
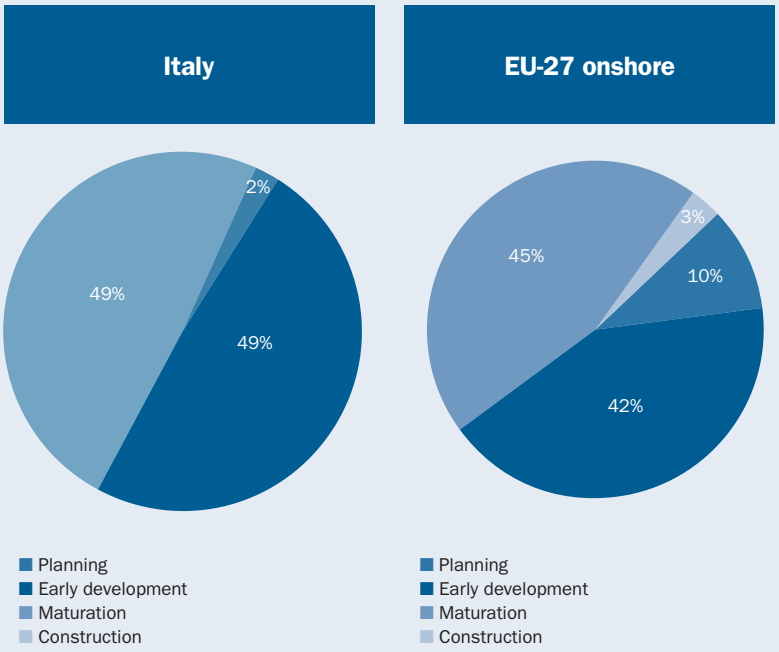


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection - challenges

The upper part of the range of grid connection lead time corresponds to the upper part of the range of total lead time (60 months), showing that in some cases, grid connection is a critical issue. The comments received from developers focus on the numerous cost related problems for grid connection, such as delays in delivering connection cost estimates, no compensation for those delays, failure to comply with best cost/benefit criteria, rationality and need in stating the minimum technical solutions for connection. Furthermore, they insist on the high heterogeneity of the Italian situation due to the different regions, mainly between the north and the south. According to the survey, the obstacles responsible for delays in obtaining the grid connection permit are related to the problems mentioned above.

As regards projects which are put 'on hold', very few projects (2%) are blocked in the early phase of project development. The projects are reported to be blocked either in the analysis phase (49%) or maturation one (49%).

The average number of "other parties" involved is 32.2, high above the EU average of 23.9. This could be explained by a high fragmentation of land ownership, especially in the southern regions of the country. It is important to note that the results for this indicator are among the worst at EU level.

The Italian TSO publishes a 10 year plan for the reinforcement of the grid. This plan includes a "formal" consultation of the stakeholders, which according to the Italian developers is not enough to take the interest of the wind power sector successfully into account. Moreover, the 10 year plan is not monitored properly. A mechanism needs to be put in place to ensure it is monitored.

Disclaimer: Since 2008, many parameters have changed and the situation could be substantially different in 2010.

Latvia

Annual wind installation in 2008:	**0 MW**
Cumulative wind installation in 2008:	**27 MW**
Penetration level in 2008 in %:	**0.8%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 46 MW**

Baltic and nordic countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

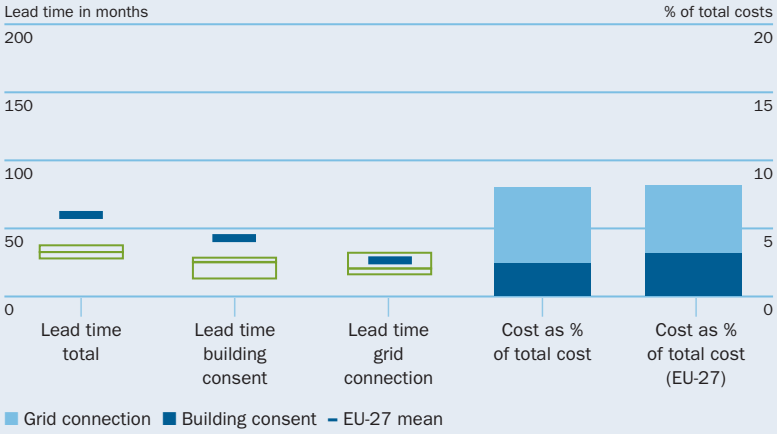
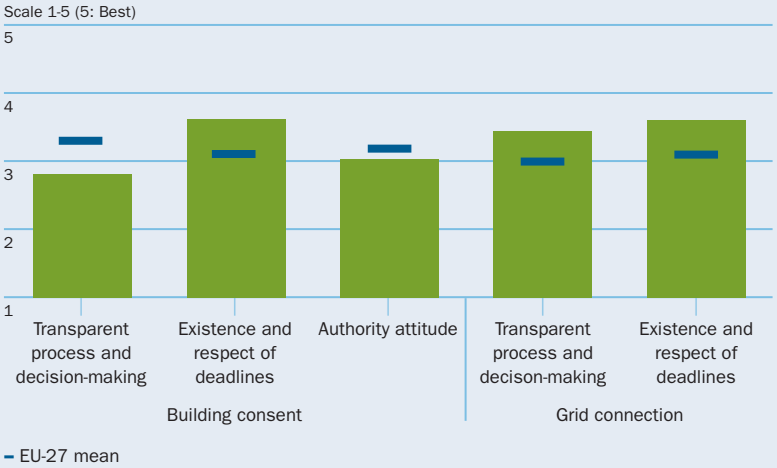


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Provide clear requirements regarding the scope of the Environmental Impact Assessments (EIA).
- Create comprehensive spatial plans with designated areas for wind farms to facilitate entry for developers.
- Improve the transparency of the decision-making process.
- Maintain the lead times and reduce them even further.
- Ensure coordination between authorities at all levels.
- Ensure access to documents regarding decision-making on wind farm applications.

Recommendations for grid connection procedures

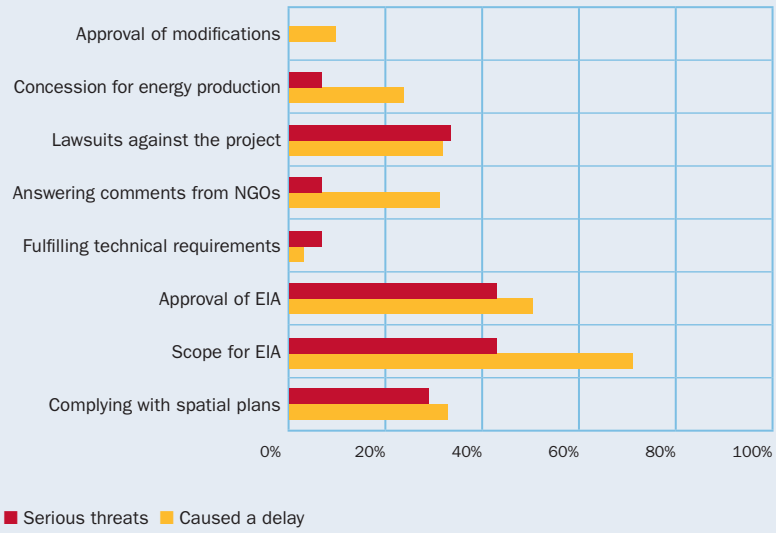
- Reduce grid connection costs.
- Create measures and requirements that force the Transmission System Operator(s) (TSO) to adopt clear targets for the integration of renewables.
- Create a master plan for grid reinforcement including the integration of renewables.
- The TSO and the wind power sector should carry out joint studies on grids to increase shared knowledge and dialogue.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

Figure 4: Obstacles to wind farm development

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Building consent – strengths

Latvia has a relatively low lead time for the building consent, grid connection, and total lead time.

Building consent - challenges

The developers have experienced widespread reasons for delays and threats against their projects.

The average number of authorities that are indirectly involved in the process is higher than the EU average.

The transparency and the attitude of the authorities are reported as being lower than the EU average, particularly when it comes to the clarity of the requirements and the decision-making process for obtaining a building consent. The political framework has been reported as unstable, and changes frequently.

The reasons why projects are put 'on hold' are various. One that stands out is public resistance/law suits, responsible for 40% of non-finalised projects. These projects are put 'on hold' early in the process, which lowers the financial risk. No new turbines have been installed in Latvia since 2005, which in itself indicates a barrier.

Despite the relatively short lead time, progress of wind farm development in Latvia is still very slow. This could be partly due to a low and/or unstable remuneration scheme for wind power investments, for example.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

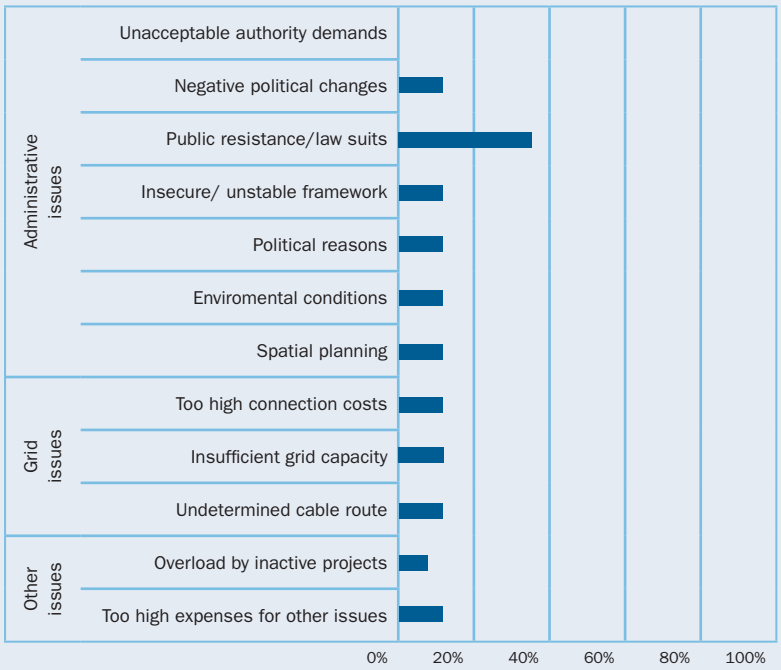
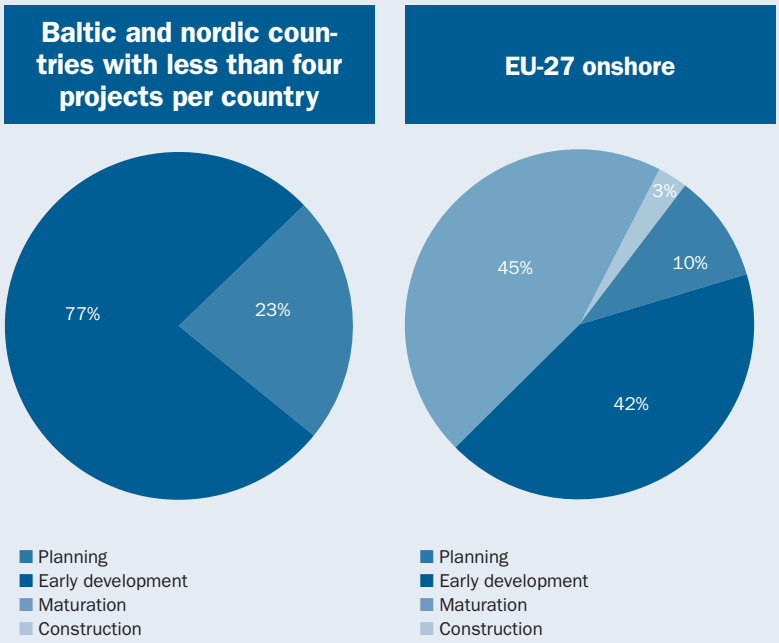


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Grid connection – strengths

Figure 1 shows that the grid access lead time (15 months) for the projects is lower than the EU average (25.8 months). Furthermore, the total lead time corresponds to the administrative lead time, meaning that the grid access lead time is not a barrier.

The costs of the grid connection (5% of total costs) are similar to the EU average (5.1%), but they take up the largest share of the wind farm development costs (1% of costs are for obtaining the building consent). This could be due to the fact that all costs are carried by the developer.

According to Figure 2, the transparency indicators (values: 4 and 4) are amongst the best in the EU, indicating a good support for wind development. But these values may not be representative due to the very low number of projects considered.

Grid connection – challenges

According to the results of this survey, only one DSO (Sadales tīkls AS) and one TSO (Augstsprieguma tīkls AS) need be contacted to obtain the connection permit, both belonging to the same group.

Another challenge mentioned by the national wind energy associations is the lack of adequate grid connections and a monopoly situation in terms of connection to the grid.

Lithuania

Annual wind installation in 2008:	**3 MW**
Cumulative wind installation in 2008:	**54 MW**
Penetration level in 2008 in %:	**1%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 14 MW**

Baltic and nordic countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

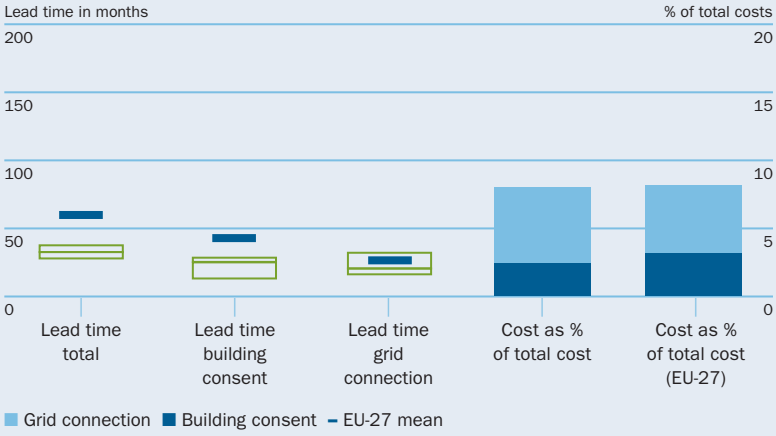
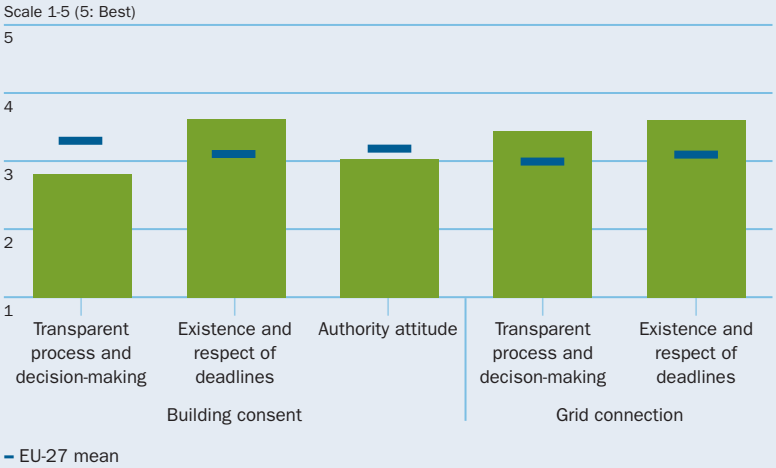


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Implement a "one-stop-shop" approach.
- Establish and implement the necessary regulatory framework for wind farm development, including clear requirements as to the scope of Environmental Impact Assessments (EIA), distance and noise requirements.
- Reduce the number of authorities directly involved in the administrative procedure.
- Create comprehensive spatial plans with designated areas for wind farm development to facilitate entry for developers.
- If no formal spatial planning exists, develop an efficient process for designing areas for wind farm development, either on the initiative of the municipality or developer.
- Improve the transparency of the decision-making process; ensure access to information.
- Maintain and improve the already short lead times, and clear deadlines.
- Ensure coordination between authorities at all levels.
- Reduce costs, especially the costs related to the tendering process.
- Increase transparency by providing clear information on the tendering process.

Recommendations for grid connection procedures

- Encourage joint studies on the penetration of wind power in the Lithuanian system, in order to improve the dialogue between Transmission System Operators (TSOs) and wind energy actors.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

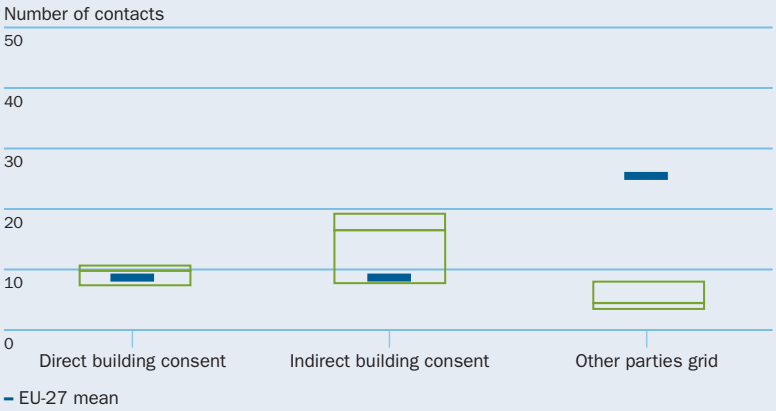
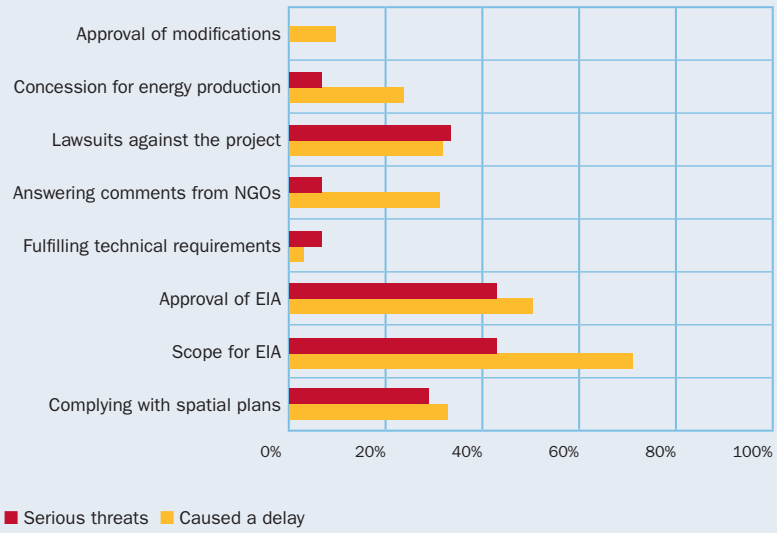


Figure 4: Obstacles to wind farm development

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Building consent – strengths

Developers in Lithuania report a relatively low lead time for the building consent, grid connection, and the total lead time.

There are also clearly defined deadlines for both processes that are well kept. Lithuania uses a tendering process.

Building consent – challenges

The reasons for project delays include lawsuits against the project.

The average number of indirect authorities that are involved in the process is higher than the EU average.

The transparency and attitude of the authorities are reported as being lower than the EU average, particularly when it comes to clear requirements and the decision-making process for obtaining a building permit.

The reasons why projects are put on hold are various. One reason that stands out is public resistance/law suits, due to which almost 40% of the non-finalised projects got held up. But they are put on hold early in the process, which means they carry a low financial risk.

Despite the relative short lead time, wind energy development in Lithuania is still very slow. This is partly due to the fact that the legal framework that regulates wind energy development (and other renewables) is not finalised. Since 2006 no new licenses for wind farms have been auctioned. Furthermore, there are no clear procedures regarding safety/noise distances and environmental requirements.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

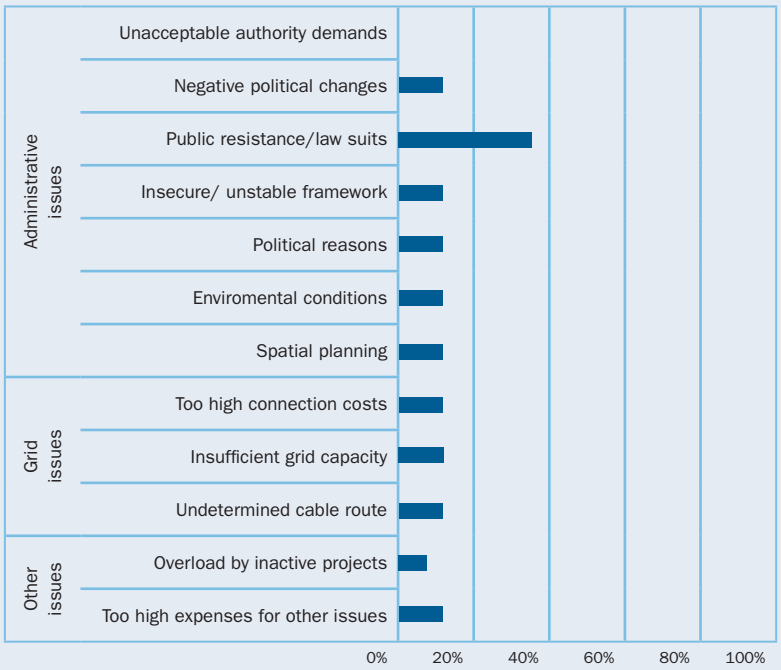
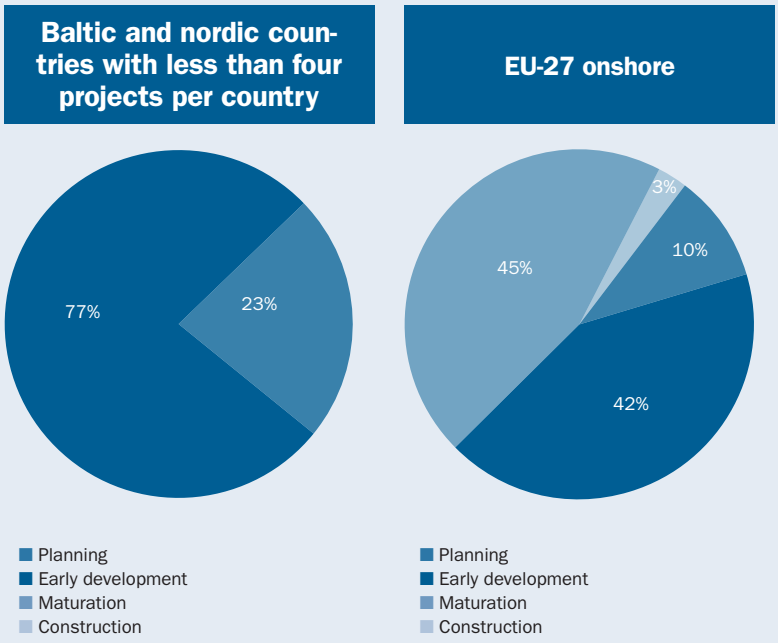


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Grid connection – strengths

There is only one TSO to contact for a connection permit, through a tendering process. The number of other parties involved is very low. There are no grid access barriers for those who received a license. A tendering process always gives more clarity on the definition of the interlocutor, but also increases the financial risk for the companies that carried out the pilot study.

The transparency in the decision-making process (average: 3) is almost equal to the EU average (3.1), in spite of the monopolistic position of the TSO, which makes it hard for third parties to get grid access. There is a good level of transparency regarding the definition of deadlines, which is a result of the tendering process that creates a clear timeframe.

Grid connection – challenges

The costs of grid connection (15% of total costs) are the highest in the EU (EU average 5.1%). These high costs are a critical barrier. The costs are borne by the developer.

The high grid connection costs are due to a selection process based on a call for tenders in which the payment of connection fees (up to 1,000% of the initial fee) is one of the deciding factors.

The Netherlands

Annual wind installation in 2008:	**500 MW**
Cumulative wind installation in 2008:	**2,225 MW**
Penetration level in 2008 in %:	**4.2%**
Type of market:	**Growth market**
Respondents:	**Nine projects – 169 MW**

The Netherlands

Figure 1: Lead times and costs

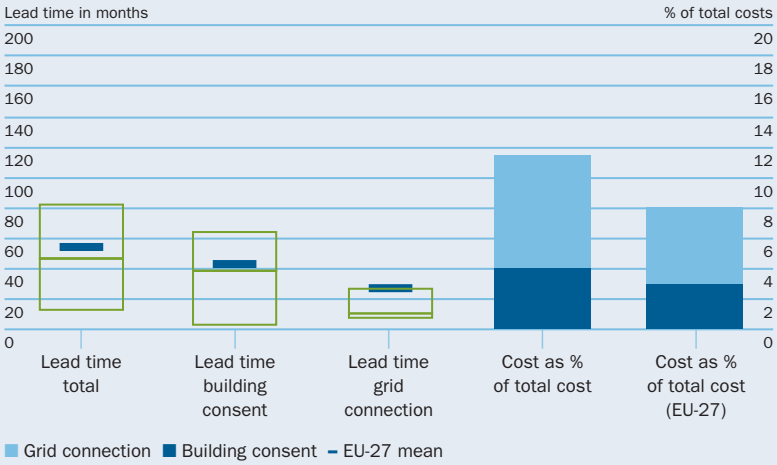
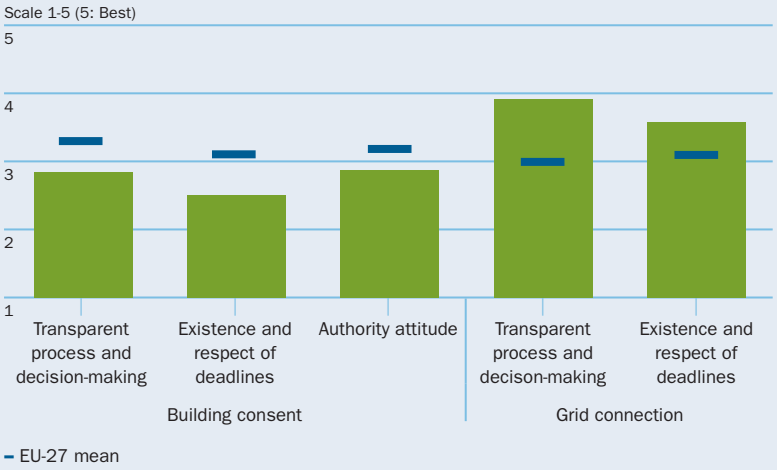


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Provide concise requirements regarding the scope of the Environmental Impact Assessment (EIA) in order to improve the transparency of the administrative procedures.
- Establish comprehensive spatial plans with designated areas for wind farm development to facilitate the developers' entry onto the Dutch market.
- Improve lead times and ensure coordination between authorities at all levels.
- Involve the local community in the decision-making process in order to ensure a higher level of social acceptance.
- Share knowledge between authorities in order to improve their attitude towards wind power deployment.
- Improve and shorten the lead time for approval of modifications after a building consent has been granted.
- Maintain the current average lead time and try to reduce the size of the range, bringing down the maximum values.

Recommendations for grid connection procedures

- Adapt the procedure to allow administrative and grid access procedures to run in parallel.
- Develop an efficient mechanism to detect grid weaknesses and prevent projects from getting held up in the construction phase.
- Reduce the costs related to grid development problems.
- Maintain the level of transparency and the clear information about whom to contact.

Figure 3: Stakeholders involved in the procedures

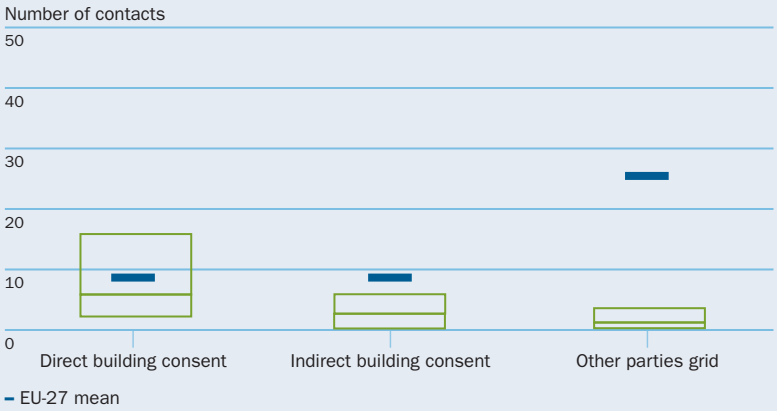
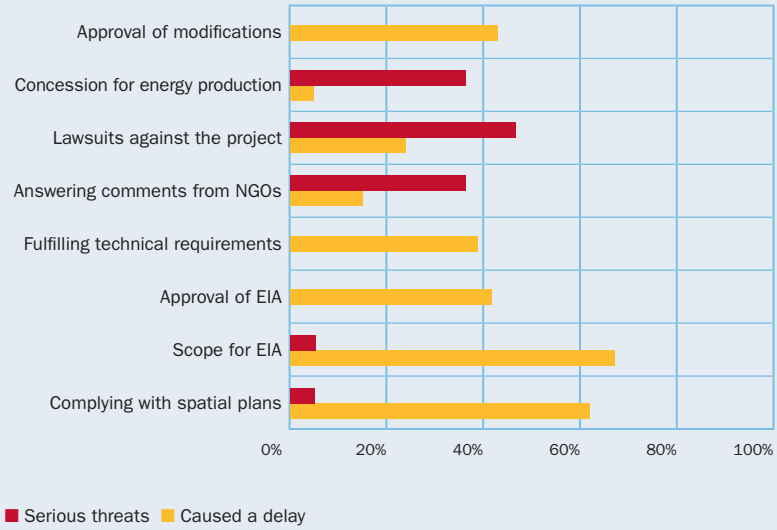


Figure 4: Obstacles to wind farm development



Building consent – strengths

The total lead times in The Netherlands are slightly lower than the EU average. The total average lead time is 46 months and the lead time for the building consent is 39 months.

On average, developers have to contact only a few authorities directly, and just a few are involved indirectly.

Building consent – challenges

The costs associated with obtaining the building consent are a little bit higher than the EU average.

There are various reasons for delays, while serious threats mainly come from lawsuits and addressing NGO's concerns. This demonstrates that there can be social acceptance problems.

Other issues relate to EIA procedures and compliance to spatial planning. Most projects are put 'on hold' at the concept or analysis phase, which indicates that viable projects are selected quickly.

The level of transparency, attitude and the use of/respect for deadlines are lower than the EU average. Administrative procedures are perceived as not very transparent.

Grid connection – strengths

The grid access lead time (average 12.9 months) of the whole sample is lower than the EU average (25.8 months). This shows that the grid access procedure is very efficient.

The fact that the total lead time is higher than the administrative and grid connection lead times shows it is impossible to carry out both procedures in parallel, which may create problems.

Figure 5: Reasons why non-finalised projects were put 'on hold'

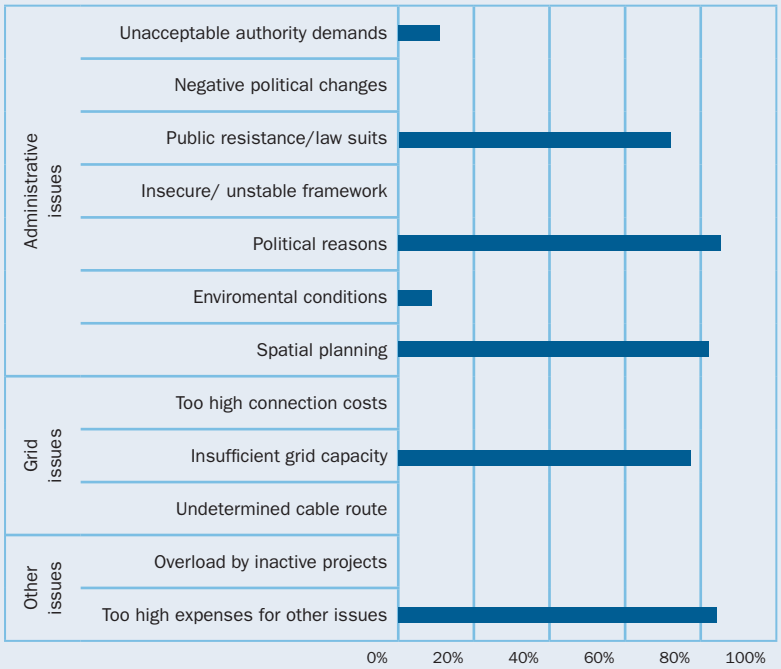
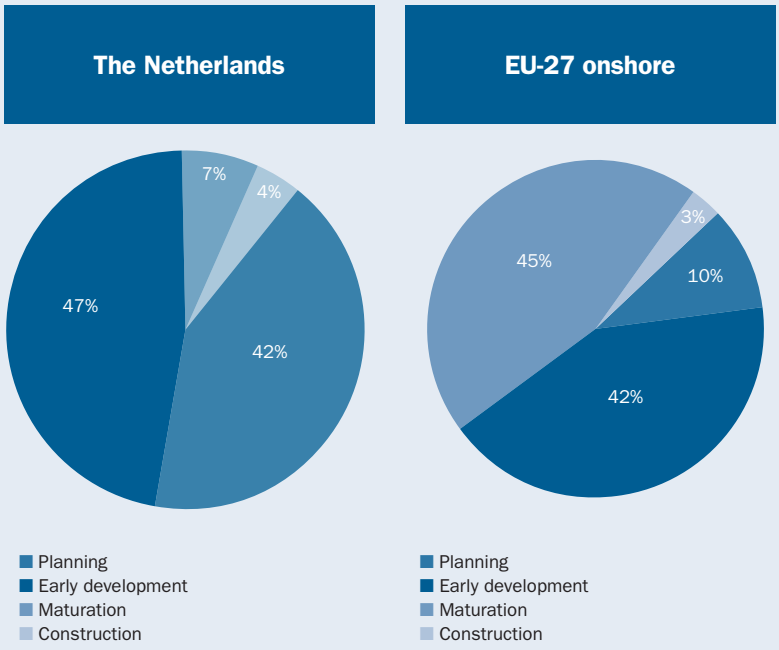


Figure 6: Phase in which non-finalised projects were put 'on hold'



Most projects get held up in the planning or early development phase, which indicates an efficient system for problem detection.

The number of parties involved (TSOs: 0.7, DSOs: 0.7, other parties: 1.1%), is lower than the EU average. The low number of other parties to contact is one of the best results in the EU. Finding the right contacts for obtaining grid access is thus not a problem.

The results for the indicators on transparency (3.8 for rules and costs, and 3.6 for deadlines) are in line with the EU average.

Grid connection – challenges

The relative costs for connection to the grid (7.8%) are higher than the EU average (5.1%). Issues regarding technical requirements, which are cited by 40% of the developers as a reason for delays, could be responsible for part of these higher costs.

If projects are put 'on hold' due to grid access issues, it is because of insufficient grid capacity. This reason is reported by almost 80% of those developers who had projects on hold.

It should be noted that 4% of the projects on hold got held up in the construction phase, which represents a real threat for developers.

The findings of the survey show that it can be seen that the Netherlands experiences problems with its grid capacity, and has a slightly higher connection cost than the EU average. But the overall process of obtaining grid access appears to be transparent and clear.

Poland

Annual wind installation in 2008:	**196 MW**
Cumulative wind installation in 2008:	**472 MW**
Penetration level in 2008 in %:	**0.7%**
Type of market:	**Growth market**
Respondents:	**14 projects – 532 MW**

Poland

Figure 1: Lead times and costs

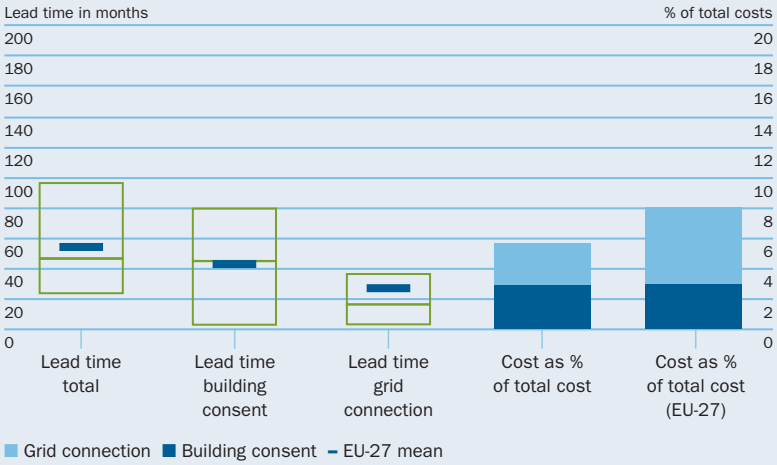
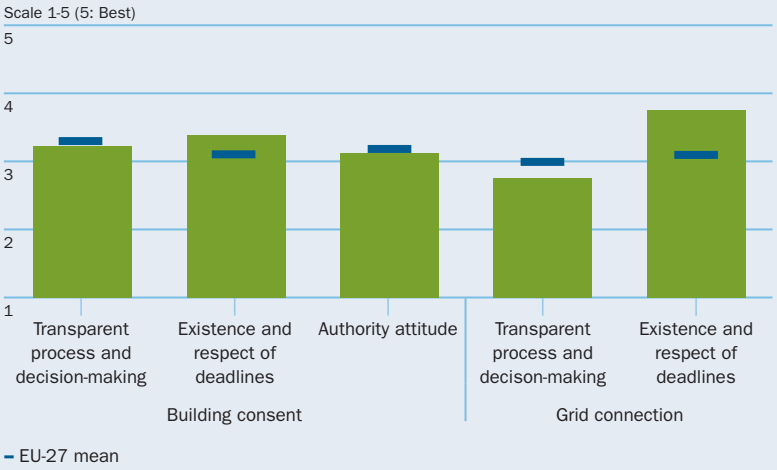


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency. Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Provide clear requirements regarding the scope of the Environmental Impact Assessment (EIAs)
- Improve the level of transparency.
- Lower lead times by reducing the number of obstacles to wind farm development.
- Create comprehensive spatial plans pinpointing suitable areas for wind power deployment.
- Share knowledge between authorities in order to improve their approach to wind energy development.
- Improve and shorten the lead time for the approval of modifications after the building consent is granted.
- Reduce the number of authorities to be directly contacted by the developer.
- Create a fair and efficient complaint procedure in order to give the developer a quick answer, when there is a complaint that ends up as a law suit.

Recommendations for grid connection procedures

- Maintain the average lead time for grid connection.
- Improve a mechanism to detect the critical phases in the grid connection process in order to be able to improve them at an early stage.
- Improve grid management via an efficient and interactive master plan for grid reinforcement and extension.

Building consent – strengths

The total lead time in Poland is 49 months, slightly lower than the EU-27 average. This lead time is mostly made up of the building permit application process, which takes an average of 43 months. Deadlines are set and mostly respected, giving the developers some idea of the length of the decision-making process.

Figure 3: Stakeholders involved in the procedures

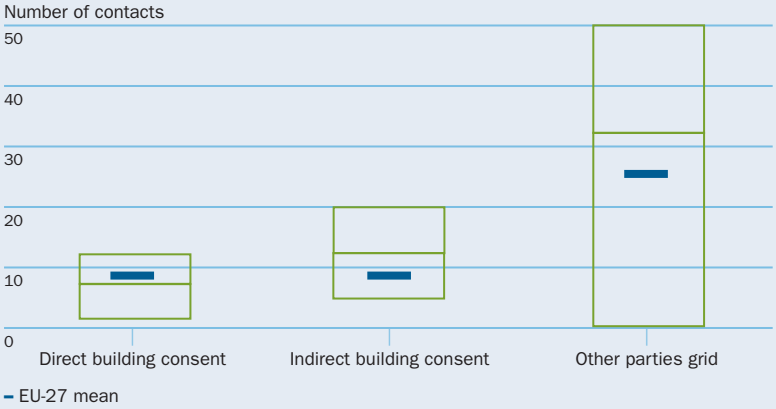
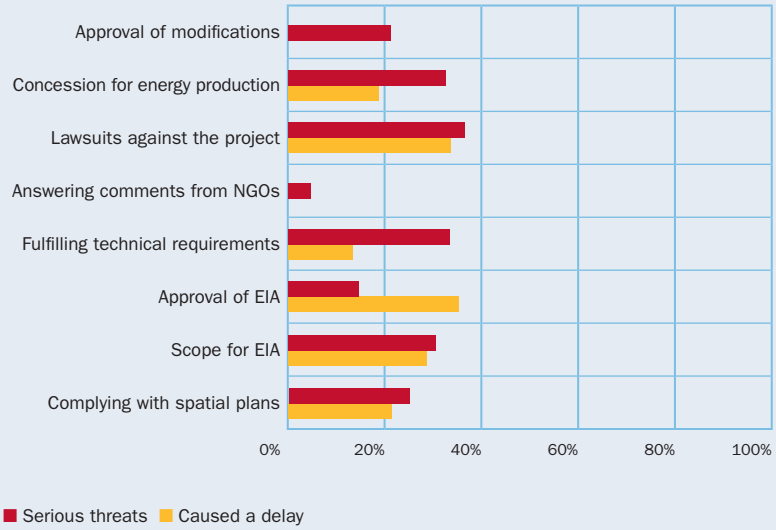


Figure 4: Obstacles to wind farm development



Building consent - challenges

The cost of obtaining the building consent is 3% of the total cost and is equal to the EU average.

The number of authorities to be contacted directly is slightly lower than the EU-27 average, but developers still have to contact more than seven authorities. The transparency and approach are close to the EU average.

The developers operating in Poland face obstacles such as addressing concerns of NGOs and getting the approval of the EIA. The other type of obstacles can be linked to concessions for energy production, fulfilling technical requirements and so on, as described in Figure 4.

The blocked projects are stopped in the maturation phase, which is late in the process of obtaining the building consent.

Grid connection - strengths

Compared to the administrative lead time, the Polish grid access lead time does not constitute an obstacle in the development of the projects, with a mean value (15.5 months) far beyond the EU mean (25.8 months).

Exceptionally, projects can present higher values but never more than 36 months. The extent of the range (3 to 36 months) indicates a heterogeneity of treatments that has to be characterised, analysed, and corrected.

The cost for grid access (2.4%) is low compared to the EU overall (5.1%) and is among the best countries for this indicator.

Figure 5: Reasons why non-finalised projects were put 'on hold'

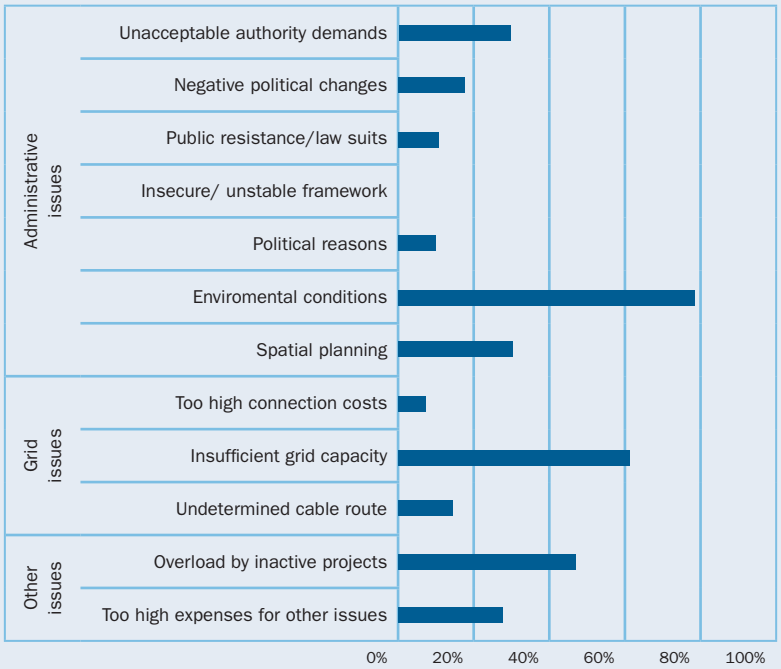
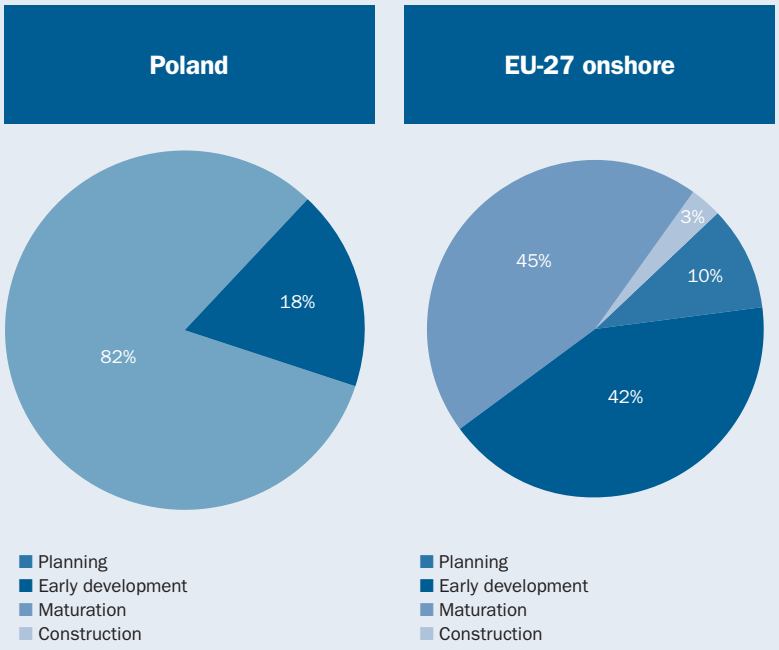


Figure 6: Phase in which non-finalised projects were put 'on hold'



The TSOs and DSOs (<1) seems to be well defined and there is consequently no "dispersion" when looking for the right contact. A more concerning result regards the number of other parties to be contacted, which is very high (mean: 32.1 in the range 0:150). Three projects have higher values than 100. The nature of the stakeholders that have to be contacted is not clear, but is probably related to land property and/or lawsuit against connection lines.

The transparency of administration experienced by the developers does not seem to be a major barrier, especially in terms of setting and respecting the deadlines (3.85 versus the EU's 2.1). For the rules and costs, Poland (2.8) is just below the EU mean (3.1).

Grid connection - challenges

The grid issues (technical requirements) are perceived as one of the most serious threats to projects.

Often projects get completely blocked late in the process (82% in the maturation phase and 18% in the analysis phase). The low grid capacity was one of the main reasons mentioned, along with EIA issues and overload of the administration treatment capacity.

The findings of the analysis of perceived barriers by national wind energy associations are in correlation with the results obtained on the insufficient grid capacity and rules transparency. Cost constraints have been reported, due to the expense of paying part of the grid reinforcement. But this does not seem to be reflected in the survey outcome.

Disclaimer: Since 2008, some parameters have changed and the situation could be substantially different now.

Portugal

Annual wind installation in 2008:	**712 MW**
Cumulative wind installation in 2008:	**2,862 MW**
Penetration level in 2008 in %:	**11.4%**
Type of market:	**Growth market**
Respondents:	**23 projects – 607 MW**

Portugal

Figure 1: Lead times and costs

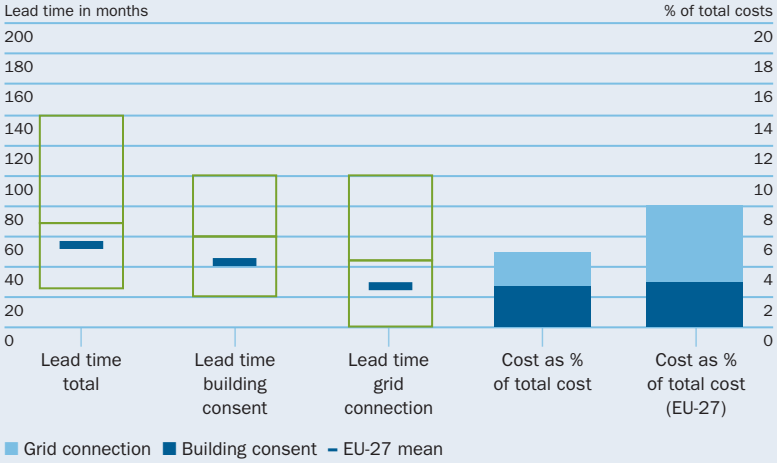
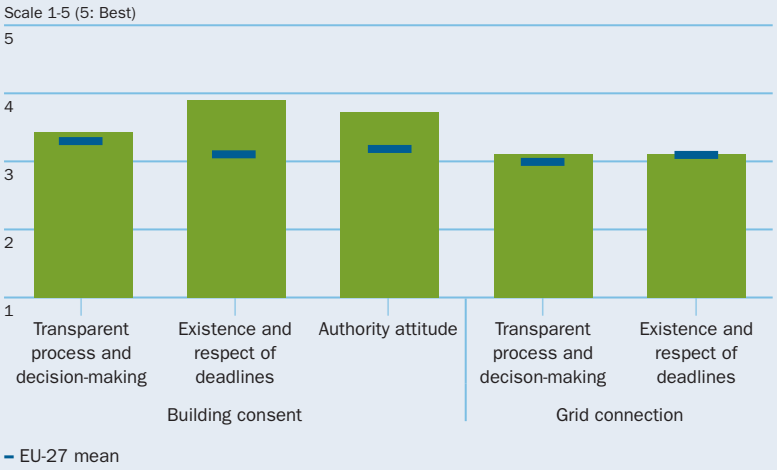


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency. Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for grid connection procedures

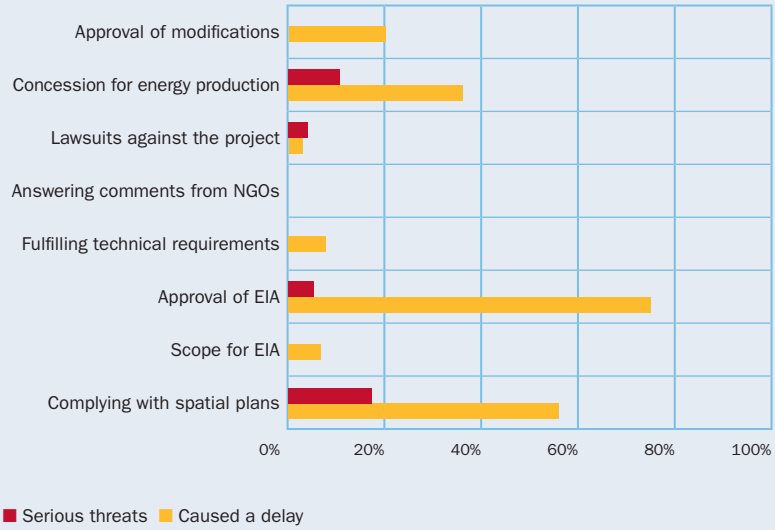
- Provide clear requirements regarding the scope of the Environmental Impact Assessments (EIAs).
- Maintain and/or improve the transparency level and reduce the lead time.
- Create comprehensive spatial plans pinpointing useable areas for wind farms to allow developers an easier entry onto the market.
- Define shorter deadlines for the authorities.
- Train and allocate enough staff with the necessary knowledge to deal with the approval processes.
- Share knowledge between authorities of all levels in order to improve the lead time for handling wind farm applications.
- Improve and shorten the lead time for approval of modifications after a building consent is approved.
- Reduce the number of authorities involved by developing the "one-stop-shop".

Recommendations for grid connection procedures

- Maintain the grid connection costs at their current level and/or improve them.
- Reduce the average grid connection lead time by developing sufficient grid capacity.
- Ensure the grid capacity is correctly managed, taking the development of wind power into account.
- Maintain and/or improve the current level of transparency for the grid permit decision–making process.
- Improve the ways of monitoring the points at which projects could get cancelled.
- Allow developers to run the administrative and connection processes in parallel.
- Reduce the high number of other parties involved.

Figure 3: Stakeholders involved in the procedures

Figure 4: Obstacles to wind farm development



Building consent – strengths

The costs associated with obtaining the building consent in Portugal are lower than the EU-27 average. The building consent costs represent 2.1% of the total cost of the wind farm. Authorities generally respect deadlines.

Both the transparency level (3.60) and the authorities' attitude (3.73) are slightly below the EU-27 average (3.21 and 3.40, respectively), which indicates a rather transparent decision-making process for the building consent.There are at the same time no significant indicators of social acceptance problems, since there are not many delays, obstacles or projects stopped by NGOs and law suits.

Building consent – challenges

The total lead time in Portugal on land is 71 months, which is the second highest lead time in Europe according to the WindBarriers survey. The long lead time is mainly due to the long time it takes to get the building consent.

The long administrative lead time (58 months) can mainly be explained by the approval process for the EIA (its scope and final approval) and compliance with the spatial plans. This seems to be one of the biggest issues for Portugal in terms of building consent.

For the projects that are put 'on hold', the main reasons are the environmental and spatial planning issues. The projects put 'on hold' can be stopped late in the maturation phase, which involves a certain financial risk for developers.

The developers in Portugal have to make direct contact with more than seven authorities (7.58) and just under seven indirectly (6.61). Even though these values are below the EU-27 average, the developer is still required to spend a lot of time handling contacts with the authorities.

Grid connection - strengths

The connection costs are amongst the lowest in the EU-27 (2.5%), despite numerous problems establishing the routes for the power lines (issues with landowners, etc.).

The identification of the interlocutor for the grid connection permit is not a critical point according to this survey: contacts were established with one DSO or one TSO.

Concerning the transparency of the rules and the division of the costs: 3.4%, the situation is acceptable and Portugal belongs to a group of countries for which grid connection is difficult but carried on in a transparent way by communicating the connection delays.

Figure 5: Reasons why non-finalised projects were put 'on hold'

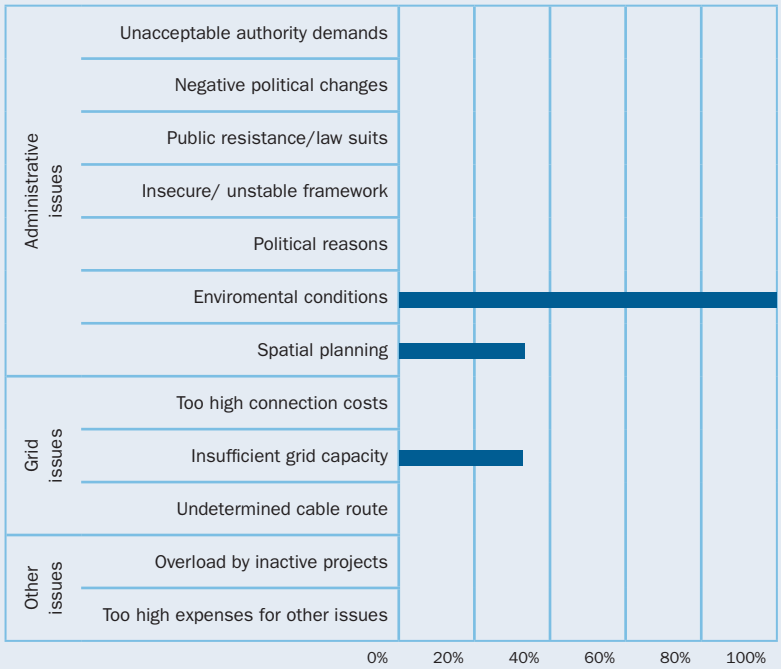
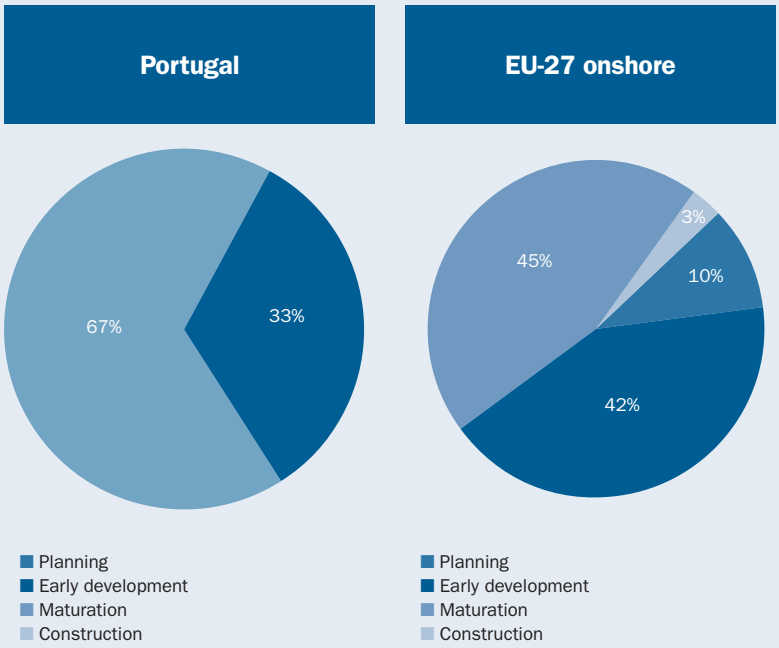


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection - challenges

Portugal has an extra high total lead time (71.1 months) for getting all the permits to start the construction of the wind farm. The high average lead time for the grid connection (46.6 months) is mainly due to insufficient grid capacity. The grid connection lead time directly influences the total lead time given that the connection authorisation is a binding condition to start the administrative processes. There is therefore no possibility of running both procedures in parallel. The number of projects put 'on hold' in Portugal is a serious issue, mainly due to a lack of efficiency in monitoring the critical factors that obstruct projects. 67% of the projects are blocked in the maturation phase, when preliminary studies are done, and 33% in the analysis phase. The EIA is mentioned by 100% of the respondents as a reason for projects that are put on hold, the lack of grid capacity comes next.

One of the critical issues regarding Portugal is the very high number of other parties concerned by the grid permit (average 47.3). This is due to a high public social acceptance problem related to the land ownership for the grid: land owners are asking for high compensation, while the expropriation measures are not made easy for developers, but they could be facilitated for TSOs.

The grid condition is one of the main critical issues for the success of a project, according to the analysis of perceived barriers undertaken previously in the project. In Portugal, grid access is granted via a call for tenders, based on a discount of the feed-in tariff. This procedure seems to be a barrier to the development of wind power in the country. Additionally, the Portuguese law gives the possibility to present a demand for a connection point, but this is no longer applicable because of the saturation of the common coupling points (PCC). The tendering procedure then begins again, with more and stricter requirements.

Romania

Annual wind installation in 2008:	**2 MW**
Cumulative wind installation in 2008:	**10 MW**
Penetration level in 2008 in %:	**0%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 6 MW**

Central and southeastern European countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

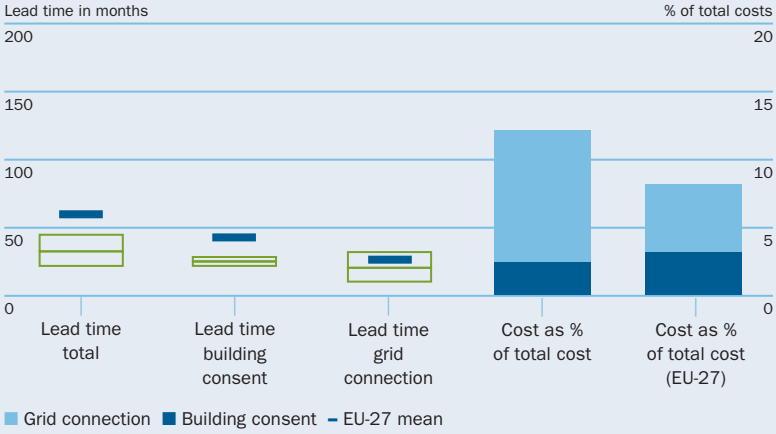
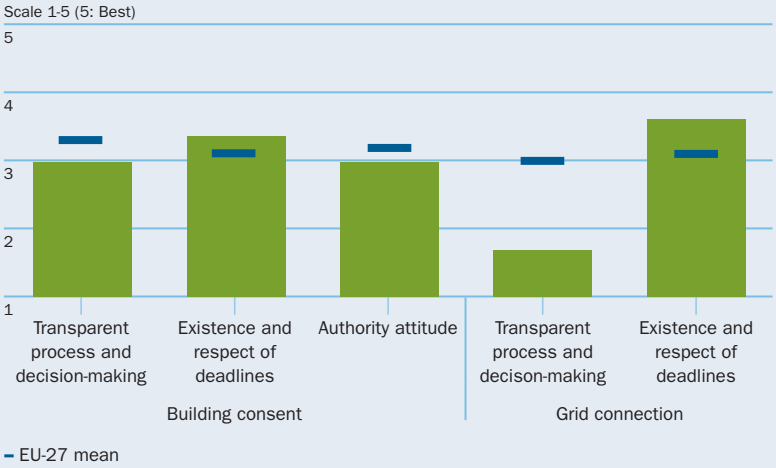


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative and grid connection procedures

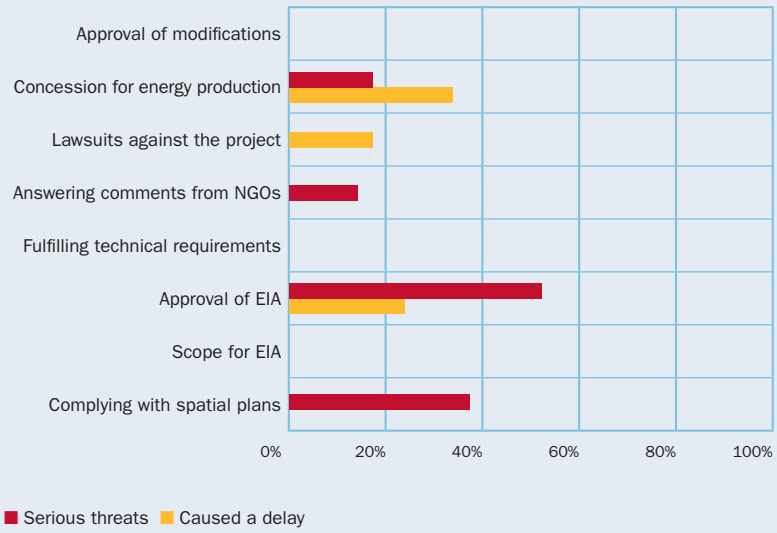
- Provide concise rules and fixed deadlines for the Environmental Impact Assessment (EIA).
- Create spatial plans pinpointing useable areas for wind parks to support the access of different developers to the wind power market.
- Improve the level of transparency of the building and grid connection permit processes.
- Maintain or lower grid costs and lead time indicators.
- Provide precise information to the Transmission System Operators (TSOs) and the Distribution System Operators (DSOs).
- Improve the capacity of the grid and its management, particularly in the areas suitable for wind power development.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Austria, Bulgaria, Hungary and Romania.

Figure 4: Obstacles to wind farm development

Note: The countries included are Austria, Bulgaria, Hungary and Romania.



Building consent – strengths

According to the WindBarriers survey Romania has relatively short lead times. The time needed to obtain the building consent is low in comparison to the EU average.

From these results, the administrative approval process is not the main explanation for the low installation level.

However, these results are not representative given the very low number of projects considered and installed in 2008.

Building consent - challenges

The decision-making process is not sufficiently transparent. This could be one of the reasons for the low level of wind power installation.

The projects in Romania, similar to the three other countries from the same group, often seem to be blocked late in the process – the maturation or construction phase.

According to Figure 4, the main challenges are the approval of the EIAs, the compliance with spatial planning and getting the concession for energy production.

Grid connection - strengths

Concerning grid connection lead time, Romania has an average of 6.7 months, as opposed to the EU average of 25.8 months.

This short lead time could possibly be explained by the fact that in Romania, when the connection permit (> 110 kV) is given, it is only valid for six months, with the possibility of extending it for another six months.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Austria, Bulgaria, Hungary and Romania.

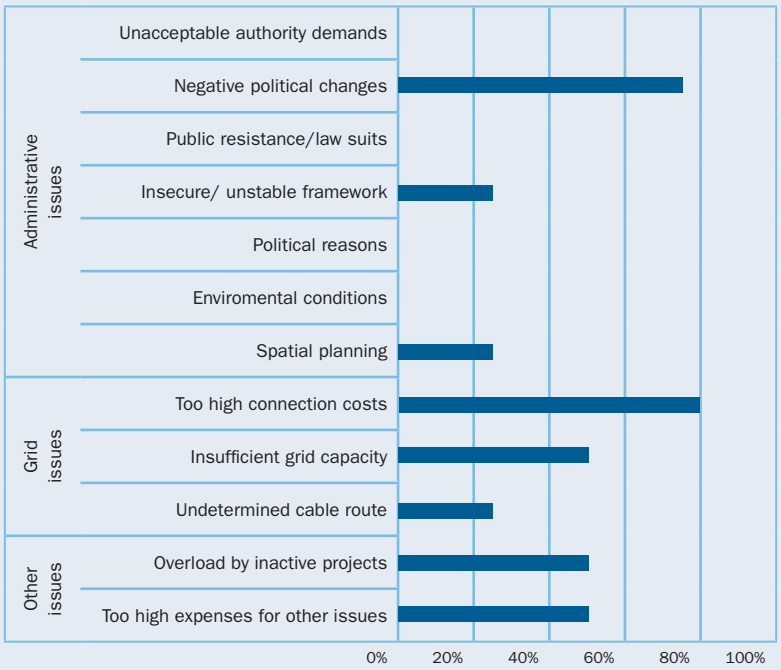
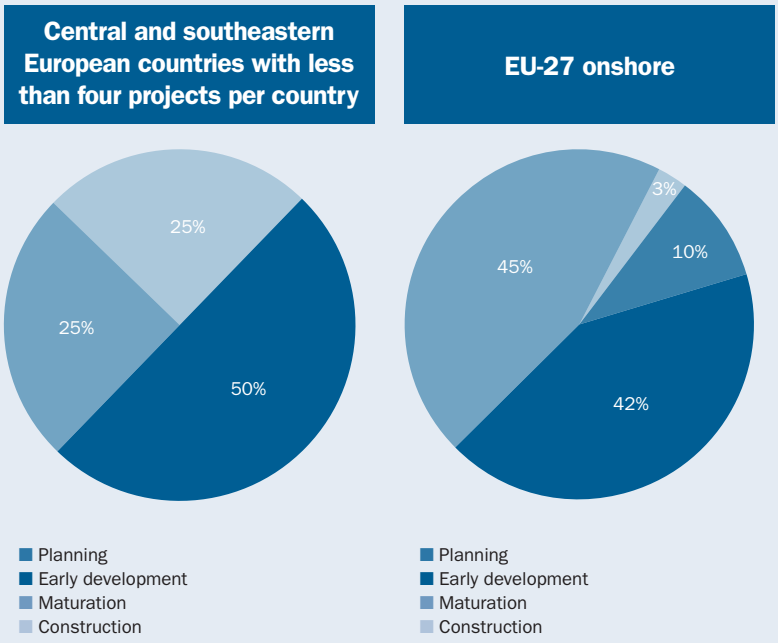


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Austria, Bulgaria, Hungary and Romania.



The average grid connection costs make up 3.7% of the total project costs, well below the EU average (5.13%).

Regarding the average number of other parties involved in the grid access procedure, Romania has an average of 1.9.

According to the WindBarriers survey, the deadlines are well defined and well kept. Again, the result may not be representative given the very low number of projects considered.

Grid connection - challenges

The strict cost conditions are not reflected in the cost values obtained from the survey.

According to results obtained in a previous phase of the project, the connection costs are entirely supported by the developer.

Most projects that get put 'on hold' do so in the analysis phase, because of cost issues and problems defining the cable route.

The lack of sufficient grid capacity, the lack of experience dealing with renewable energy, and the fact that the developer cannot present independent studies are also mentioned as serious obstacles.

Spain

Annual wind installation in 2008:	**1,609 MW**
Cumulative wind installation in 2008:	**16,740 MW**
Penetration level in 2008 in %:	**12.3%**
Type of market:	**Developed market**
Respondents:	**31 projects – 822 MW**

Spain

Figure 1: Lead times and costs

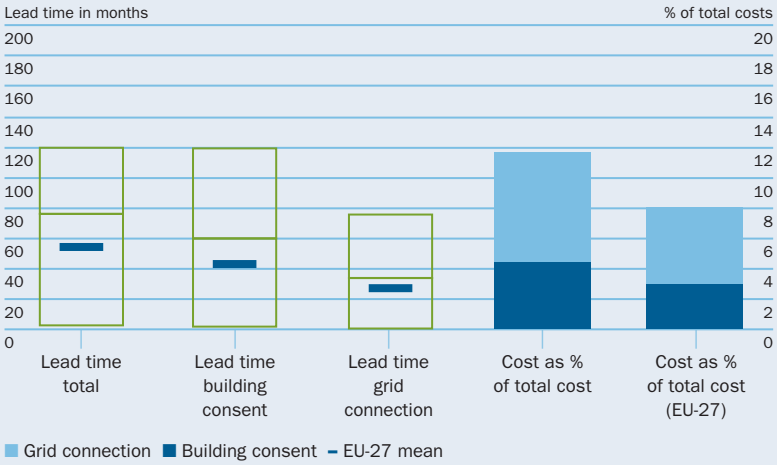
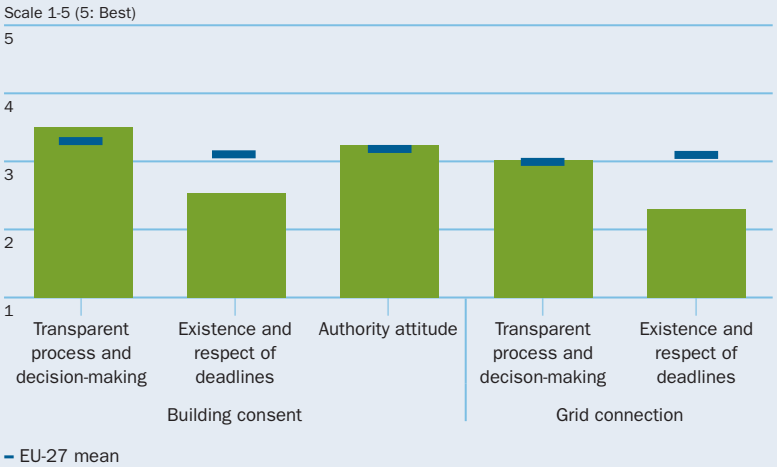


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency. Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative procedures

- Avoid continual changes to regulation which affect the stability and credibility of the political support for wind energy.
- Clear and uniform procedures are required between the Autonomous Regions (CCAA) (responsible for regulating wind installations) on the scope of the Environmental Impact Assessments (EIAs) in order to improve the transparency of the process, and reduce lead times.
- Tendering in order to select projects in the CCAA should be avoided to reduce extra costs on the projects.
- Create comprehensive spatial plans pinpointing useable areas for wind farms to allow developers an easier entry onto the market.
- Define deadlines for the authorities which should be followed and met to avoid an excess of costs for developers.
- Improve and shorten the lead time for the approval of modifications after the building consent has been obtained.
- Extend the involvement of local communities in the decision-making process and ensure a fair and quick complaint process.

Recommendations for grid connection procedures

- Avoid the construction of new infrastructure being delayed, in order to facilitate the connection of new projects.
- Facilitate the involvement of developers, but ensure investment is paid for by the grid owners.
- Increase communication on the status of the grid and on the available capacity, in order to increase transparency and reduce the number of projects blocked due to insufficient grid capacity.
- Establish a mechanism to detect the critical points of the projects at a very early stage, and avoid them getting blocked during the maturation or construction phases.

Figure 3: Stakeholders involved in the procedures

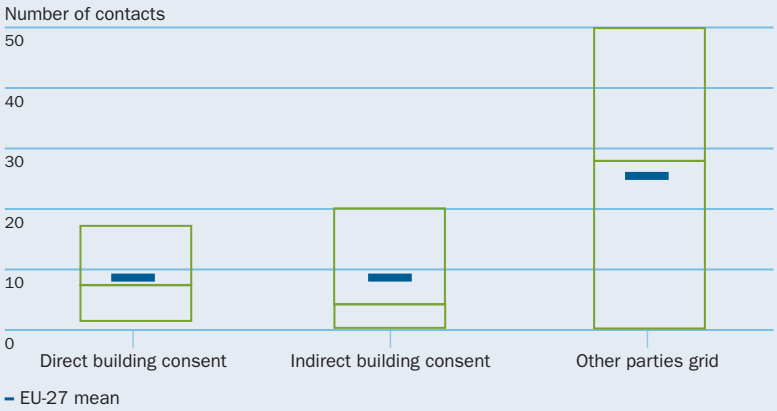
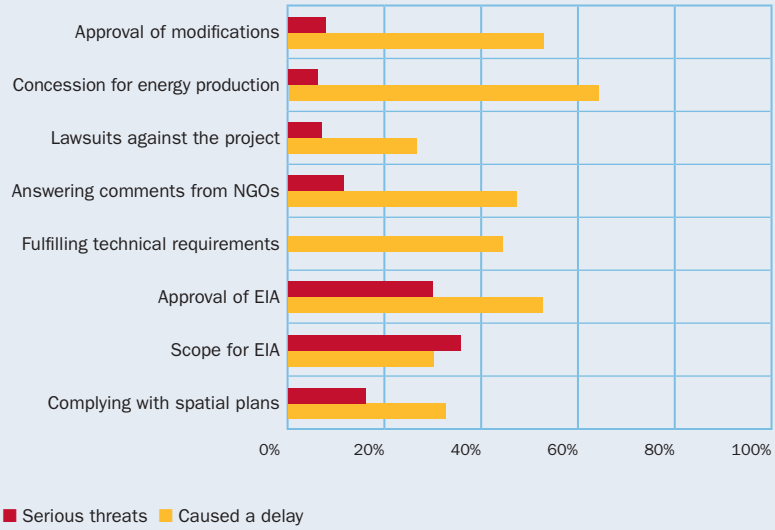


Figure 4: Obstacles to wind farm development



Building consent – strengths

Spain is the second largest market in EU for newly installed wind farms and in terms of the cumulative number of MW installed. The authorities, when only a few have to be contacted directly, have a generally positive attitude towards wind power. The procedures are on average very transparent.

Building consent - challenges

The total lead time in Spain is longest of all the EU-27 according to the WindBarriers survey. The total lead time is 73 months. This long lead time is due to long lead times both for the building consent and for the grid connection. The costs for obtaining the building consent and grid connection authorisation are high. The deadlines are not well defined, and/or not kept.

The main reasons for projects being blocked are environmental and spatial planning issues together with political issues.

Projects are often blocked in the maturation phase. 7% of these projects were stopped in the construction phase. Many of the blocked projects are stopped late in the process, causing a financial risk for the developer. There are also social acceptance problems, which delayed more than 40% of projects. Other issues raised refer to addressing concerns of NGOs and/or law suits filed against the project.

Grid connection - strengths

There are no problems knowing who to contact to get grid access (the Transmission System Operator - TSO - and only one Distribution System Operator – DSO - have to be contacted). The grid access process in Spain is centralised and the national TSO is responsible for giving access to all the projects.

There is an excess of requested capacity in almost all grid connection points. The applications are tendered in the CCAA.

Grid connection - challenges

Despite its excellent results in terms of wind power penetration and development, Spanish overall lead times and costs are much above the EU average. The administrative lead time is critical. For the slowest projects (up to 120 months), the total lead time corresponds to the administrative lead time. The grid access lead time is high on average (33.5 months), but overall there is a very wide range of times. In some CCAA, projects were concluded in three months, which demonstrates that the decision-making process can be very efficient.

Figure 5: Reasons why non-finalised projects were put 'on hold'

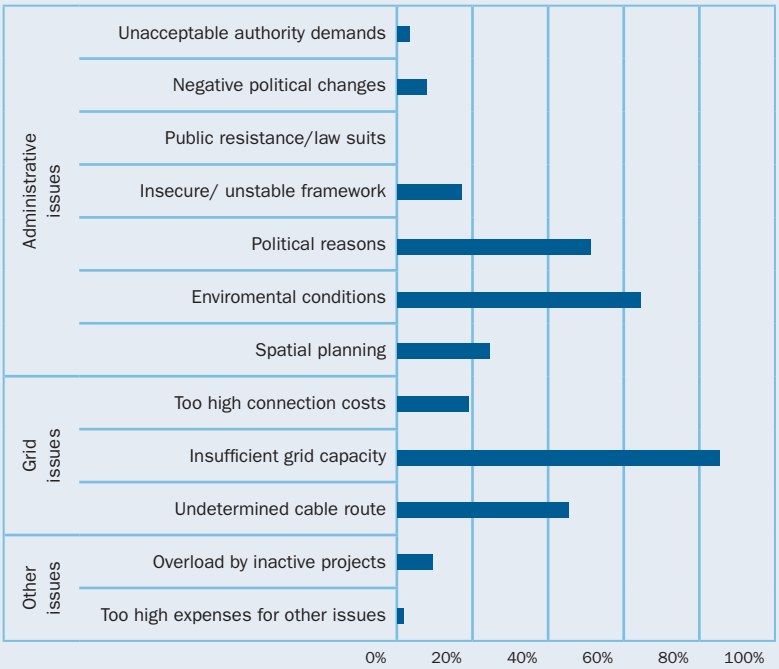
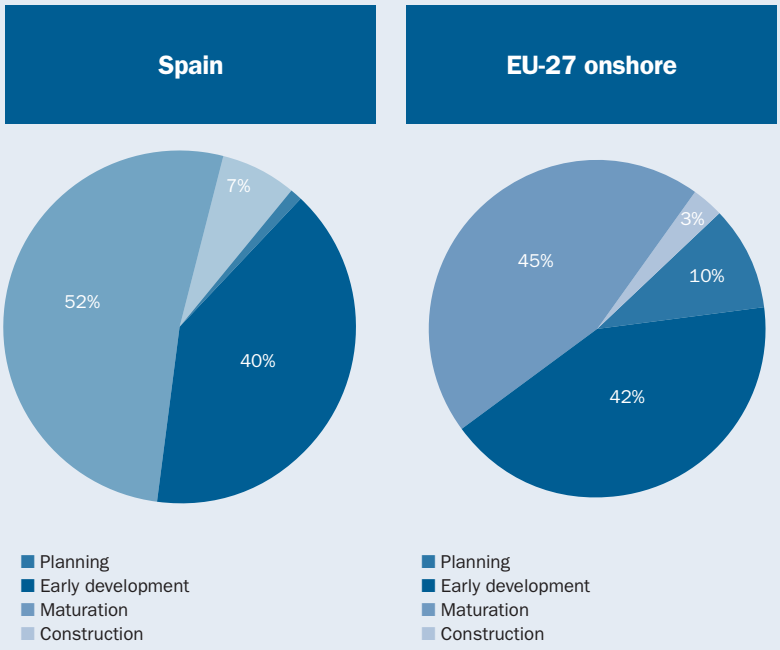


Figure 6: Phase in which non-finalised projects were put 'on hold'



Costs are also on the high side with an average of 7.5% of total project costs (EU average: 5.1%).

There are many reasons behind the delays to projects. Among them, the problem of fulfilling technical requirements was cited by 46% of respondents. The Spanish grid codes require technical solutions that are not always used in other countries but that are technically available. The problem of technical requirements is probably responsible for the increase of costs for grid connection, together with the complex topography of Spain.

The findings of the projects on hold are worrying, as many are put on hold in the maturation phase (52%) and 7% are stopped in the construction phase, representing important losses for the developers.

The reasons for this are a separation between the EIA processes and political issues, together with grid problems: lack of capacity, cable route, and grid connection costs.

There can be few or many "other parties" to contact (between 75 and 150), but for the majority of projects it was under 20. These extreme values demonstrate that in some cases, the procedure can be extremely difficult.

The transparency of the decision-making process is one of the worst in the EU-27 for rules as well as for the costs (average: 3.1). Deadlines are well respected compared to the rest of the EU (2.5 against 2.1).

There is a lack of transparency in the way the grid conditions are communicated which leads to uncertainties when planning projects. This uncertainty cannot be solved before contacting the grid operator.

Sweden

Annual wind installation in 2008:	**236 MW**
Cumulative wind installation in 2008:	**1,021 MW**
Penetration level in 2008 in %:	**1.6%**
Type of market:	**Emerging market**
Respondents:	**Less than four projects – 40 MW**

Baltic and nordic countries with less than four projects per country

Figure 1: Lead times and costs

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

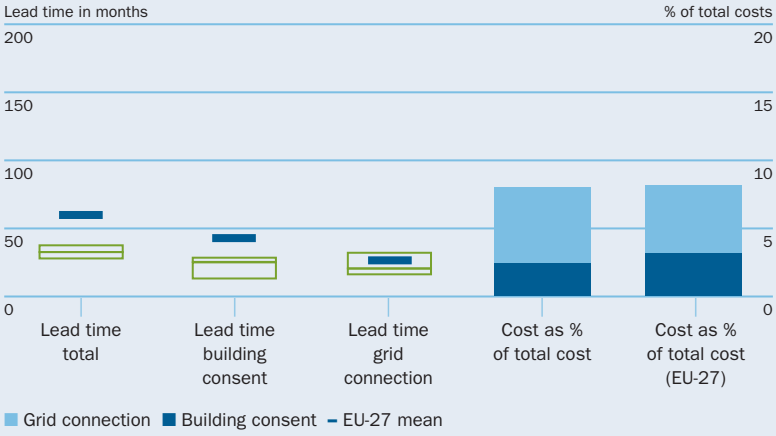
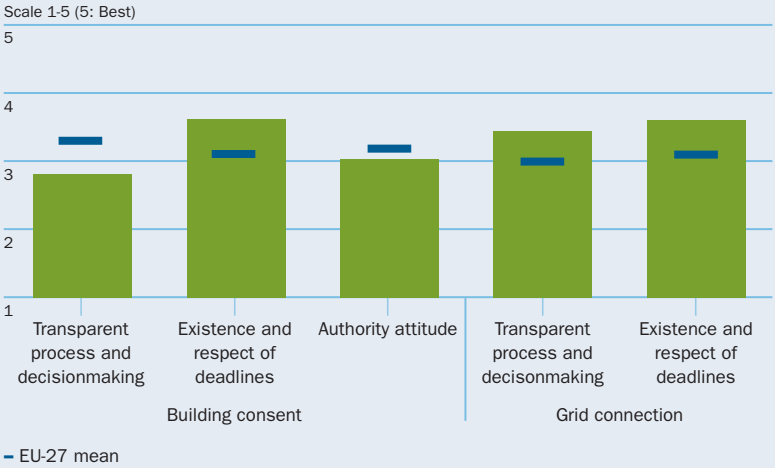


Figure 2: Transparency, deadlines and attitudes

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for both administrative and grid connection procedures

- Create clear requirements regarding the scope of the Environmental Impact Assessments (EIA).
- Create comprehensive spatial plans with designated areas for wind farm development to facilitate entry for developers.
- Improve transparency of the decision-making process.
- Maintain and reduce the already short lead times.
- Ensure coordination between authorities at all levels.
- Ensure access to documents showing the progress of a wind farm application.
- Set and meet deadlines for complaint processes.
- Maintain the current low costs for grid connection.
- Maintain the good level of transparency during the whole grid connection process.
- Make it easier to identify the interlocutor that has to be contacted for a grid connection.

Figure 3: Stakeholders involved in the procedures

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

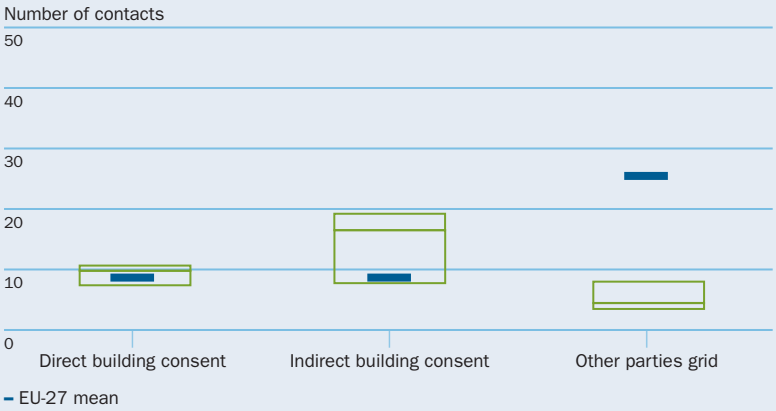
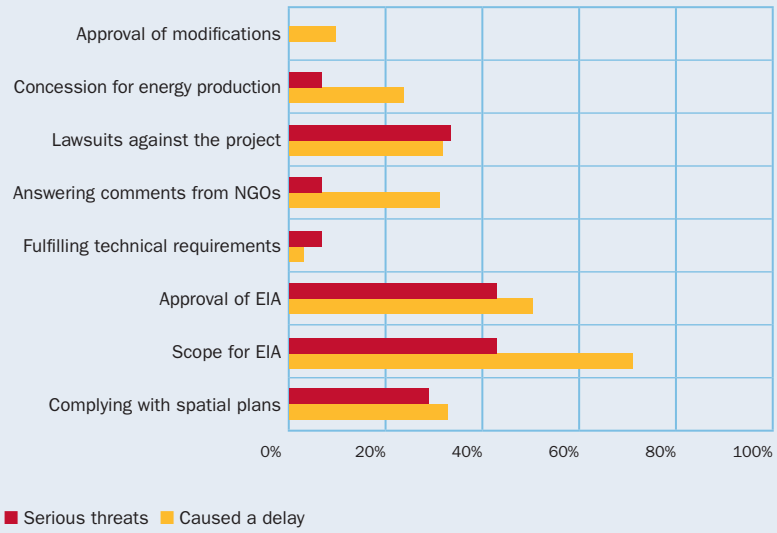


Figure 4: Obstacles to wind farm development

Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Building consent – strengths

According to the WindBarriers survey, Sweden has a low lead time for the building consent, grid connection and a low total lead time.

For Sweden the administrative framework for the approval of building consents is efficient. Furthermore, there are well defined and well kept deadlines for both processes.

Building consent – challenges

Developers have experienced widespread reasons for delays and obstacles against their projects.

The average number of indirect authorities that are involved in the administrative process is higher than the EU average.

The transparency and attitude of the authorities are reported as being lower than the EU average, particularly when it comes to the clarity of the requirements and the decision-making process for obtaining a building consent.

The reasons why projects are put on hold are varied. One reason that stands out is public resistance/law suits, responsible for 40% of the non-finalised projects. Projects are put on hold early in the process, indicating that developers have a low financial risk.

Despite the relative short lead time, the installed capacity is increasing slowly in Sweden. This could be partly due to a low and/or unstable remuneration scheme for wind power.

Figure 5: Reasons why non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.

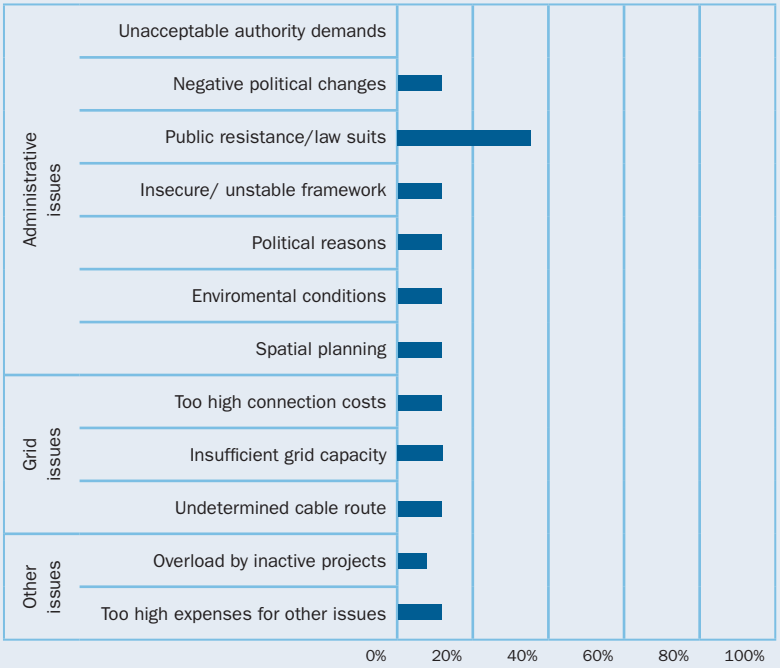
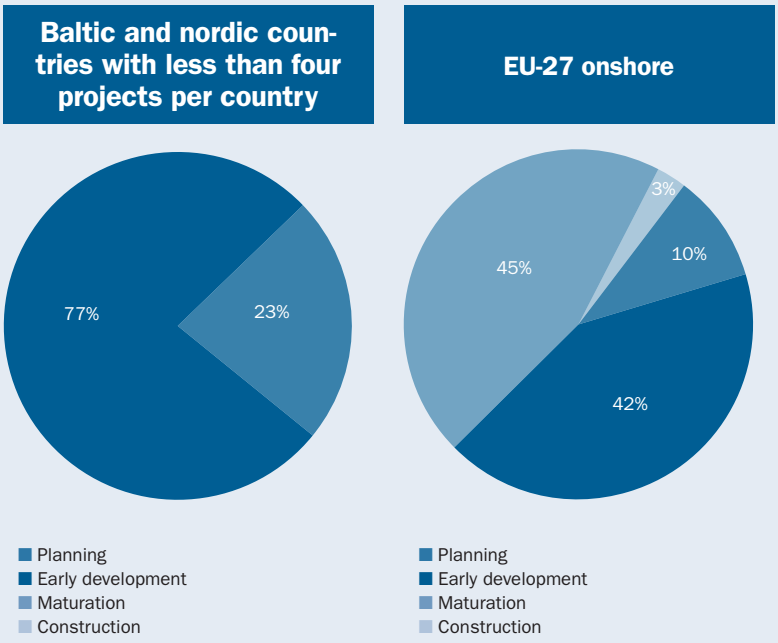


Figure 6: Phase in which non-finalised projects were put 'on hold'
Note: The countries included are Estonia, Finland, Latvia, Lithuania and Sweden.



Grid connection – strengths

Regarding the grid connection costs, Sweden presents the best results in the EU, with only 1% of the total costs. These costs cover:

- A connection fee: to carry out the necessary work to connect the wind farm to the grid but also to reinforce the grid at a higher level.
- A transmission fee to cover energy losses, higher level grid fees, metering, operating costs and maintaining the grid.

The transparency of the decision process is very well perceived by the project developers, especially regarding the setting and respecting of deadlines. Sweden is in the top five EU countries for transparency.

Grid connection – challenges

The Swedish grid access lead time (average 23.4 months) is similar to the EU average (25.8).

The Swedish electrical system is composed of several levels:

- National grid (>220 kV)
- Regional grids (30 to 130 kV)
- Local grids (0.4 to 20 kV)

This division leads to a classification of the wind farm according to the power level:

- Single wind turbines and small wind farm (<10 MW): connection to the local grid.
- 10MW to a few hundred MW: connection to the regional grid.
- Several hundred MW: connection to the national grid.

This classification complicates the initial contact for obtaining grid access. For example, for one of the projects in the survey, five TSOs had to be contacted, and all developers contacted at least one DSO and one TSO.

United Kingdom

Annual wind installation in 2008:	**836 MW**
Cumulative wind installation in 2008:	**3,241 MW**
Penetration level in 2008 in %:	**2.3%**
Type of market:	**Growth market**
Respondents:	**11 projects – 48 MW**

United Kingdom

Figure 1: Lead times and costs

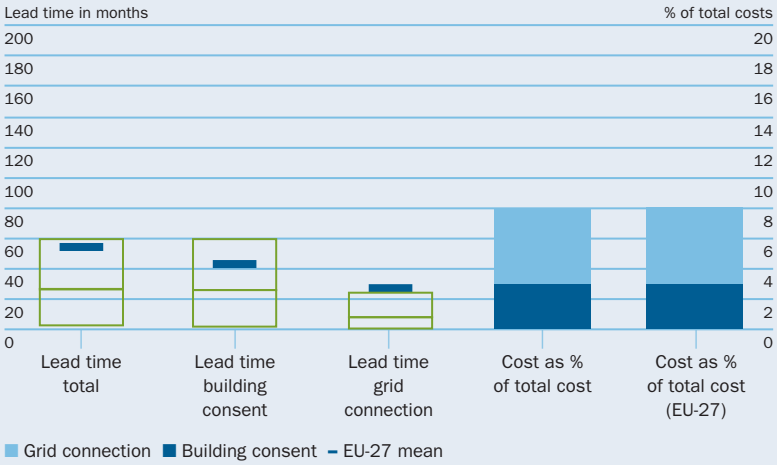
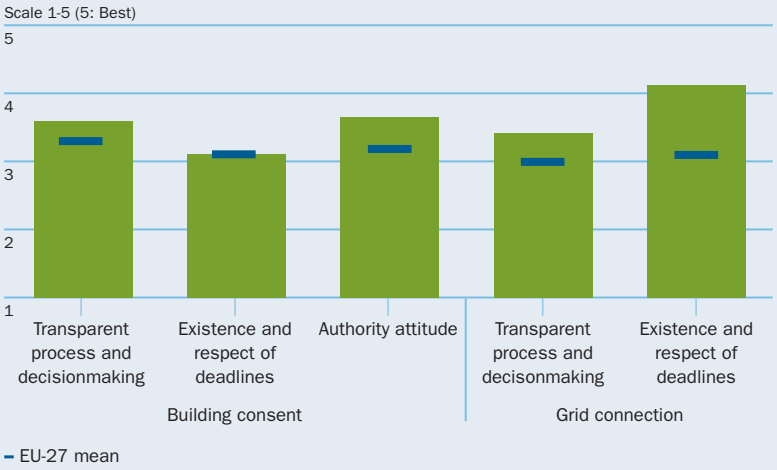


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

Recommendations for administrative and grid connection systems

- Establish concise requirements regarding the scope for the Environmental Impact Assessments (EIAs) to improve the transparency and reduce the lead time.
- Improve developer and investor certainty in the planning process, in order to facilitate target delivery.
- Improve and shorten the lead time for approval of modifications and conditions once the building consent is approved.
- Improve the mechanism for identifying critical points responsible for projects getting blocked in the maturation phase.
- Bring connection costs down.
- Maintain broad stability in the planning framework, and the renewable obligation (the main support scheme for renewable electricity projects in the UK), in order to maintain investor confidence.
- Reduce the number of other parties involved in the grid connection process.

Figure 3: Stakeholders involved in the procedures

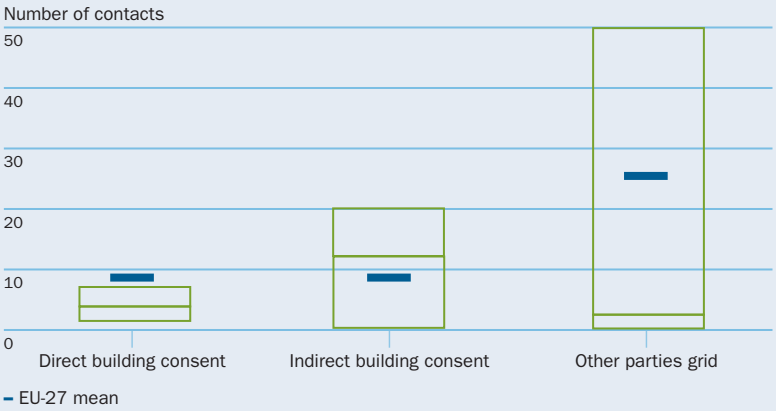
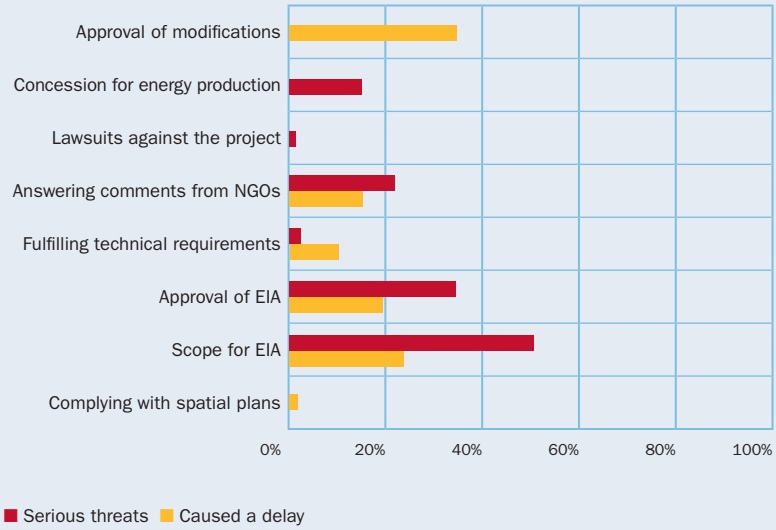


Figure 4: Obstacles to wind farm development



Building consent – strengths

According to the survey the average amount of time taken to get the building permit in the UK is 26 months.

It is important to see this figure in the wider wind energy development context. A larger sample should be used to confirm the findings.

Building consent – challenges

The relatively short time spent planning, when compared to other EU countries, is partly due to an increasing tendency to refuse projects. This is resulting in unnecessary delays in the deployment of projects which are later approved following lengthy and expensive planning appeal inquiries. Those projects blocked in the system are delayed due to environmental issues or for political reasons. Half of the operational projects surveyed were also threatened due to EIA problems.

In addition, there is an increasing tendency towards legal challenges from well established and well funded protest groups, post consent. 50% of those projects that are 'on hold' in the system were delayed at least in part due to law suits from individuals standing against the project.

These delays, at the initial planning stage, at appeal, and too increasingly at judicial review, increase planning effort and therefore investor uncertainty and financial risks.

Figure 5: Reasons why non-finalised projects were put 'on hold'

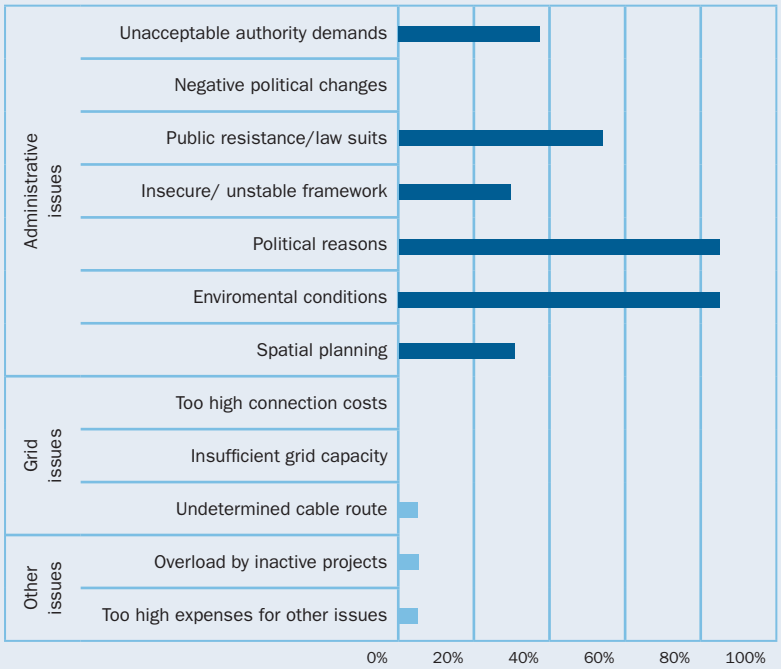
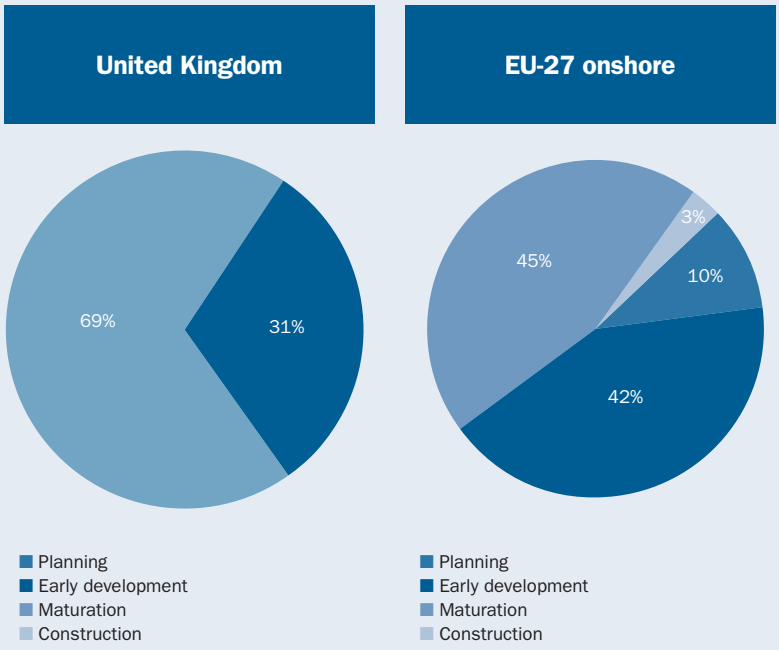


Figure 6: Phase in which non-finalised projects were put 'on hold'



Grid connection – strengths

Concerning the lead times, the administrative process is clearly a critical issue given that the averages and upper values of the range are the same for the total lead time and the administrative lead time. So the grid access lead time is not a barrier at all, and is actually below the EU average.

Transparency indicators are very good for the UK, especially for the definition and respect of deadlines.

It seems that UK grid access management does not present important barriers for the development of wind power.

Grid connection - challenges

Costs (5.2%) are almost equal to the EU average (5.1%).

Projects were blocked in both analysis (31%) and maturation phases (61%). This ratio should be brought down by increasing the efficiency of the weakness detection mechanisms. This would avoid the developers getting too far with the evaluation process of the project.

It seems fairly clear whom to contact for grid connection, with less that one Transmission System Operators/ Distribution System Operators to be contacted. There are up to 70 other parties contacted in some projects (average 2.6), probably because of environmental issues.

EU-27 Offshore

Annual wind installation in 2008:	**357 MW**
Cumulative wind installation in 2008:	**1,471 MW**
Penetration level in 2008 in %:	**3.7%**
Type of market:	**Growth market**
Respondents:	**Eight**

EU-27 Offshore

Figure 1: Lead times and costs

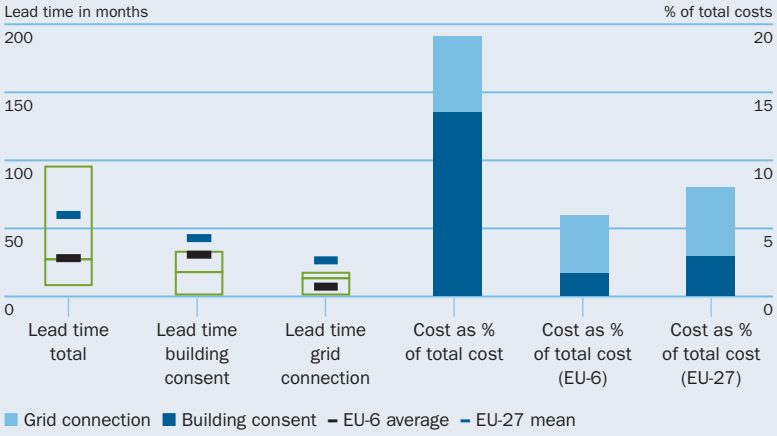
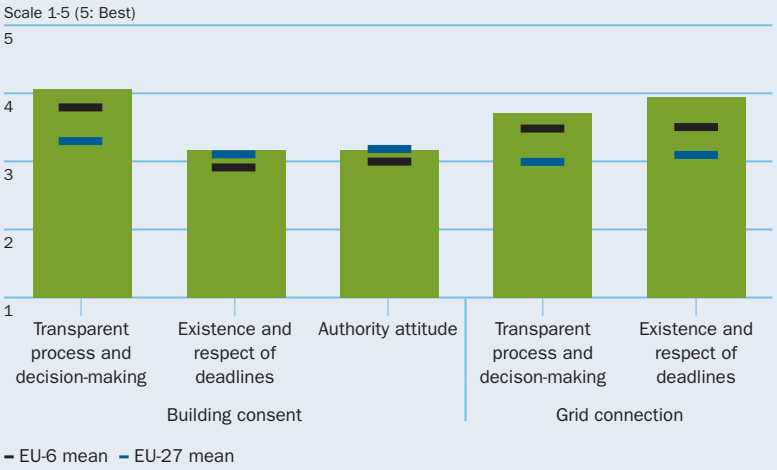


Figure 2: Transparency, deadlines and attitudes



Note: Transparency is measured from 1: Low – 5: High transparency.
Attitude is measured from 1: Opposed – 5: Supportive attitude.

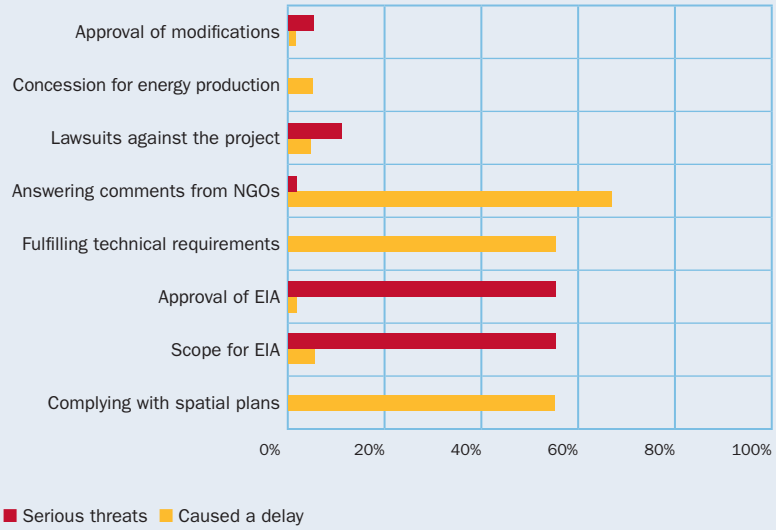
There were six countries with offshore wind projects analysed by the survey (EU-6).

Recommendations for administrative and grid connection procedures

- Improve the knowledge base of both developers and authorities by sharing experiences on Environmental Impact Assessments (EIAs).
- Ensure that the lead time can stay relatively short when more offshore projects will apply for a permit.
- Provide clear definitions of requirements for the EIAs, and of the technical issues for these problems.
- Create comprehensive spatial plans defining the most suitable offshore areas for wind power development.
- Set and keep deadlines for all the procedures.
- Increase knowledge production by efficiently answering technical requirements.
- Include offshore deployment in grid planning.

Figure 3: Stakeholders involved in the procedures

Figure 4: Obstacles to wind farm development



Building consent – strengths

Compared to onshore wind farms, offshore wind farms have a considerably shorter average lead time. The offshore wind farms in the survey have a total lead time of 26 months on average, which is less than half the onshore average of 55 months.

The shorter lead time is mainly due to the shorter time needed for obtaining the building permits and other relevant permits.

If we compare the lead time for offshore (EU-6) with the onshore projects in the same countries, the total lead time is similar. However, the lead time for the building consent is much lower for the offshore projects (18 months) compared to onshore projects in the same countries (EU-6 average is 28 months) and in the EU (average 42 months).

This indicates that the countries with offshore wind farms have created an efficient and rapid decision-making process on the basis of a well functioning onshore process.

Approval of offshore wind farms is done by the national energy agencies instead of regional or municipal authorities. This results in fewer direct contacts and more indirect contacts, because the authorities themselves take a greater responsibility in bringing the application forward between the relevant authorities.

Building consent – challenges

Even though the offshore lead time is considerably shorter than onshore, the costs related to the consenting processes account for more than double the onshore costs.

More than half of the offshore farm projects have experienced serious obstacles concerning the scope and approval of the EIA. On the other hand, only a few projects have experienced lawsuits against the project. More than half of the projects were delayed as they were not able to meet technical requirements, address concerns of NGOs, or comply with the spatial plans for the areas.

The extent of these problems partly reflects the lack of experience in dealing with offshore wind farm approvals. And they explain the high administrative and grid connection costs.

The relative inexperience of both the developer and the authorities causes more uncertainty about the EIA requirements, the handling of the spatial plans, and how to address new types of concerns of NGOs.

This inexperience is also reflected in the developers' perception of the transparency of the process, which is lower for offshore projects than for onshore projects in the EU-6.

Grid connection – strengths

Despite the additional complexity of operating in offshore environments, costs for grid access (5.4%) are reasonable compared to onshore costs (5.1% in EU 27, 4.1% for the EU-6).

Regarding the grid access lead time, the very small range (0-18 months) shows the determination of the authorities to connect the offshore projects.

The processes are as transparent offshore as onshore. The perceived transparency of onshore administrative processes is applicable offshore.

The number of other parties involved is lower because the maritime area is owned by the state.

Grid connection – challenges

Meeting technical requirements is amongst the most cited reasons for delays.

The main challenge for the future is to get these results from a wider sample (more than six countries).

WindBarriers project partners

Partner N°	Participant name	Participant short name	Country code	Main role in consortium
CO	European Wind Energy Association	EWEA	BE	Coordinator In charge of coordinating the data collection in Germany, Belgium, The Netherlands, Luxembourg Involved in all the Work Packages (WPs)
CB 1	Asociación Empresarial Eólica	AEE	ES	National association, in charge of data collection in Spain, Portugal, France, Italy, Greece, Cyprus, Malta
CB 2	Danish Wind Industry Association	DWIA	UK	National association, in charge of coordination in Denmark, UK, Ireland, Sweden, Finland
CB 3	Polish Wind Energy Association	PWEA	PL	National association, in charge of coordination in Poland, Czech Republic, Slovakia, Estonia, Latvia, Lithuania
CB 4	Hungarian Wind Energy Association	HWEA	HU	National association, in charge of coordination in Hungary, Romania, Bulgaria, Austria, Slovenia
CB 5	DONG Energy	DONG Energy	DK	Utility, operating wind farms in Denmark, UK, Norway, Sweden, Poland and Germany both on and offshore; in charge of data collection in these countries
CB 6	Iberdrola	Iberdrola	ES	Utility operating wind farms in Spain, Greece, France, Portugal, Germany and Poland; in charge of data collection in these countries
CB 7	Austrian Wind Power GmbH	AWP	AU	Project developer, with wind parks in Austria, Czech Republic, Hungary, Poland, Slovakia; in charge of data collection in these countries
CB 8	Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.	Fraunhofer Institute	DE	Sharing its experience on previous projects on this matter like the ongoing PROGRESS and the closed OPTRES projects. Developing a methodology for the indicators Calculating the indicators Designing of the questionnaire Computing the final results

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