DeepWind Deliverable

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Nature of deliverable:	**R**
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Actual submission date:	**M48**
Quality check approval by:	**Will be reviewed by Troels Friis Pedersen, DTU**

Part 1: Analysis of a real market for floating offshore wind turbines

Part 2: Preparation for a business plan

Revision	**closed**
Comments from NEN	**Implemented**
Comments from VES	**N/A**
Comments from DTU	**Implemented 22-09-2014**

Remarks
DTU corporate Office for Innovation & Sector Services (Jon Storm Madsen, email 19.03.2014) was consulted to assist with how to achieve a business plan for DeepWind. The reference (in Danish) www.connectdenmark.com was recommended to be considered, together with the above document to establish a business plan. Because VESTAS is no more able to carry out additional steps in leverage of this task, it is found too early to provide a written business plan for the DeepWind concept. The project sofar is providing the background of information to describe the concept in proper terms for the investors. Investors and industrial connections beside Nenuphar are at the moment not identified, and in the time of executing the project, conditions for the industry and wind energy market has changed substantially. An example is DS-SM (worldwide wind turbine tower provider) was sold to US company. The analysis of the wind industry is complex in regional and international measures, and seems to be connected to the business economy in general. Jon Storm Madsen advised us to carry on with the plan –to write the business plan and to look actively for investors and industrial players interested. At the moment there are no patents which have been notified in the consortium. For the business-plan and industrial alliances this issue is also very sensitive.
Conclusion: We have concluded that the working out of the business plan needs a strong industrial commitment and insight, which at the moment is not the case within the project. Therefore we have decided not to write a business-plan, but to prepare a document which guides to prepare this. DeepWind-despite the scientific record of achieving results minimizing the risks, is still to be elevated in terms of actions that narrows the gap between this stage of future emerging technology, and a clear industrial commitment to put plans into action.

We will start this plan with an analysis of the bathymetry in Europe, and thus worldwide. Then, we will analyse the worldwide strategies for offshore wind, for bottom-mounted and floating technologies. Based on these strategies, we will recommend some key markets to develop the Deepwind product, with the following principle: for these markets to be developed, two main things are required:

- A need for deepwater solutions
- A political will with an attractive feed-in tariff for offshore wind

Eventually, we will propose a ramp-up plan to develop a 5MW+ wind turbine for these markets.

Real market analysis
Author: Charles Smadja, NEN
Submitted:22-09-2014
Pp 56

Real market analysis

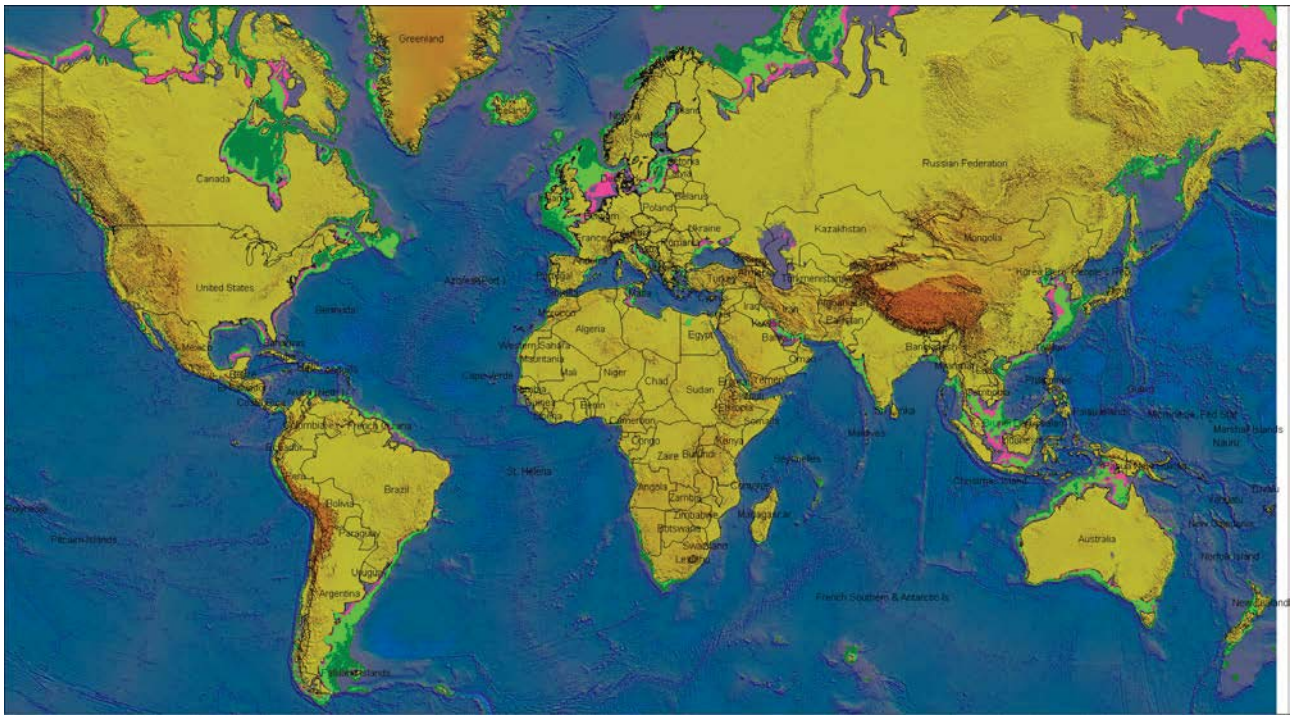
The strategy should be based on the real market. The present report offers a synthesis for offshore (incl. floating) deployment strategies, country by country

1. Depth analysis: where is floating offshore wind a good solution?

The following analysis uses a simple “red light” principle:

- Between 0 and 30 m of depth, no floating offshore wind is required. So red color has been used for these zones.
- For areas with a depth above 50m, floating solutions are clearly required. So green color has been used for these zones.
- Between 30 and 50 m of depth, this is an intermediate are where both floating and bottom-mounted solutions can be considered. But as bottom-mounted solutions already exist for these depths, a rose color (close to red) has been used for these zones.

World overview:



Between 0 and 30 m depth (classical offshore windi

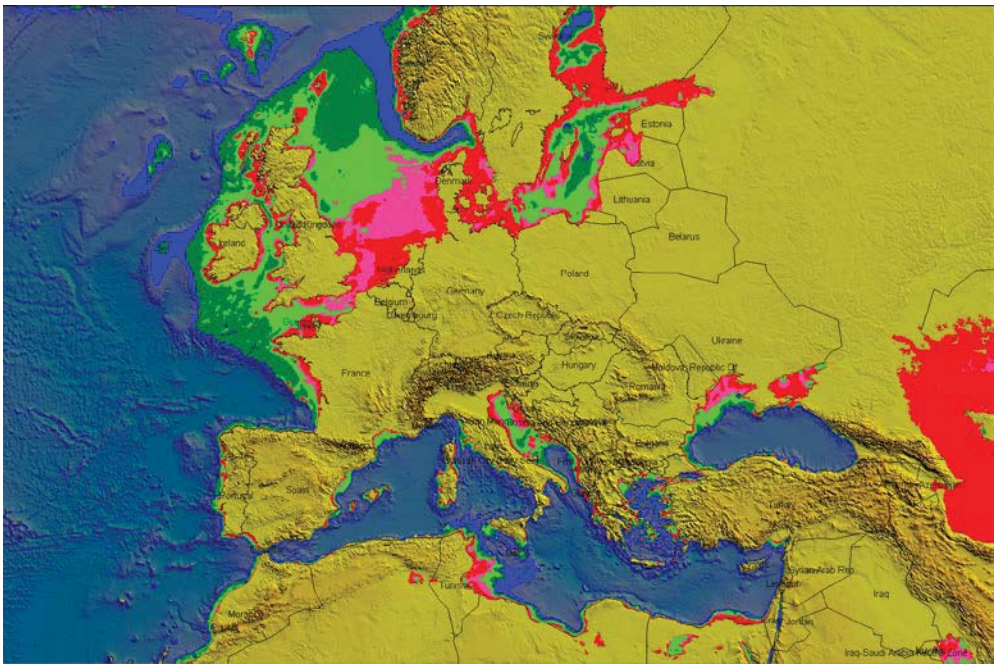
Between 30 and 50 m depth (intermediate area

Between 50 and 100 m depth

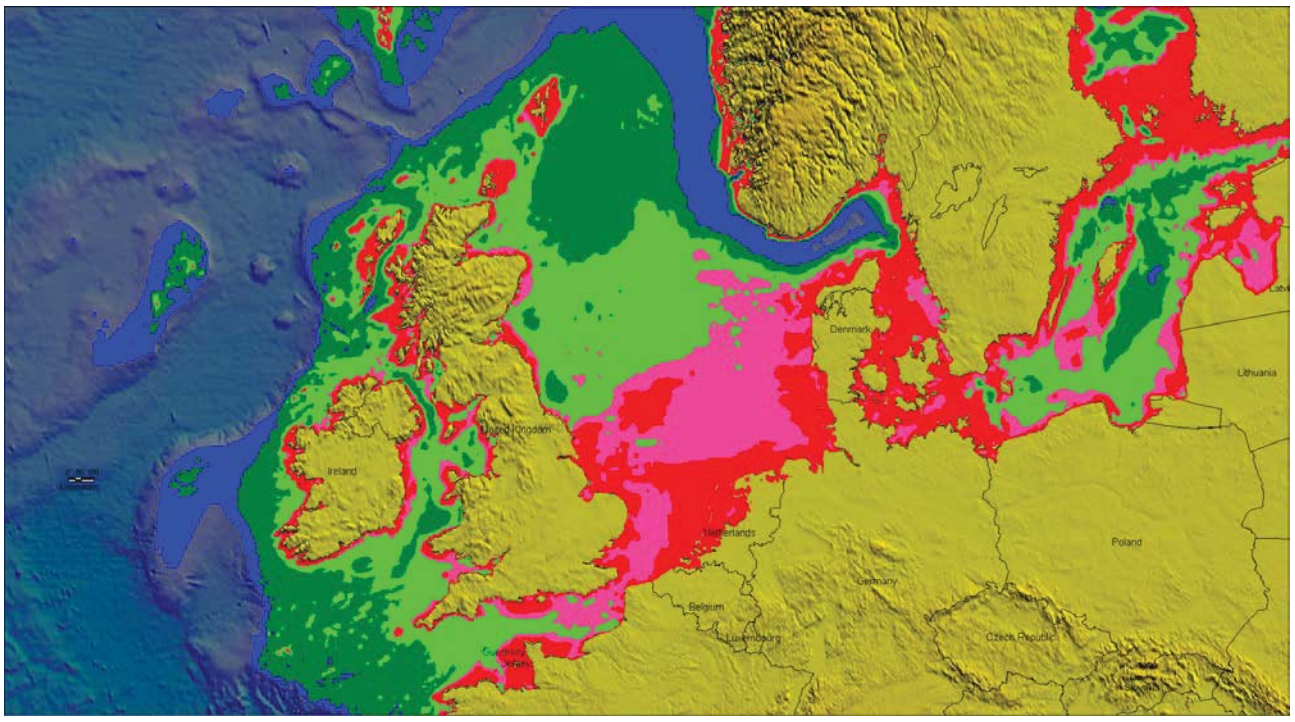
Between 100 and 200 m depth

Between 200 and 500 m depth

Europe:

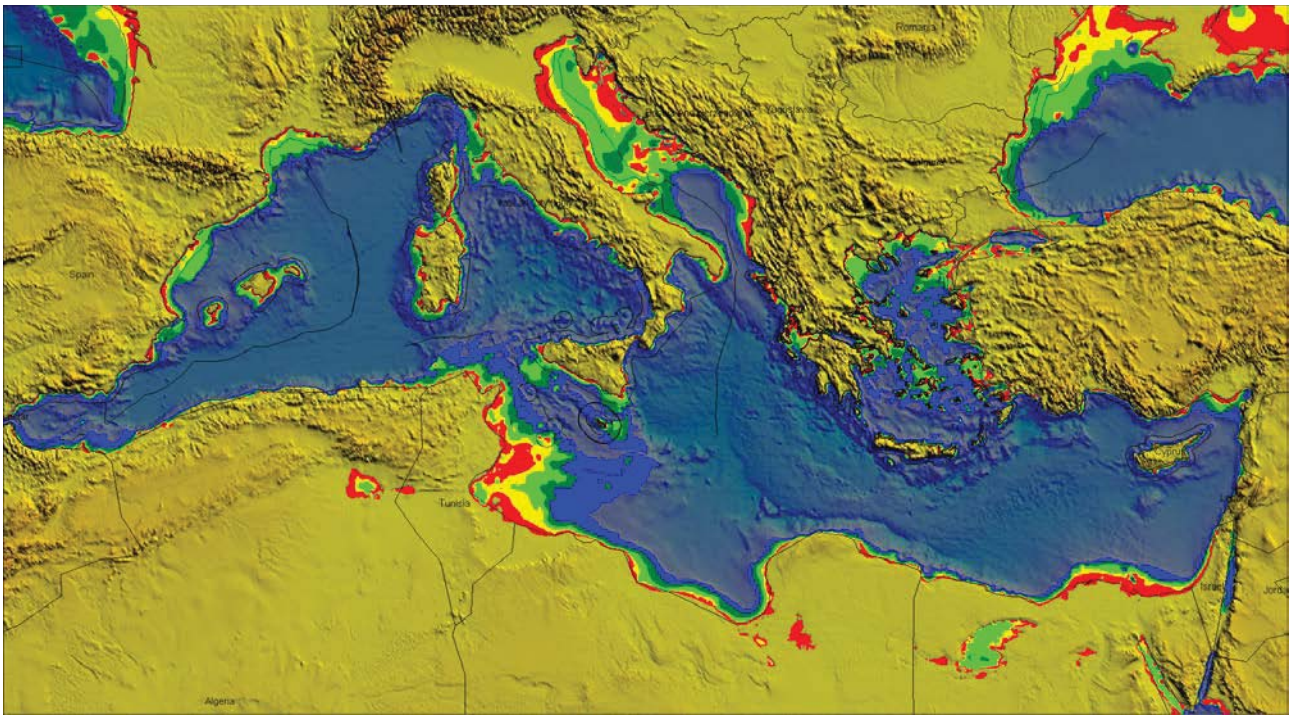


Focus on the North Sea:



Focus on the Mediterranean Sea:

1



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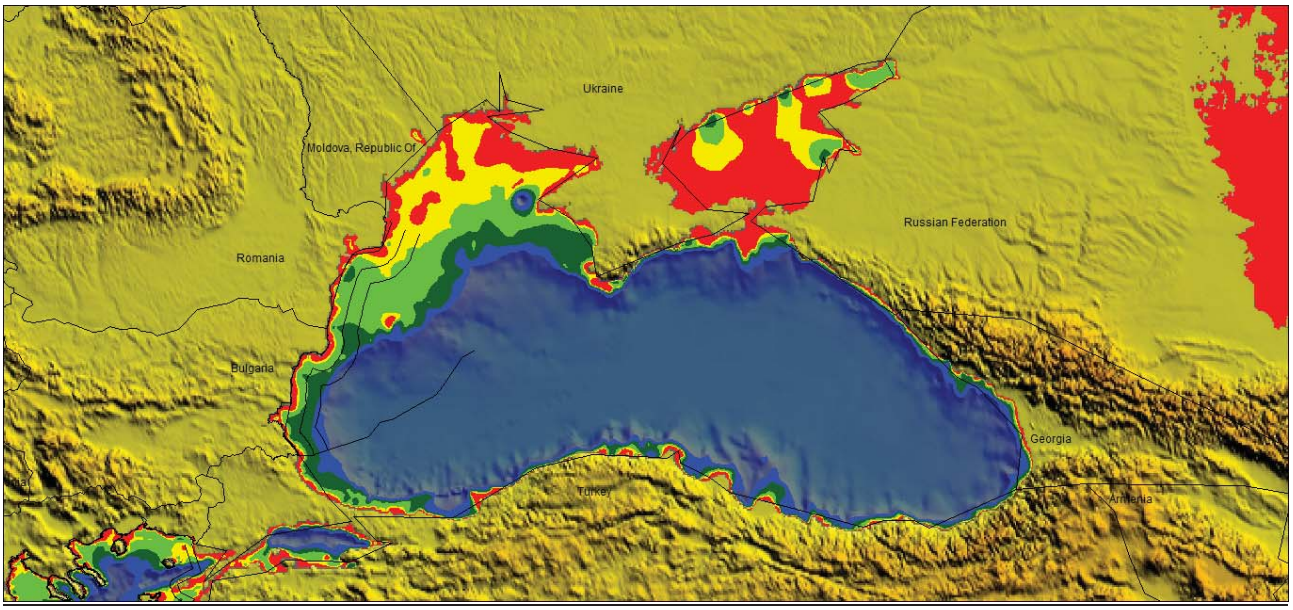
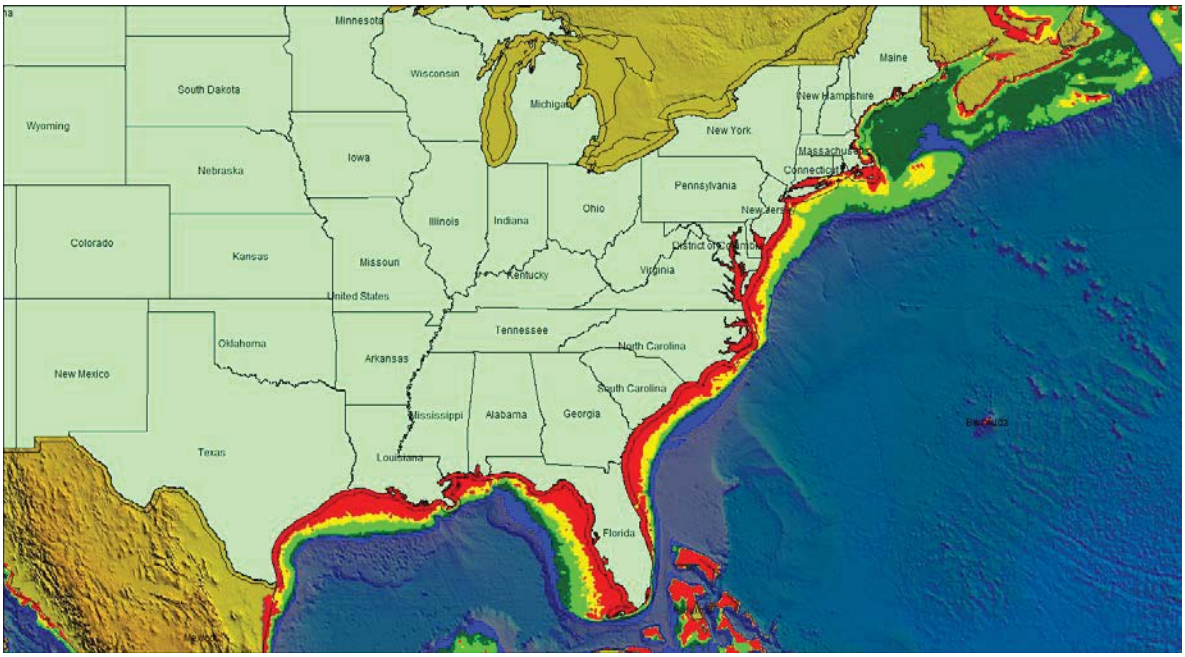
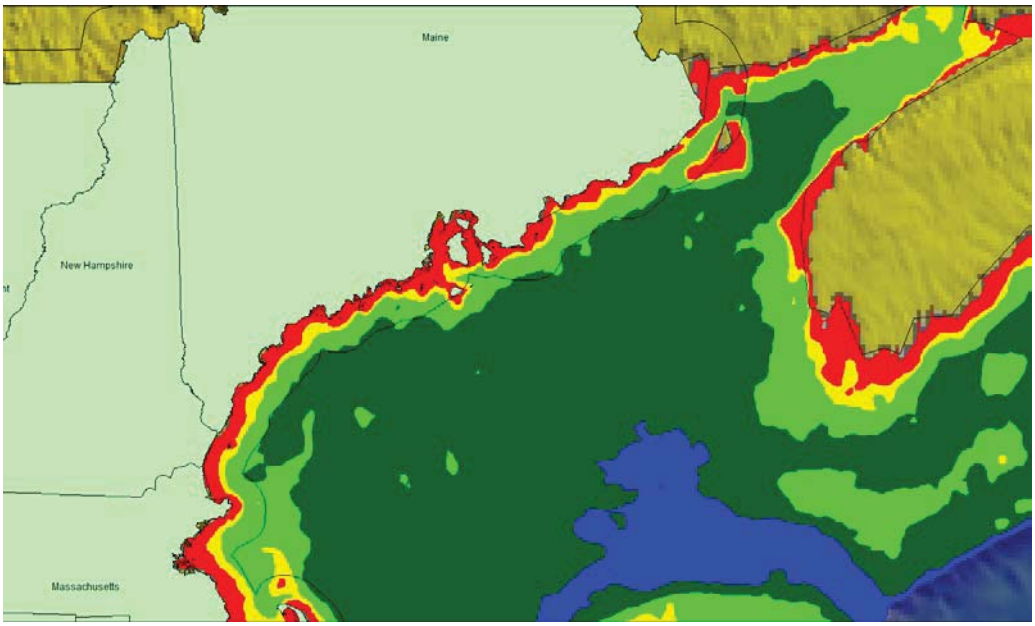


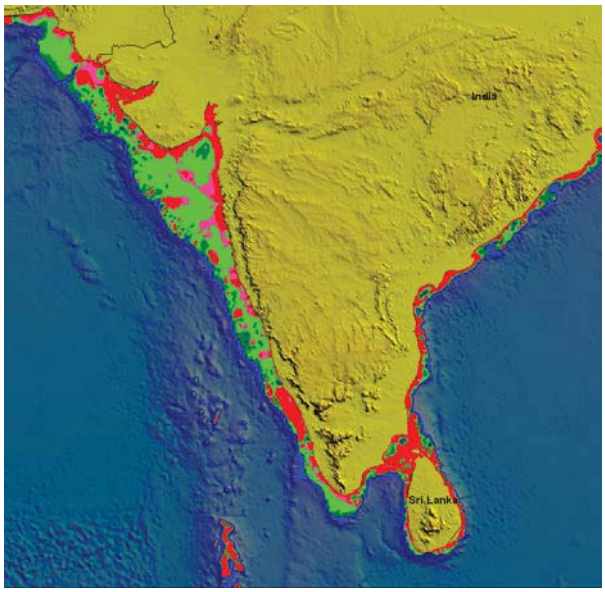
USA – East Coast:



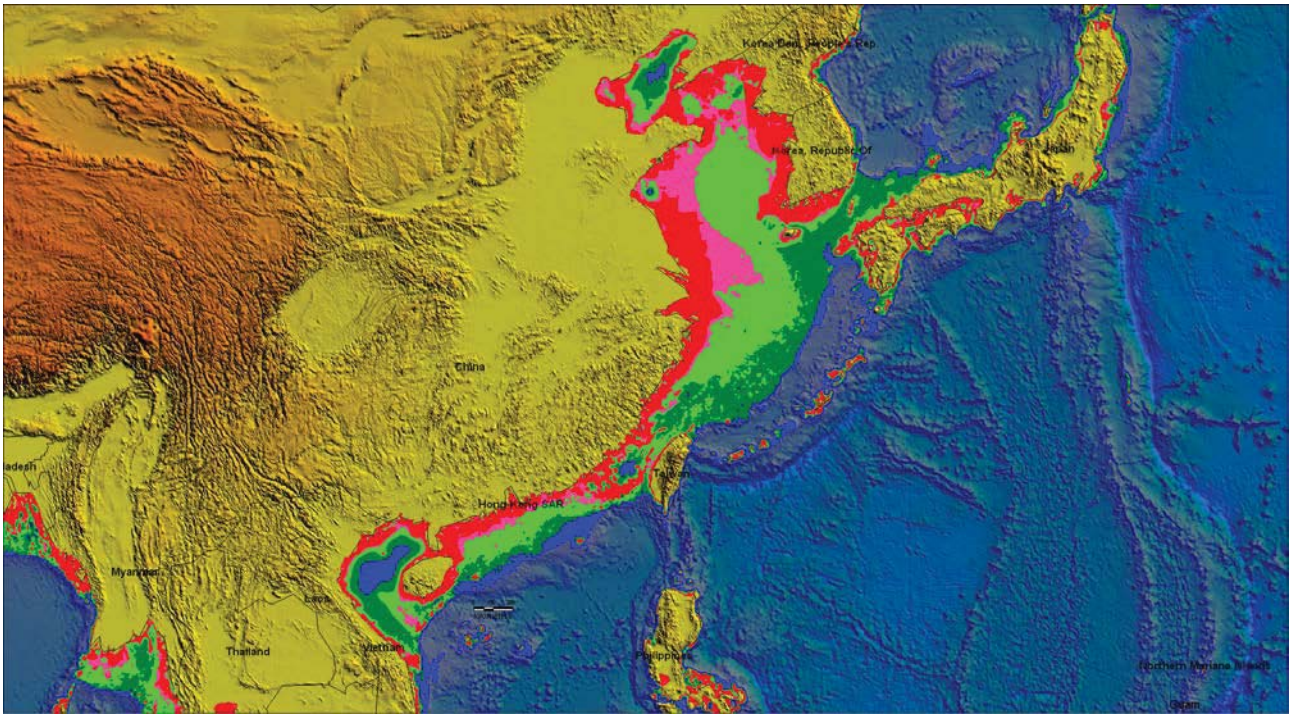
Focus on the State of Maine:



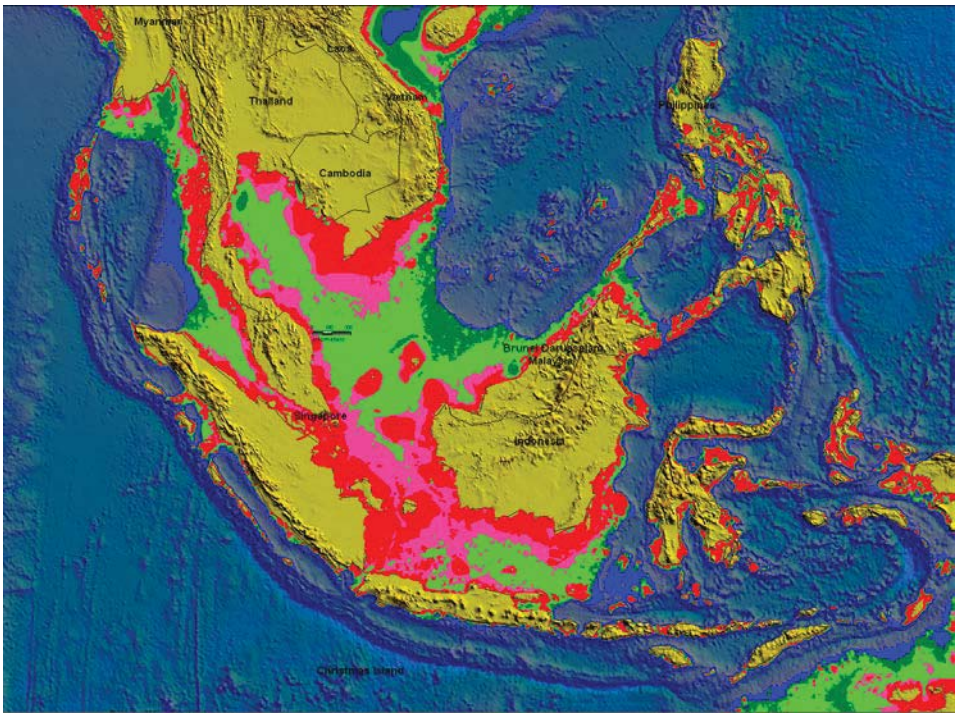
India:


India
Sri Lanka

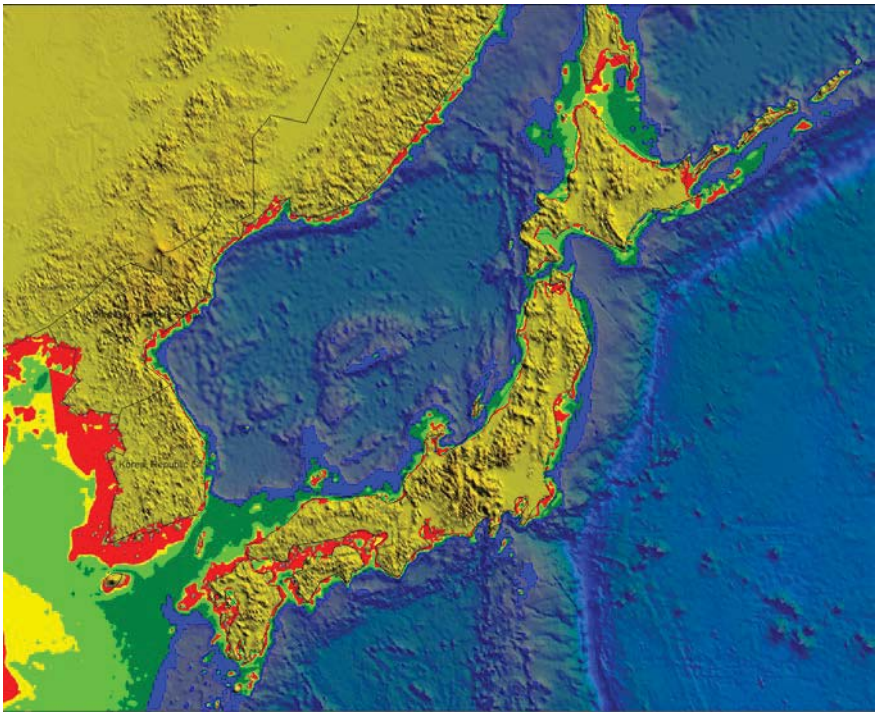
China:


China
Hong Kong SAR
Myanmar
Laos
Thailand
Vietnam
Philippines

South-Easy Asia:



Japan and Korea:



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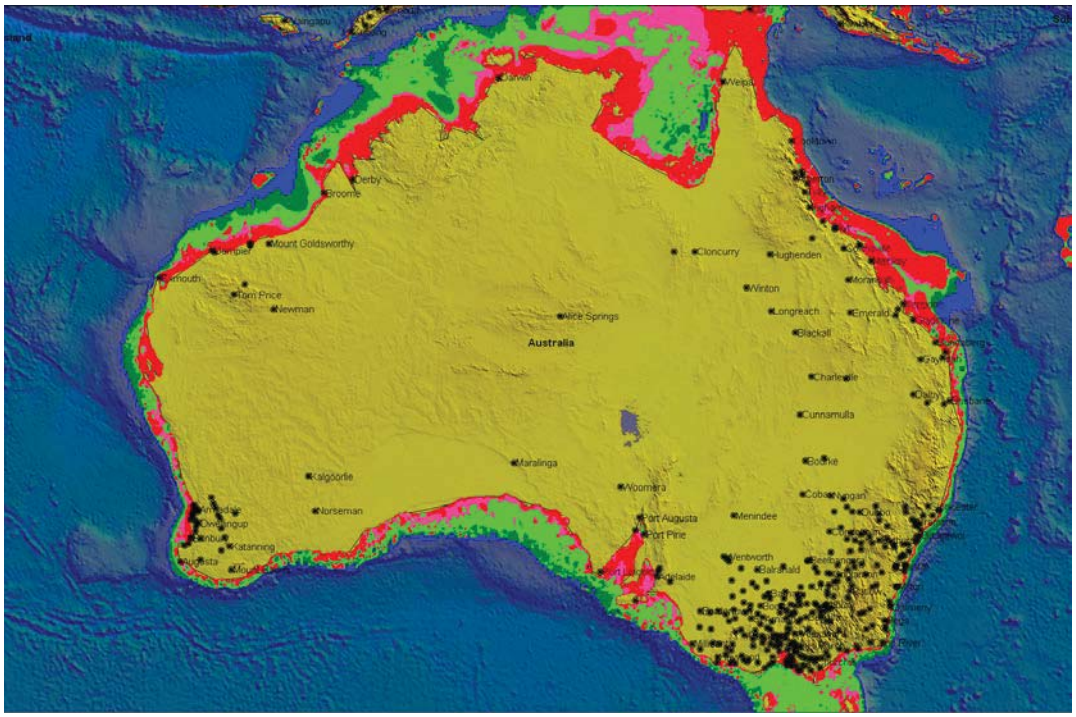

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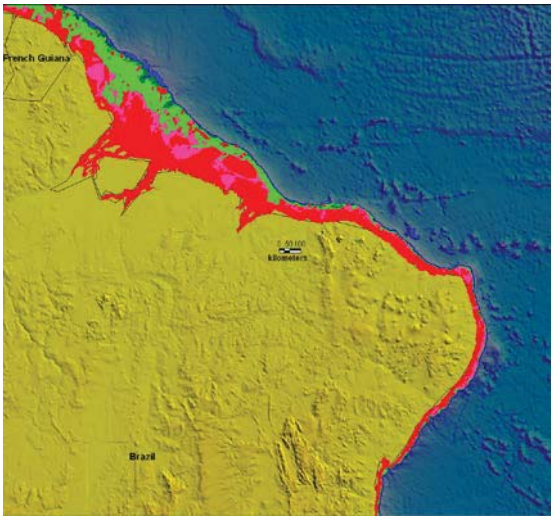
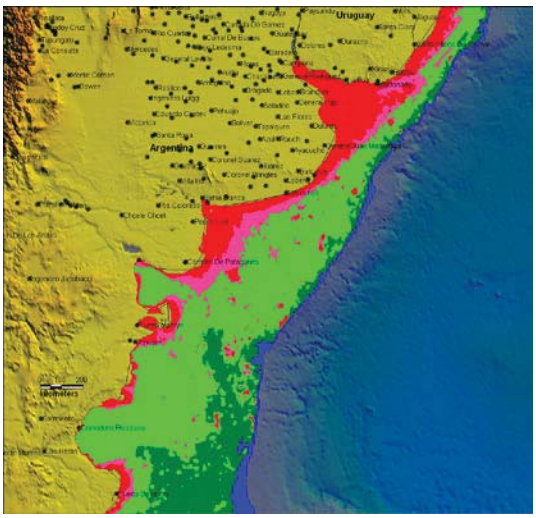


Argentina:



Africa and Middle East:

2. Review on strategies and plans

Currently, Member States apply different support schemes for renewable energy sources, including feed-in tariffs, feed-in premiums, quota obligations with tradable green certificates, investment grants and tax incentives.
Differences in support schemes and support scheme design can be explained by different national priorities and framework conditions. Furthermore, national electricity markets still have very different characteristics and remain nationally segmented, despite the market opening foreseen by Directive 2003/54/EC.
Even though significant differences in support scheme design exist, feed-in systems are the most common RES-E support scheme across Europe. 20 of the 27 EU Member States have implemented feed-in schemes as main support instrument; three more Member States as supporting instrument for certain renewable energy sources technologies.

Recently, also Member States with quota systems have introduced feed-in tariffs in combination with their quotas. Italy and the United Kingdom, for example, introduced a feed-in tariff for small-scale installations and Belgium one for PV. Furthermore Finland recently decided to move from its investment grant support to a feed-in premium.

Definition of feed-in tariffs (FiTs): utilities have the obligation to connect local renewable power generation to the grid. The utilities - or in some cases the government - pay those generators a guaranteed price, i.e. feed-in tariff or a premium on top of the market price for power.
A lot of countries have feed-in tariffs in place: Austria, Denmark, France, Germany, Greece, Luxemburg, the Netherlands, Portugal, Spain, Cyprus, Czech Republic, Estonia, Hungary, Lithuania and Slovenia.
This strategy provides security for investors by guaranteeing revenues with a long-term perspective to production capacity for renewable energy.

Weaknesses:

- Initial feed-in systems did not include any reflection of market price signals; however, modern systems (Spain, Germany) include systems to tune the tariffs to market prices and costs.
- No incentive to reduce production costs. In Germany, it has been proven that wind turbine the debate on the acceptability of feed-in tariffs according to European rules on state-aid generators operate at costs between 15-30% more than in countries where no feed-in tariffs exist.

Regarding the compatibility with EU rules, feed-in tariffs do not yet allow for trade. However, also in this case international trade via certificates.

The use of feed-in tariffs to pay for renewable generation now overwhelmingly dominates European renewable energy policy.

- 20 of 27 EU states use feed-in tariffs as the main renewable energy programme;
- Three of 27 EU states also use feed-in tariffs for certain technologies, such as solar PV in Italy;
- Only four of 27 EU states don't use feed-in tariffs at all;

85% of all new wind systems since 1997 have been installed with feed-in tariffs in the EU;
Nearly 100% of all new solar PV systems since 1997 have been installed with feed-in tariffs in the EU;
68% of all new biomass generation since 1997 in the EU have been installed with feed-in tariffs; Feed-in tariffs are the most cost-effective renewable policy in Europe; and Feed-in tariffs remain the most important measure for EU nations to meet EU renewable targets.

In 1997, there were some 5 GW of wind generating capacity installed in Europe. By the end of 2009 there was 77 GW. Thus, there has been as much as 60 GW of wind capacity installed in Europe with feed-in tariffs. A fleet of this size is capable of generating more than 120 TWh per year and represents a private investment of more than US$120 billion.

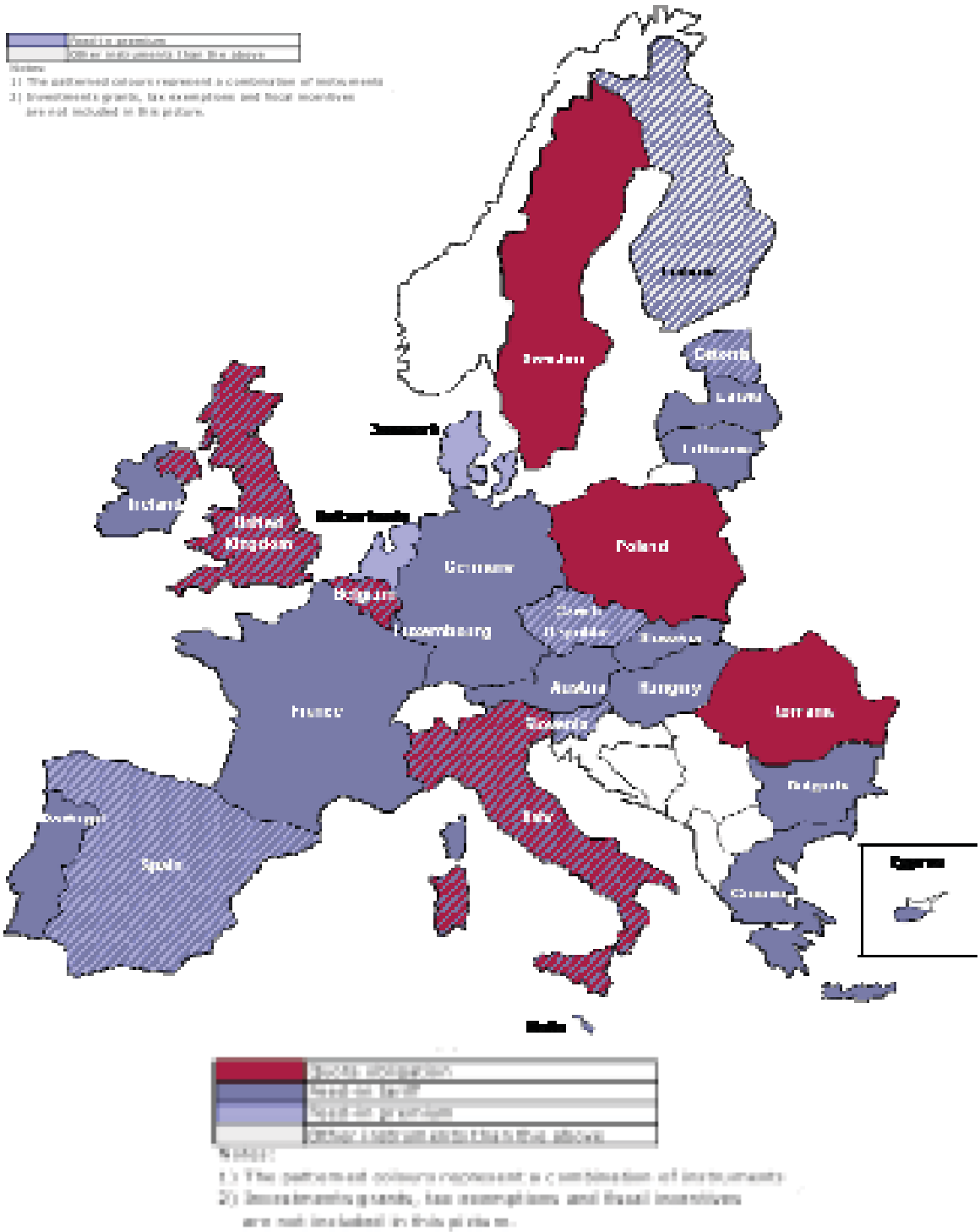
For onshore wind energy feed-in tariffs are more cost-effective than other policy mechanisms and especially more so than quota systems, such as renewable energy standards. For example, consumers in the UK are paying far more for wind energy than necessary to build profitable projects. Similarly, Italians are paying more than necessary, as are Belgians. The UK's Renewable Obligation uses a quota system with tradable green certificates. Italy and Belgium use similar policies.

In contrast, Germany, France, and Spain pay only what's necessary to develop a profitable project.
The French system of differentiated tariffs for wind energy is based on resource intensity works that reduces the cost of wind energy to consumers.

Differentiated wind tariffs are used in France, Germany, and Switzerland.

In France, wind turbines are paid 0.082€/kWh for the first ten years of a 15-year contract. During the years 11 through 15, the tariff varies based on the productivity of the wind turbine. Highly productive wind turbines, for example at windy sites, are paid as little as 0.028/kWh whereas turbines at less windy sites are paid up to 0.082/kWh. This limits excessive profits at windy sites, that is, higher payments than necessary to develop profitable projects.

Some member states reformed their renewable energy policy to enable more local ownership and in so doing increase local acceptance of renewable energy. Historically, there has been more local ownership of renewable generation in jurisdictions that use feed-in tariffs. More than half of the 43 GW of renewable generators in Germany are owned by farmers or local investors.



Map of EU countries according to their support mechanisms for renewable energy sources (Introduction of Feed-in Premium in Finland)

Countries using feed-in tariffs have been responsible for the majority of newly installed wind onshore and photovoltaics capacity in Europe, 86% of all wind onshore capacity and nearly 100% of all photovoltaics capacity installed by the end of 2009 in Europe was initiated by feed-in tariff systems. Also in overall terms

countries using feed-in tariffs have had a leading role in developing renewables in Europe: 77% percent of the new renewable electricity generation in Europe installed between 1997 and 2008 was contributed by these countries. On the other hand feed-in tariff countries are responsible for only 61% of the European electricity demand in 2008.

The positive impact of a feed-in tariff on wind energy deployment is demonstrated by best-practice countries, particularly Spain, Germany, Denmark and Portugal. In total, the installed wind power capacity in Europe5 has increased by a factor of almost 8 from 1999 to 2009 and risen from 9678 MW to 74767 MW. From 2008 to 2009, the growth in wind energy capacity was 16%.

In most of the countries with significant PV deployment, the vast majority of installations have occurred following the introduction of a feed-in scheme. The strong growth in Germany and formerly Spain are the clearest indicators, but also recent tariff introductions in Italy, France, Portugal, Czech Republic and Slovenia have led to stimulation of previously insignificant markets for PV.
Feed-in schemes help to decrease renewable energy sources generation costs.

One goal of energy policy should be to provide incentives for technology improvements and more efficient solutions in order to reduce the electricity generation costs of renewable energy sources technologies. One best practice element of feed-in systems is the regular degression of tariffs: The tariff / premium level depends on the year in which the renewable energy sources plant starts to operate. Each year the level for new plants is reduced by a certain percentage. Therefore the later a plant is installed, the lower the reimbursement received. The tariff degression can be used to provide incentives for technology improvements and cost reductions.

Besides the annual tariff degression implemented in many feed-in tariff systems further measures are used to limit the support expenditures of feed-in systems. Many Member States apply a **stepped tariff design**, where the level of the tariff depends on the specific resource condition of the individual plant. Especially the costs of electricity from wind energy vary significantly depending on the wind yield, which is taken into account by such a tariff design.

In the **Netherlands**, **Portugal**, **Denmark**, **France** and **Germany** concepts are applied where the FIT level depends on the local conditions at the plant site. In the first four countries in this list the guaranteed payment of a higher tariff level is limited to a maximum energy output of a plant. A lower level of the tariff applies, when this amount of power output is reached.

In **Germany** the support system for wind energy is a little different. Operators of onshore wind turbines receive a fixed FIT during the first five years after the plant has started operating. The German Renewable Energy Act ("Erneuerbare-Energien-Gesetz", EEG) defines a *reference wind turbine*, which is located at a site with a wind speed of 5.5 m/s in an altitude of 30 meters. This reference turbine would generate a so-called *reference yield* in a five-year-period. If a wind turbine produces at least 150% of this reference yield within the first five years of operation, the tariff level will be reduced for the remaining 15 years of support. However, for each 0.75% the generated electricity stays below the reference yield, the higher starting tariff will be paid for two further months. This means that the use of wind energy to generate electricity is not

restricted to locations with very good wind conditions but that sites with less favourable conditions can also be exploited.

Many EU Member States want to support (especially high price) technologies but are afraid that support costs may increase uncontrollably. Some countries set caps, limiting the amount of annual installations to a certain capacity or financial amount. The downside of caps is the reduced investment stability for market parties and a frequent stop-and-go in the market. Therefore other countries set growth corridors with continuous automatic adjustments of tariffs. The latter option preserves investment stability to a higher degree but may be less effective in limiting the increase of support expenditures.
A growth corridor or growth path is the amount of renewable capacity a country would like to see installed in a given year (e.g. 800-1.200 MW, or 1.000 MW) or part of a year (e.g. 200-300 MW per three month). In case growth is in line with that growth corridor the normal tariff degression would apply (e.g. minus 10% per year). In case growth is stronger than envisaged, the tariff degression is increased (e.g. minus 1% per 10% overshoot). In case of less growth than envisaged, tariff degression is decreased. The higher the frequency of adjustments (e.g. once in three month instead of once a year) and the higher the increase of tariff degression in case of overshoot, the higher the control on support cost but the lower the investment stability. Germany currently uses this system in the case of photovoltaics, whereas Spain applies a fixed cap for the annual installed capacity.

Support for autoproducers through net metering was introduced in a number of countries with the aim to decrease the grid load and also to limit the support expenditures. The most prominent example for this policy is Italy, which revised its former Net Metering policy in 2009 and introduced a law which allows RES-E plants with a nominal power of up to 20 kW, plants with a capacity up to 200 kW that started production after 31.12.2007 and high-efficiency CHP plants up to 200 kW to apply Net Metering. Under this scheme, the producer is able to compensate the value of electricity consumed with the value of the electricity produced in different periods, thus reducing the producer's electricity bill. Therefore, there is no direct remuneration for (excess) electricity fed into the grid but an exchange of the value of electricity consumed and produced.

United Kingdom

The United Kingdom was the most active country in the EU in 2010, connecting an additional 653MW bringing the installed total to 1341.2MW. This additional capacity includes the Thanet (300MW), Gunfleet Sands I and II (108 and 64.8 MW) and Robin Rigg (180MW) wind farms.
The country is already the largest single offshore wind market in the world and is expected to achieve revenue worth $4.5 billion by 2017. (Pike research)
It offers the greatest level of government subsidy. The country has pre-approved 49 GW of offshore wind capacity, worth a potential investment of $100 billion.
12 GW of capacity in the United Kingdom should come online by 2017, representing a 42 per cent annual growth rate.

According to Renewable UK, British wind power capacity rose to 5203.8MW in 2010, over a quarter of which (25.8%), 1341.2MW, is offshore.
The UK will build on its global leadership of the offshore segment in years to come with, according to Renewable UK, 1154.4 MW under construction and 2591.7MW of approved projects. The pace of onshore installations is also bound to pick up, with projects for 1363.9MW under construction and 3604.3 MW already approved. British aid policy continues to be based on a system of certificates (Renewable Obligation Certificate System).

A ROC is the green certificate issued for eligible renewable electricity generated within the United Kingdom and supplied to customers in the United Kingdom by a licensed supplier. ROCs are issued by Ofgem (Office of gaz and electricity market) to accredited renewable generators. The default is that one ROC is issued for each megawatt-hour (MWh) of eligible renewable output. Some technologies get more, some less. For instance, offshore wind installations receive 2 ROCs per MWh; onshore wind installations receive 1 ROC per MWh and sewage gas-fired plants receive half a ROC per MWh.
For the 2011-2014 period, the number of ROCs needed for suppliers (in England, Scotland and Wales) to reach their objectives will be 0.124 ROCs per MWh supplied in England (a little over 12% of all renewable electricity). It will be 0.055ROCs per MWh in Northern Ireland. The value of one MWh varies by technology – one MWh of onshore wind power earns only 1 ROC, whereas one MWh of offshore wind power earns two (for accredited wind farms until 2014).
Incentive: UK Renewable Obligation
Prices: Offshore wind: Two Renewable Obligation Certificates (ROCs)
Time to register/apply: 9-12 months to gain consent from the IPC, plus time to conduct consultations and carry out environmental impact assessment.
Grid connection and responsibilities: Transmission System Operator
In the United Kingdom, the generation of electricity from renewable sources is regulated through a **combination of a feed-in tariff system and a quota system** in terms of a quota obligation and a certificate system.

Under the feed-in tariff, accredited producers whose systems have a capacity of less than 5 MW can sell their electricity at fixed tariff rates established by the Gas and Electricity Market Authority (Ofgem).
The feed-in tariff system in Great Britain came into effect in 2010 and aims to support small-scale RES-E systems (less than 5 MW, however systems between 50 kW and 5 MW located in Great Britain are entitled to choose between this system and the Renewables Obligation). Once the accreditation process of the system is completed, the electricity exported to the grid by the system is bought by a FiT licencee, i.e. an electricity supplier, at the rates fixed by the FTO 2010 and corrected yearly by the the Gas and Electricity Markets Authority.

The FTO 2010 applies only to Great Britain, i.e. England, Wales and Scotland. The Order does not apply to Northern Ireland.
In order to be accredited, wind installations of less than 50 kW shall take part in the Microgeneration Certification Scheme, an independent scheme that certifies microgeneration products of less than 50 kW and installers in accordance with consistent standards. Alternatively, installations between 50 kW and 5MW shall complete a process for accreditation based on the existing ROO process (thus called ROO-FiT Process) (Renewable Obligation Process).
Payment rates:

- up to 1.5kW = 0.362 GBP/kWh
- 1.5-15kW = 0.28 GBP/kWh
- 100-500kW = 0.197 GBP/kWh
- 500kW-1.5MW = 0.099 GBP/kWh
- >1.5MW = 0.047 GBP/kWh

An inflation-indexed payment rate table is published every year prior to 31 March by the Gas and Electricity Markets Authority.
The tariffs are guaranteed for 20 years.

Under the quota system, electricity suppliers of more than 5 MW are obliged under the Renewables Obligation Orders to supply a certain proportion of electricity from renewable sources ("quota") to their customers.

To this end, they shall present Renewables Obligation Certificates (ROCs, SROCs in Scotland, NIROCs in Northern Ireland) to the regulatory authority Ofgem (in charge of England, Scotland and Wales and receiving NIROCs on behalf of NIAUR, the regulatory authority of Northern Ireland). A supplier's quota is deemed satisfied if he presents a certain number of green certificates.

This framework supports systems or plants above 5 MW. Systems or plants between 50 kW and 5 MW located in Great Britain (England, Wales and Scotland) are entitled to choose between the ROC scheme and the FIT. Systems eligible for the Feed-in Tariff Scheme are not eligible for ROCs. The ROC scheme supports systems above 5 MW.

Both onshore and offshore wind energy stations are eligible except systems that were commissioned prior to 01/01/1990 and have not been substantially renewed since 31/12/1989.
Amount of quota.

Obligation period	Number of ROCs / MWh of electricity supplied in Great Britain
1 April 2009 – 31 March 2010	0.097
1 April 2010 – 31 March 2011	0.104
1 April 2011 – 31 March 2012	0.114
1 April 2012 – 31 March 2013	0.124
1 April 2013 – 31 March 2014	0.134
1 April 2014 – 31 March 2015	0.144
1 April 2015 – 31 March 2016	0.154
Any further 12-month obligation period until 31 March 2037	0.154

(Schedule 1 ROO 2009)

Obligation period	Number of ROCs / MWh of electricity supplied in Northern Ireland
1 April 2009 – 31 March 2010	0.035
1 April 2010 – 31 March 2011	0.040
1 April 2011 – 31 March 2012	0.050
1 April 2012 – 31 March 2013	0.063
1 April 2013 – 31 March 2014	0.063
1 April 2014 – 31 March 2015	0.063
1 April 2015 – 31 March 2016	0.063
Any further 12-month obligation period until 31 March 2037	0.063

(Schedule 1 ROO 2009)

In England, Wales and Scottland, and Ireland, the amount of electricity to be stated in a renewables obligation certificate is 1 MW for onshore wind and 2/3 MW for offshore wind.
The costs of the quota system are borne by the consumers through the electricity price.
Furthermore, in the United Kingdom commercial and industrial users of traditional energy sources are subject to a Climate Change Levy (CCL), a tax on the consumption of fossil energy.

Ireland

In Ireland, electricity from renewable sources is promoted through a feed-in-tariff scheme that operates as a floor price, i.e. bonuses on top of the wholesale price. The entities entitled to this tariff are those suppliers that purchase electricity from renewable sources from generators with whom they have entered into a commercially negotiated REFIT power purchase agreement. The REFIT scheme establishes guaranteed support prices for each category of electricity. The original scheme known as REFIT 1 only had state aid clearance to accept new applications until 31/12/09. Consequently state aid approval is being sought to continue to offer REFIT. REFIT 2 covering onshore wind (small and large scale), hydro (small scale) and landfill gas is with the European Commission for clearance. Separate state aid applications will be required for additional REFIT categories of offshore wind (and wave and tidal energy). This regulatory system indirectly incentivises the generation of electricity from renewable sources.
Thus, only onshore wind-power plants (differentiation between systems over and under 5 MW) are eligible.

In detail, the amount of payment is calculated as follows:
- Electricity suppliers receive at least 15% of the reference price for large-scale wind power (exceeding 5 MW).
- If the market payment is less than the reference price as defined, the supplier in question will be paid the difference
The amount of payment is based on a reference price. The reference prices are:

- Large-scale wind-power stations (exceeding 5 MW): €ct 6.6 per kWh
- Small-scale wind-power systems (up to and including 5 MW): €ct 6.9 per kWh

Since 1 January 2007, the reference prices have been annually adjusted by the annual increase, if any, in the consumer price index.
Eligibility to the REFIT scheme is limited as follows:

- The duration of support is limited and depends on the term of the individual power purchase agreement (PPA); however, the term of the agreement shall not exceed a period of 15 years.
- The eligibility period will terminate if one of contracting parties prematurely terminates the PPA or if the „letter of offer“ is withdrawn by the Department of Communications, Energy & Natural Resources.

Distribution system:
All active electricity supply companies are obliged to levy the PSO (public service obligation) (if any) on all of their final customers when issuing electricity bills and all final customers pay the levy to their supply company as part of their electricity bill. The relevant levy amount is then collected from suppliers for distribution and transmission connected customers the system operators. The TSO is responsible for making payment of the money it collects to all relevant PSO stakeholders, which includes electricity suppliers eligible for REFIT payments.

Baltic sea

The Baltic Sea is poised to become Europe's second biggest wind energy hub after the North Sea following the launch of Germany's first commercial offshore wind power park.

The Baltic 1 wind park, officially inaugurated by German Chancellor Angela Merkel, is about 16 kilometers offshore from the Fischland-Darss-Zingst peninsula.
The park consists of 21 wind turbines and has a total installed capacity of 50 MW. The park is operated by Energie Baden-Wuerttemberg (EnBW), a German utility based Karlsruhe that aims to generate 20 percent of its energy from renewable sources by 2020.

As Germany's first commercial offshore wind power farm, Baltic 1 follows the country's other big offshore wind park, the smaller "Alpha Ventus" consisting of 12 wind power generators in the North Sea. The park was launched as a test pilot supported by the German government.
EnBW has begun plans to build a second Baltic Sea wind park, a much larger facility with 80 turbines located offshore from the island of Ruegen. It is slated to go online in 2013. The estimated cost of the new facility is €1.2 billion.

The new EnBW wind farm is only the beginning of more onshore and offshore wind parks as well as solar parks in Germany. The government has so far granted permission for 23 offshore parks in the North Sea with a capacity of 5,650 MW and three in the Baltic Sea with a capacity of 1,040 MW. But demand is much larger: The government has received applications from potential operators to build an additional 56 wind parks in the North Sea and 15 in the Baltic Sea.
Germany's energy policy has changed dramatically following the catastrophe in Japan's Fukushima nuclear power plant. It now calls for far greater support for and use of renewable energies, particularly wind power.

Germany

Germany is the other key EU market. Despite its limited coastline and the need to go to deeper waters, the country has significantly accelerated its offshore wind development, thanks also to favourable public policy. The local wind energy sector hopes to benefit from the manufacturing capacity and knowledge that already exists with onshore wind production in north western Germany.
2010 Germany remains the EU country with the largest installed capacity, followed by Spain, Italy, France and the UK. It connected some of the Baltic 1 and Bard 1 project wind turbines, adding108.3MW of capacity to bring accumulated capacity up to 180.3MW.

The Fraunhofer Institute for Wind Energy and Energy System Technology (IWES) has joined forces with the ForWind wind energy research center to form the National Wind Energy Research Association.
Germany gives greater priority to renewable energies, in particular wind power, in the wake of the Fukushima nuclear disaster. The goal of the German government is to generate at least 35 percent of the country's electricity needs using renewable energy sources by 2020.

Incentive: Feed-in tariff

Prices: initial tariff: 0.13€/kWh plus bonus of 0.02 €/kWh for commissioning by end of 2015. No digression until 2015.

- Onshore: 5.02 – 9.2 €ct/kWh (according to duration of payment) + 0.5 €ct/kWh each for a system service bonus and/or a repowering bonus.
- Offshore: 3.5 – 13 €ct/kWh (according to duration of payment) + bonus of 2 €ct/kWh for systems commissioned prior to 1st January 2016.

Time to register/apply: two to three years, in some cases five.
Grid connection and responsibilities: Transmission System Operators
Germany has seen a strong increase in installed wind energy over the last ten years: the installed capacity increased from 4442 MW in 1999 to 18415 W in 2005 to 25777 MW in 2009. By the end of 2009, wind energy accounted for 6.7% of German electricity production.
The tariffs for electricity from RES are reduced annually. Depending on the type of technology, the FITs for new installations decrease by 1% for wind power plants and, once in July 2010 up to 13%. This way cost reductions due to the learning curve effect are included in the policy and a continuous incentive for efficiency improvements and cost reductions for new plants is offered.

Both onshore and offshore generation are eligible with the following exceptions:

- Inefficient onshore generation. Electricity from wind energy is not eligible if generated by systems whose output exceeds 50 KW and for which the system operator provided no proof prior to commissioning that they are able to achieve at least 60 per cent of the reference yield at the planned location. This proof shall be furnished by presenting a technical expert opinion.
- Offshore generation in protected areas. Electricity is not eligible if generated by systems located in an area of environmental importance, such as systems constructed in a protected area or at a site of Community importance.

The amount of tariff for a given system is the statutorily fixed tariff minus the degression percentage, which depends on the year in which the system was put into operation. The amount of tariff depends on the costs of constructing and operating a certain type of plant, i.e. investment costs, operational costs, the costs of measurement and the cost of capital. Cost and efficiency audits are carried out in exceptional cases only. The calculation of the tariff is based on the expected costs. This aims to guarantee the cost-effective operation of most systems.

Onshore: 5.02 – 9.2 €ct/kWh (according to duration of payment) + 0.5 €ct/kWh each for a system service bonus and/or a repowering bonus.

Offshore: 3.5 – 13 €ct/kWh (according to duration of payment) + bonus of 2 €ct/kWh for systems commissioned prior to 1st January 2016.

The tariffs will be gradually reduced. The degression principle is meant to provide an incentive to reduce costs through technological progress. The tariffs for new systems will be reduced by a legally fixed percentage depending on the year of commissioning and the energy source used (§ 20 EEG). The reference tariff applicable in the year a given system is put into operation is applicable during the entire period in which the tariff is paid. A progress report shall be filed on a regular basis to evaluate the tariffs and

recommend adjustments. The degression rate is 5% for electricity from offshore wind systems from 2015 onwards and 1 % for other systems.

Denmark

Denmark added 211MW in 2010 with Rodsand II (207MW) and the latest (3.6-MW) wind turbine to the Avedore farm, taking its offshore capacity to 872MW.

Incentive: Feed-in tariff added to market prices, negotiated in a tender process.

Prices:

- Horns Rev II: 0.07 €/kWh
- Rodsans 2: 0.08 €/kWh
- Anholt: 0.14 €/kWh

Time to register/apply: one year (as an average). But it can take three or four years for a political decision to launch the tender process.

By the end of 2009, wind energy accounted for 19.5% of Denmark electricity production.
In Denmark, electricity from renewable sources is promoted through a price regulation system based on net-metering and a variable bonus paid on top of the market price. In addition, local initiatives for the construction of wind energy plants are supported through loan guarantees.

In Denmark, the generation of electricity from renewable sources is promoted through a price regulation system based on bonus payments. The operators of renewable energy systems usually receive a variable bonus, which is paid on top of the market price. The sum of the market price and the bonus shall not exceed a statutory maximum per kWh, which depends on the source of energy used and the date of connection of a given system.

Net–Metering. Electricity producers using all or part of the electricity produced for their own needs are exempt from paying Public Service Obligation on this electricity. The Public Service Obligation is a charge levied to support renewable energy.

Loan guarantees. Associations of wind energy plant owners and other local initiatives may apply for guarantees for loans for feasibility studies that are conducted in the run-up to the construction of a wind-energy system.

Both on-shore and offshore plants are eligible.
There are two types of bonuses:

- Maximum bonus: The bonus varies according to the market price and the statutory maximum set for the sum of both the market price and the bonus.
- Guaranteed bonus: In certain cases, system operators are granted a guaranteed bonus on top of the market price. In such cases the statutory maximum is not defined.

Onshore plants:

- Guaranteed bonus of 0.25 DKK/kWh for 22,000 full load hours.

- Systems financed by utility companies: maximum subsidy (bonus plus market price) of 0.33 DKK/kWh, applicable for 10 years from the date of connection of the system, plus guaranteed bonus (unlimited term) of 0.10 DKK/kWh.

Offshore plants:

- Wind farms: maximum subsidy (bonus plus market price) depends on the location of the farm: 0.518 or 0.629 DKK/kWh for a total of 10 TWh, limited to 20 years from the date of connection of the wind farm.
- Systems financed by utility companies: maximum subsidy (bonus plus market price) of 0.353 DKK/kWh, applicable to 42,000 full load hours, plus guaranteed bonus (unlimited term) of 0.10 DKK/kWh.

Systems with an installed capacity of up to 25 kW that generate electricity for the operator's own use: maximum subsidy (bonus plus market price) of 0.60 DKK/kWh.

Re-powering: guaranteed bonus of 0.08 DKK/kWh or maximum subsidy (bonus plus market price) of up to 0.38 DKK/kWh. System operators will receive this payment only for as much electricity as would be generated by a system with twice the capacity of the original system in 12,000 full load hours.

Sweden

The Kingdom of Sweden promotes renewable energy through various incentives, the most important of them being the quota system, which is based on a certificate trading system. Furthermore, tax regulation mechanisms and a grant scheme have been introduced.

Quota system. The main incentive for the use of renewable energy sources is a quota system in terms of quota obligations and a certificate trading system. The Electricity Certificates Act obliges energy suppliers to prove that a certain quota of the electricity supplied by them was generated from renewable energy sources. Energy suppliers shall provide this evidence by presenting tradable certificates allocated to the producers of electricity from renewable sources.

Wind Energy is eligible. The eligibility of certain plants commissioned prior to 1st May 2003 will cease at the end of 2012 or 2014; other plants will become ineligible after 15 years of support. In any case, eligibility will cease at the end of 2035 at the latest.

The quota for the period from 2011 to 2035 has been set as follows:

Obligation period	**Quota obligation per MWh of electricity sold or consumed**
2011 – 2012	0.179
2013	0.135
2014	0.142
2015	0.143
2016	0.144
2017	0.152
2018	0.168
2019	0.181
2020	0.195
2021	0.190
2022	0.180
2023	0.170
2024	0.161
2025	0.149
2026	0.137
2027	0.124
2028	0.107
2029	0.092
2030	0.076
2031	0.061
2032	0.045
2033	0.028

2034	0.012
2035	0.008

Number of certificates according to technology

One certificate is issued for every MWh of electricity produced, regardless of the generation technology employed. Obligated persons that fail to satisfy their quota obligation shall pay a quota obligation fine. Each certificate not invalidated carries a fine of 150% of the weighed, average certificate value during the applicable obligation period.

Electricity suppliers pass on the costs arising from the quota obligation to the consumers by adding a surcharge to their services.

Tax regulation mechanisms. Electricity generated from wind energy is eligible for tax privileges consisting in a reduction of the real estate tax as defined in the Act on the Federal Real Estate Tax, and a reduction of the energy tax as authorised by the Energy Tax Act.

Subsidies. Sweden grants subsidies for research and development in the field of wind energy and assists municipalities in planning wind energy projects. The following planning measures are eligible for grants:

- development and review of a land use plan,
- development of a detailed wind map or extensive landscape analysis,
- other required measures.

Only projects accepted since 2006 are eligible. Only planning measures related to wind power plants are eligible for a grant.

Grants shall amount to 50% of the estimated planning costs unless a different amount seems to be more appropriate for one of the following reasons:

- the complexity of the planning measure,
- the need of co-operation between various municipalities,
- the involvement of the inhabitants in the municipalities in question,
- the wind conditions in the municipalities concerned,
- a desire for increased use of wind energy in the region in question,
- other exceptional reasons.

The costs of the grant scheme are borne by the state.

Norway

Norway provides wind power generation with investment support via the state owned enterprise Enova. It grants an investment of 5.76 €/MWh. Every project is considered individually and approved projects receive a given amount per GWh of assumed production for the economic life of the project (usually 20 years). The incentive level for wind installations increased in recent years: considering only the year 2009, new investment projects received a unit grant amounting (yearly) to 13.52 €/MWh.

Belgium

The third most active country in the EU in 2010 was Belgium, which commissioned 55 wind turbines (165MW in total) 46 kilometres off the Zeebrugge coast at the Belwind wind farm. Belgian offshore wind power capacity now stands at 195MW.

The main means of support is a quota system based on quota obligations, tradable certificates and minimum prices. The trade of certificates is subject to federal legislation, while the quota obligations are defined in regional regulations. Electricity suppliers shall present evidence that they have supplied to their final consumers a quota of renewable energy determined by the region (Wallonia, Flanders, and Brussels Capital). To this aim, electricity suppliers are obliged to acquire green certificates. The competent regulatory authority issues one certificate per MWh of offshore electricity. The federal grid operator is obliged to purchase green certificates from all the generators that have applied for the sale of electricity at a minimum price so that the sale of a certain minimum amount of electricity can be guaranteed.
Green certificates are issued under the following conditions:

The system operator must be authorised to produce electricity from renewable energy sources. A system operator is deemed authorised only if he has been issued a certificate of origin by the competent regional or federal authority (e.g. VREG in Flanders).
In addition to this, the operators of systems that generate electricity from wind power in Belgian waters need to be licensed by the responsible ministry.

Offshore wind energy is eligible for federal schemes only.
The green certificates allocated to offshore plants by the federal regulatory authority have a validity of five years.

Minimum price per certificate:

- Offshore wind power stations with a capacity of up to 216 MW: ct €10,7per MWh, for every further MW: € 90 per MWh
- Onshore wind power stations: € 50 per MWh

The Netherlands

The Netherlands have introduced a premium tariff (SDE), i.e bonuses on top of the wholesale price, to promote the generation of electricity from renewable sources.

The SDE+ scheme grants to the producers of renewable energy a bonus payment, which aims to compensate for the difference between the wholesale price of electricity from fossil sources and the price of electricity from renewable sources and is paid for a period of up to 15 years. This scheme applies to newly constructed installations only.

Under the SDE+ scheme, the funds available are no longer distributed in such a way as to provide an individual budget for each technology. Now, there is a single budget for all technologies, i.e. all technologies compete against each other for subsidies. Subsidies are made available in 4 stages; the level of subsidy increases with every stage. Subsidies are allocated on a "first come, first serve“ basis: Applicants applying at a later stage run the risk of being rejected due to a lack of funds. In general, the SDE+ scheme gives an advantage to those applying for lower subsidies and at an early stage of the allocation process.

In general, all renewable energy sources are eligible for the scheme. Subsidies are made available in 4 stages. The maximum basic subsidy and the eligible technologies differ at each stage. The basic subsidy is annually calculated by the Ministry of Economic Affairs. In addition, the Ministry will annually set a correction value by which the basic subsidy will be reduced.
As confirmed by the Dutch energy agency, all installations must be completed and put into operation within 4 years after the subsidy was granted, 5 years for offshore wind systems located in national waters.

Onshore Wind: Eligible within a specific category: Installations < 6 MW: subsidies may be awarded for a maximum of 1760 full load hours/year. Installations greater than or equal to 6 MW: Funding is provided for a maximum of 2400 full load hours/year.

Offshore wind (in national waters and in the sea): Eligible within the open category offshore wind > 3 MW in national waters.
The amount of subsidy is different for each renewable energy generation technology. The maximum basic subsidy and the level of funding awarded in each of the 4 stages differ according to the technology and the system size. The support levels are as follows:

Onshore:
Stage 1: €ct 11.3 per kWh, stages 2-4: €ct 12 per kWh

Offshore:
Stage 1: €ct 11.3 per kWh, stage 2: €ct 13.8 per kWh, stage 3: €ct 16.3 per kWh, stage 4: €ct 18.8 per kWh
The basic subsidy is annually calculated by the Ministry of Economic Affairs. In addition, the Ministry will annually set a correction value by which the basic subsidy will be reduced.

Onshore:
Plants < 6 MW: €ct 4.7 per kWh. Plants greater than or equal to 6 MW:€ct 4.8 per kWh.

Offshore:

National waters: €ct 4.8 per kWh
Sea: €ct 4.9037 per kWh

Subsidies are paid for a period of 15 years starting at the date of commissioning of the system in question. The Dutch state bears the costs. The Ministry of Economic Affairs, Agriculture and Innovation has provided funds of € 750 m for the SDE+ scheme.

Furthermore, electricity from renewable sources is exempt from this tax if the electricity was generated by the consumer himself: generators of electricity from renewable sources that use the electricity they consume (own consumption clause) may be exempt from the tax levied on electricity consumption (Ecotax). Moreover, enterprises are eligible for tax credits (EIAs) for investment in renewable energy systems. The exemption from tax on electricity generated for a consumer's own use generally applies to all renewable energy generation technologies, inclusive wind energy.

France

In France, electricity from renewable sources is promoted through price regulation in terms of a feed-in tariff and tax benefits. On the regional level, renewable energy is promoted through subsidies.

Price regulation. In France, electricity prices are regulated through a feed-in tariff scheme. Operators of renewable electricity systems are contractually entitled against the suppliers (EDF and private suppliers) to payment for electricity exported to the grid. The distribution grid operator is obliged to enter into agreements on the purchase of electricity at a price fixed by law ("obligation to conclude a contract"). The French government invites tenders for the construction of systems that generate electricity from renewable sources in order to reach the target capacity set by the multi-annual investment plan (Programmation Pluriannuelle des Investissements PPI). Successful tenderers may receive a higher payment.
Only systems within the designated wind development areas (zone de développement éolien) are eligible. The minimum and maximum capacities allowed depend on the particular development area of a system.
The tariff for wind energy is 2.8 - 13 €ct/kWh, depending on the site (onshore / offshore), overall time of operation and time of operation/year.

Tax regulation mechanisms. Electricity generated from renewable energy sources is promoted through several tax incentives. Persons investing in renewable energy systems are eligible for an income tax credit. Under certain conditions, persons installing a renewable energy system on a new building may also be eligible for exemption from real estate tax.
Tax incentives I (Crédit d'impôt)

- Persons that install renewable energy systems at their principal residence may deduce 50% of the net costs of hardware from income tax.
- Caps for the period of 2005-2009 per principal residence: 8,000 € per individual, 16,000 € for married couples or cohabiting couples (PACS) + 400 € per child, if they both have the duty of care: 200 € per child.
- In multi-family houses, every resident may claim the money he invested.
- The capacity of the eligible system shall not exceed 3 kWp. Systems that generate more than 3 kWp are eligible only if the electricity consumption of the building is higher than half of the nominal installed capacity.

Tax incentives II (Value-added tax reduction):

- On the French mainland and in Corsica, the reduced VAT rate is 5.5%.
- In the overseas departments and regions (DOM-ROM) of Guadeloupe, Martinique and Réunion, the VAT rate is 2.10%

Subsidies. In France, there aren't any federal subsidies for electricity from renewable sources. However, this support measure is widely used on the regional level.

Both onshore and offshore wind-energy plants are eligible under the following condition that only systems within the designated wind development areas are eligible. The minimum and maximum capacities allowed depend on the particular development area of a system.
The tariff varies between 2.8 - 13 €ct/kWh, depending on the site (onshore / offshore), overall time of operation and time of operation/year.
The tariffs for existing systems are inflation-indexed. In addition, 20% of each tariff are linked to the index of agreed earnings. This adjustment is made annually on the day the purchase agreement was concluded. The index takes into account the index of labour costs per hour and the index of industrial production costs.

The eligibility for the tariff is limited in time: onshore wind energy: 15 years, offshore: 20 years.

Spain

By the end of 2009, wind energy accounted for 12.7% of Spain electricity production.

In Spain, the generation of electricity from renewable sources is mainly promoted through a price regulation system. System operators may choose between two options: a guaranteed feed-in tariff and a guaranteed bonus (premium) paid on top of the electricity price achieved on the wholesale market. This system only applies to those amounts of electricity that are within the statutory maximum production capacities set for each individual technology.

- Only systems whose capacity does not exceed 50 MW are eligible. Moreover, a system's capacity shall be within the statutory maximum capacity set for the respective source of energy.
- Operators of systems that generate electricity from renewable sources other than photovoltaic energy and whose capacity does not exceed 50 MW may choose between the guaranteed feed-in tariff and a bonus, which is paid on top of the price achieved in the free market.
- Operators of systems whose capacity is 50 to 100 MW are only entitled to a bonus for high system efficiency and for the use of reactive energy, which is paid on top of the sale price.

Except for operators of solar power systems, system operators may choose between two feed-in tariffs. A system operator's decision is binding for one year.

Both onshore and offshore wind energy systems are eligible until the market cap of 20,155 MW of installed capacity is reached. The guaranteed feed-in tariff for onshore wind is:

- for 20 years: 7.9084 €ct/kWh
- from the 21st year onwards: 6.6094 €ct/kWh

The feed-in tariffs are paid during the entire time of operation of a system. The payment starts on the date of commissioning of the system. For wind energy, it is reduced after 20 years of operation specified by statutory law.

Eligibility for the payment of a bonus ends after 20 years of system operation.

- The cost of the feed-in tariffs for electricity from renewable sources is first borne by the grid operator.
- The grid operator may pass on this cost to the consumers in the form of surcharges.
- At the end of every month, the grid operator shall balance his additional income and additional expenses. If the energy supplier's balance results negative, the deficit is covered by the National Energy Committee (CNE)

Premium tariff:

- Onshore wind: 3.1633 €ct/kWh
- Offshore wind: 9.1041 €ct/kWh

The cost of the premium tariffs for electricity from renewable sources is first borne by the grid operator. The grid operator may pass on this cost to the consumers in the form of surcharges. At the end of every month, the grid operator shall balance his additional income and additional expenses. If the energy supplier's balance results negative, the deficit is covered by the National Energy Committee (CNE)

Furthermore, investments in systems and equipment required for the generation of electricity from renewable sources may be deducted from tax. All entities whose income is below € 71,007.20 per year are entitled to a tax credit equal to 20% of all investments related to the use of renewable energy or similar measures in their building of residence.

Portugal

The feed-in tariff also had a strong impact on the wind energy market in Portugal. By the end of 2009, wind energy capacity increased to 3535 MW.

In Portugal, the most important means of promotion is a feed-in tariff. Operators of renewable energy systems are contractually entitled against the grid operator to payment for electricity fed in. The grid operator is obliged to enter into a contract on the purchase of electricity at a statutorily set price ("obligation to enter into a contract"). The feed-in tariff consists of two elements: a guaranteed payment rate and an amount calculated by a statutorily set formula.

Apart from that, individual tariffs for electricity generated by so-called microproduction units are established that are combined with heating systems. Microproduction units are installations that use a single production technology and have a single-phase or three-phase load operating at a low voltage, and a capacity of no more than 5.75 kW. Solar energy systems, wind power stations, hydro-electric power stations or biomass-fuelled CHP systems whose capacity is < 3.68 kW are eligible for a special tariff („Regime bonificado“). The operators of microproduction units receive the special tariff for 15 years.
The guaranteed feed-in tariff is the only means of promotion. The calculation is based on various factors like system output and capacity.

There are specific rules for RES production from small power systems (miniproduction units), which use a single production technology and have an output of up to 250 kW. The installed capacity of systems considered to be miniproduction units is limited to 50% of the consumption level defined in the electricity purchase contract.

The amount of feed-in tariff is not specified and is calculated only by using a formula comprised of flexible factors.

In case of wind energy, the payment lasts for the first 15 years of operation.

The grid operator may pass on the costs of the feed-in tariff to the consumers through the electricity bill.
Furthermore, in Portugal the purchase of renewable energy systems is promoted through a reduced VAT rate. The reduced VAT rate applies to systems traded within Portugal only. The purchase of systems, equipment or machines that generate electricity from renewable sources is incentivised by a reduced VAT rate of 12%..

Italy

In Italy, electricity from renewable sources is mainly promoted through a quota system. According to the quota system, producers and importers of electricity are obliged to prove that a certain quota of the electricity produced or imported by them was generated from renewable energy sources. On the one hand, electricity producers may satisfy this obligation by generating "green electricity", which is rewarded with tradable green certificates.

The certificate system may be combined with other promotion instruments, except for the premium tariff for photovoltaic systems and the feed-in tariff for electricity from renewable energy (except photovoltaic energy below 1 MW).

The Budget Act of 2008 limits the period during which certificates are issued to 15 years for all systems commissioned after 31 December 2007, regardless of the source of energy used.

A ministerial decree has been published to specify a new support system and provisions related to the transition from the old system to the new one. Eligible plants entering into operation before 31 December 2012 will still receive incentives under the old scheme for the whole eligibility period.
Wind energy is eligible under the condition that the annual output exceeds 200 kW.

The percentage of renewable energy in total electricity production for 2014 is 8% per 100 GWh.

Adjustment of quotas:

- 2007 to 2012. The quota increases by 0.75 percentage points and depends on the electricity produced and imported in the previous year.
- From 2012 onwards, the quota (7.55% in 2012) will linearly decrease until becoming equal to 0 in 2015.

Since 2008, the value of one certificate has been 1 MWh. However, the value of a certificate may be altered by a decree of the Ministry of Economic Development. For systems operative since 2008, the number of certificates is based on the net production in the previous year, which is multiplied with a certain coefficient: The coefficient for wind energy is 1 for systems whose output exceeds 200 kW. The coefficient for offshore systems (no minimum kW requirement) is 1.5.

Green certificates create additional costs to producers and importers. These costs are mirrored by the market prices for electricity.

Price regulation. Renewable energy sources in general and photovoltaic energy in particular are promoted through several kinds of feed-in and premium tariffs, which especially benefit small systems. Small systems, except for photovoltaic systems, can also choose the guaranteed feed-in tariff as an alternative to green

certificates. Furthermore, the Gestore dei Servizi Elettrici (GSE) shall manage the sale of renewable energy on request, and interested parties can make use of net-metering.

Feed-in tariffs 1:

Wind energy systems with an installed capacity of between 1 kW and 0.2 MW for wind energy are entitled to choose a guaranteed feed-in tariff instead of participating in the green certificates system.
This support scheme applies eligible plants and systems that enter into operation by 31 December 2012.
From 1 January 2013, a new incentive system will be in place.
This tariff is explicitly designed to promote small systems, except for photovoltaic systems. To be able to apply for the tariff, a given system operator must present a certificate classifying his system as a renewable energy system. Wind energy is eligible if the capacity is between 1 kW and 0.2 MW.
The payment in the case of wind energy amounts 30 €ct/kWh.
Statutory law does not provide for any adjustment mechanism. Yet, the amount of feed-in tariff may be adjusted by a decree of the Ministry of Economic Development every three years. The tariffs were last amended in late 2010.

Wind energy is also eligible for the second feed-in tariff: "Ritiro dedicato", which is a means of regulating the sale of electricity in Italy rather than a "classical" feed-in tariff. The grid operator (GSE) manages the sale on behalf of the producers, who thus need not sell their energy on the free market in person. Thus, the GSE is a mediator between the producers and the market. This system aims to enable renewable energy to access the market indirectly and more easily. Producers of up to 2,000,000 kWh of electricity from renewable sources may choose between the minimum tariff determined by the energy authority and the market prices dependent on time of day and region. If production exceeds 2,000,000 kWh, the surplus is subject to the market price.

The amount of payment decreases with increasing output and depends on the following categories:

- 103.4 €/MWh for outputs of up to 500,000 kWh per year
- 87.2 €/MWh for outputs from 500,000 kWh to 1,000,000 kWh per year
- 76.2 €/MWh for outputs from 1,000,000 kWh to 2,000,000 kWh per year
- Market price for outputs > 2,000,000 kWh.

Part of the costs is borne by the consumers through the electricity price. The system operators also bear part of the costs. They shall pay to the grid operator a fee for the services regarding the sale of electricity. This fee amounts to 0.5% of the value of the energy fed in, the maximum being 3,500 € per year and system. The fee is levied to cover the GSE's administrative costs. The grid operator receives the difference between the minimum tariff, which he shall pay to the system operators, and the price he achieves on the market from the fund for the promotion of systems generating electricity from renewable energy sources, which is in turn financed from a surcharge added to the electricity bills of consumers.

Premium tariff:

This incentive system provides a bonus for the producers of intermittent renewable energy sources in case their actual production is in line with their projected production. The amount of the bonus paid out is proportional to the accuracy of the projections. For each dispatchment point, Terna calculates on an hourly

basis the difference between the actually produced energy and the produced energy as projected. In case this difference is lower, in absolute value, than the produced energy multiplied by the Srif parameter (0.2 for 2011 and 0.15 from 2012 onwards), Terna pays the producer a premium, which is calculated as follows: The base amount (3 €/MWh) is multiplied by the difference between the Srif parameter multiplied by the produced energy and the difference in absolute value between the produced and the projected amount of energy. The cost for this incentive system is considered a grid usage cost, and as such it is borne by the consumers through their electric bills.

Fiscal regulation mechanisms. Wind energy (and photovoltaic) systems are eligible for a reduced VAT of 10% (instead of 20%). This tax benefit applies to enterprises, the professions and private individuals.
In addition to these national promotion instruments, Italy provides for a series of regional programmes.

Czech Republic

In the Czech Republic feed-in tariffs for new and existing RES-E generation are adjusted annually according to the inflation by at least 2% but no more than 4%, with exception of biomass and biogas plants. The feed-in tariffs for the following year shall not be reduced by more than 5% compared to the tariff in force at the time of the calculation of the new tariff.

Slovenia

Slovenia has recently adjusted its support scheme: RES-E generation plants with a capacity up to 5MW are supported through a feed-in tariff. Larger plants get support from a feed-in premium on top of the market price. For the feed-in tariff, currently no regular degression is foreseen apart for PV. Here, the annual degression is 7%. The feed-in premium, however, is regularly adjusted on the basis of reference energy market prices.

Latvia

In Latvia has only recently introduced a new tariff structure for the RES-E generation, which is nevertheless currently being reviewed as the feed-in tariffs (which vary from the source of RE and capacity of installation) are the highest among Europe. It is therefore expected that the tariff level for wind power and other RES will be decreased.

Bulgaria

Bulgaria, which introduced a feed-in system for wind installations in 2007, increased its wind power capacity to 180 MW in 2009.

In Bulgaria, electricity from renewable sources is mainly promoted through a feed-in tariff. Producers of electricity from renewable sources are contractually entitled against the grid operator to the purchase and payment of electricity at a guaranteed price. The feed-in tariff may not be received on top of other incentives.

The payment is a guaranteed payment in terms of minimum payment rates. The tariffs are set by the regulatory authority on 30 June every year. Systems and plants put into operation prior to or on 3 May 2011 are eligible for the tariffs applicable until 3 May. Systems and plants for which a connection agreement was concluded prior to 3 May 2011 will receive the feed-in tariff applicable on the date the system/plant was put into operation.

Wind energy :

- New plants with an efficiency of 2,250 earned hours: 191 BGN per MWh (9.77 €ct per kWh)
- New plants whose efficiency exceeds 2,250 earned hours: 173 BGN per MWh (8.85 €ct per kWh)
- Plants that are not covered by this definition: 137 BGN per MWh (7.01 €ct per kWh)

The tariffs are revised and set by the regulatory authority for energy on 30 June every year. The rule that the feed-in tariffs may not be reduced by more than 5% per year (introduced on 03.05.2011) was abolished. In pursuance of the amendment, the feed-in tariff may not be changed during the entire term of the subsidy agreement. The feed-in tariff applicable is the one in force on the date on which the plant/system was put into operation.

The period of the obligation to purchase and dispatch electricity is 12 years for wind power plants.
The costs arising from the feed-in tariff scheme are borne by the consumers through the electricity price.
The grid operators have the right to request compensation for the costs resulting from the purchase of electricity from renewable sources. The costs resulting from the purchase of electricity from renewable sources are added to the electricity price and thus passed on to the final consumers.

Romania

In Romania, electricity from renewable sources is mainly promoted through a quota system. Electricity suppliers are obliged to present a certain number of so-called "green certificates", which are issued for electricity from renewable sources. This quota system has not yet been applied as it is currently probed for state aid by the European Commission. In addition to support through the quota system, renewable energy is subsidised by the Romanian Environmental Fund.

Quota system: In Romania, the main means of promotion is a quota system based on quota obligations, tradeable certificates, and minimum and maximum prices. Electricity suppliers are obliged to present a quota of green certificates. These tradeable certificates are allocated to the producers of electricity from renewable sources. This quota system has not yet been applied as it is currently probed for state aid by the European Commission. According to the regulatory authority ANRE, the law in question is expected to be authorised by the European Commission within the next few months. However, certain changes to the Law may be necessary to obtain the Commission's authorisation.

Wind energy is eligible. In general, eligibility ends after 15 years. Wind power stations that are no more than 10 years old, and have already been used for electricity generation within the territory of another state or were in operation before the Law came into effect become ineligible after 7 years.

Amount of quota per year: The percentage of electricity from renewable sources promoted under the green certificates scheme is as follows:

- in 2011:10%
- in 2012: 12%
- in 2013: 14%
- in 2014: 15%
- in 2015: 16%
- in 2016: 17%
- in 2017: 18%
- in 2018: 19%
- in 2019: 19.5%
- in 2020: 20%
- from 2020 to 2030: at least 20%

of the total annual electricity sold by an obligated person.

The quota for 2020–2030 will be determined upon resolution by the ministry in charge. The adjustment of the quotas applicable from 2010 to 2020 is not explicitly regulated by law.
The number of green certificate issued for wind energy is:

- until 2017: 2 certificates,
- from 2018: 1 certificate per MWh of electricity generated

The amount of subsidy corresponds to the price per certificate achieved in the market. During the years 2008–2025 the transaction value of a green certificate will be at least 27 Euros and at maximum 55 Euros. The certificate price will not differ according to technology. If a supplier fails to meet the annual quota, he will be obliged to purchase the missing certificates at a higher price of 110 Euros each
Furthermore, certificates may be traded on the international market only if the applicable national quota for green certificates has been met. The costs of the quota system are borne by the consumers through the electricity price.

Subsidies: The Romanian Environmental Fund provides funding for projects for environmental protection. One of the schemes under the Fund is the "Programme for the Promotion of Electricity Generation from Renewable Sources“, which also applies to electricity generation projects.
There is at least one call for applications per year.
Wind energy is eligible. The maximum subsidy is 50% of the eligible project costs. An exception is the region of Bucharest-Ilfov, where the maximum subsidy is 40% of the eligible project costs. The subsidy is subject to a maximum of 30 m Lei (approx. 7.13 m Euro) per project. The total budget for the 2010 application round was 900 m Lei (approx. 214 m Euro). The costs are covered by the state.

Ukraine

Ukraine has introduced tariff differentiation by technology. This policy relies on a series of multipliers of the retail rate.

However, to avoid exchange risk, Ukraine's new "Green Tariffs" provide a minimum tariff denominated in Euros based on the official exchange rate by the National Bank of Ukraine on January 1, 2009.
There is also a domestic content requirement of 30 percent to qualify for the tariff and the requirement increases to 50 percent in 2014.
The tariffs, which went into effect on April 22, 2009 apply through 2030.

The Green Tariff Law differentiates the Green Tariff depending on the source of alternative energy and the type and capacity of the generation facilities. To address the risk of devaluation of Ukraine's currency, the Green Tariff Law also introduces a fixed minimal Green Tariff nominated in euros pursuant to the official euro/UAH exchange rate as of January 1, 2009. In addition, the Green Tariff Law stimulates manufacturing and consumption of materials from Ukraine, as well as works and services required for construction of the generation facilities that use alternative sources of energy.

As of July 2013 the following tariffs per kWh were applied: wind – UAH 1.23 (EUR 0.12)
The Green Tariff Law sets a mechanism for protection of investors from devaluation of Ukraine's currency during construction and exploitation of generation facilities based on alternative sources of energy. In particular, the law specifies that in any event the Green Tariff approved by NERC for a particular company may not be less than a fixed minimal Green Tariff. The minimal Green Tariff is nominated in euros and equal to the Green Tariff calculated using the Basic Tariff and coefficients valid as of January 1, 2009 and the official euro/UAH exchange rate set by the National Bank of Ukraine as of January 1, 2009 (1 euro = 1085.546 UAH). Through the mechanisms of the Green Tariff, Ukraine's parliament stimulates consumption of materials, works and services from Ukraine during construction of generation facilities based on alternative sources of energy. The Green Tariff Law provides that a generation company has the right to charge its customers the Green Tariff only if, starting from January 1, 2012, the share of materials, works and services from Ukraine used for construction of a generation facility based on alternative sources of energy is not less than 30 percent of its total value, and starting from January 1, 2014 – not less than 50 percent.

By means of a separate provision of the Green Tariff Law, the state of Ukraine guarantees companies that generate electricity from alternative sources at the constructed generation facilities will have the right to follow the Green Tariff rules valid at the date the generation facilities were put into use, even in case of further change to the Green Tariff rules. In such a case, however, the companies may decide to follow new Green Tariff rules.

Russia

Its vast geography includes every type of condition favourable to renewable generation. Yet that potential remains almost completely unrealised. At the end of 2009 just 13 MW of wind and negligible solar capacity was present in a country with a total installed generation base of 220 GW. And, if large hydropower is excluded from the equation, only around 1% of Russia's power is currently generated from renewables.

Energy in Russia is dominated by oil, coal and above all, gas and has huge reserves, allowing it to supply its consumers with relatively cheap energy and wield the power that comes from being a key exporter to Eastern Europe and beyond.

A decree supported by current President Dmitry Medvedev set a target for a 4.5% share in electricity generation by 2020. As part of the decree, Russia's energy ministry is charged with developing support mechanisms to bring renewables into a power economy that needs massive investment to bring large parts of its creaking, Soviet-era, infrastructure up to date. KPMG estimates that Russia will require US$320 billion of investment in generation alone, creating a significant market for renewables.

The presidential decree and 4.5% renewables target is highly promising but needs to be underpinned by rigorous, specific policies of the type seen elsewhere. , it is more likely to remain a figure on paper than a reality. Willems cites grid access as an example of the type of measures he has in mind. 'In most European countries there is priority access for renewables and an offtake obligation on the part of wholesalers to get electricity produced by renewables to the end consumer,' he says. A full, European feed-in tariff system is not necessarily expected to emerge in Russia, but maybe some sort of feed-in support system, perhaps based on generation capacity.

The first stage of the 4.5% by 2020 target required Russia to achieve 1.5% by the end of 2010. This was not met, yet there is a lack of urgency by the authorities.

Wind and biomass have a tremendous opportunity to make an impact within 10 years, especially for the 10% or so of Russians who are not connected to the grid.

Turkey

Turkey has had a limited feed-in tariff policy since 2005. The previous policy paid the equivalent of $0.07 per kWh for wind energy for a period of seven years. By international standards, the policy was a failure.
Early in 2011, the Turkish parliament adopted a new feed-in tariff policy of equally limited duration, ten years, and equally limited objectives, 600 MW of total capacity. As before, tariffs are limited as well.
The new tariff for wind energy is 0.056 €/ kWh (0.073 USD/kWh). (Payment in US cents, not Euro cents). Program cap 600 MW/year through 2015.

One departure from previous policy, Turkey will now offer incentives or bonus payments for hardware "Made in Turkey".

In the case of wind turbines, the bonus payments will be as follow:

- Blades: 0.006 €/kWh (0.008 USD)
- Generator & power electronics: 0.008 €/kWh (0.010 USD)
- Tower: 0.005 €/kWh (0.006 USD)
- All other mechanical components: 0.010 €/kWh (0.013 USD)

Industry observers have widely panned the new program as insufficient to create the volume necessary to attract manufacturing.

Turkey has a goal of shifting 30% of its power generation to renewables by 2023. Yet, instead of fully supporting a fledgling renewables sector, Turkey's new program limits production and places bureaucratic barriers in the way of small-scale operators that could deter investors even if Turkey has excellent potential for wind, solar, and hydro power production.

Georgia

The current political and economic climate in Georgia is unstable, resulting in a paucity of investment in the country's renewable energy resources.
The most promising renewable energy resources in Georgia are geothermal, wind, and hydro power. Wind power potential is estimated to be at least 2,000 MW.

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Japan

Japan has approved a new law implementing a feed-in tariff policy for renewable energy. The law, which is in effect since July 2012, sets a target of 30,000 MW of new renewable development within the next decade, nearly five times the 6,500 MW of wind, solar, and geothermal power currently operating in the country.

The move has global implications, as the world's third largest economy follows that of the world's second-largest economy, China, and the world's fourth-largest economy, Germany, in implementing feed-in tariffs in order to rapidly develop renewable energy.

The new law is also a clear sign that Japan plans to reduce its reliance on nuclear power, after the disaster at Tokyo Electric Power's Fukishima 1 plant.
While details remain sketchy, the program contains the following features.

- Contract term: will be set by special committee
- Technologies: wind, solar, biomass, geothermal, small hydro
- Tariffs: cost-based
- Target: reported as 30,000 MW within 10 years, though not contained in the law
- Cost recovery: utility ratepayers with reduction for heavy industrial users
- Program review: every 3 years with more frequent tariff reviews

As in Germany, heavy industry can apply for a reduction in the surcharge on electricity to support the program. Similarly, those affected by the Great East Japan Earthquake will not have to pay the surcharge for the program.

Reuters reports that a ruling party lawmaker said he expects the tariff for solar PV to start at 40 Yen per kilowatt-hour ($0.50 USD/kWh), and the tariff for wind energy to start at 20 Yen per kilowatt-hour ($0.25 USD/kWh).
If implemented as suggested, the wind energy tariff would be among the highest in the world.

It remains to be seen if Japan will open its domestic market to foreign manufacturers of renewable technologies.

Until the new feed-in tariff policy is implemented, Japan will remain a laggard in renewable energy development in comparison to leaders such as Germany. For example, in wind energy, Japan's performance has been poor : based on its population, Japan has installed only 9% of the wind energy capacity installed in Germany.

Nevertheless, with the new feed-in tariff policy and with careful implementation of the new policy, Japan could quickly become a leader in domestic renewable energy development and could join Germany in the rapid phase-out of nuclear power.

USA

Wind Production Tax Credit (PTC)

Production Tax Credits (PTC) were a part of the Energy Policy Act of 1992 (EPACT92) and are intended for wind and bioenergy resources. The purpose of the Production Tax Credit is to support renewable energy based upon the environmental, economic, and energy security benefits that renewable energy resources can provide.

There are several incentives that go along with a Wind Production Tax Credit.The PTC provides a 2.1 cent per kilowatt-hour benefit for the first ten years of a renewable energy facility's operation. It is only available for wind energy equipment located within the United States and only if electricity produced is sold to an unrelated party. Any unused credits may be carried forward for up to 20 years following generation.

A second incentive of PTC is wind developers can receive a 30% Investment Tax Credit (ITC) in place of the Production Tax Credit. This only applies if the projects are placed in service between 2009 and 2013. Lastly, a third incentive of the Production Tax Credit is providing grants that cover up to 30% of the renewable energy projects. This program is under the Department of Treasury and is effective for wind projects that are placed in service in 2009-2010 or the construction is begun by 2010 and plans to be in service before 2013.

The Wind PTC was extended an additional two years, expiring the end of 2012.

Impacts of Production Tax Credit

The Production Tax Credit has been the primary incentive for wind energy and has been essential to the industry's research and development. Wind Power development in the United States has shown a great dependence on the PTC. The wind industry has experienced growth during the years leading up to the expiration of the PTC and a dramatic decrease in installed wind capacity in years where the PTC has lapsed. In 2003, 1687 MW of capacity were installed leading up to a lapse of the PTC in 2004. In 2004, only 400 MW of capacity were installed in the United States. With the PTC reinstated in 2005, 2431 MW of capacity were installed which was a record at the time for the United States. The PTC allowed for the United States to lead the world in wind power additions in 2005 and 2006 with 16% of the worldwide capacity being installed in 2006 coming from the United States. The planning and permitting process for wind energy can take up to two years. With short-term extensions of the PTC, big investments from companies for research and development are less likely to occur. The current trend of short-term extensions of the Production Tax Credit have led to a boom and bust cycle of short-term planning and low number of investments. As the PTC expires many investors hurry to finish projects thus producing smaller capacity installations and creating higher electricity costs. Longer term Production Tax Credit policy would stimulate low-cost wind development and establish a more stable policy for wind development. Having short-term extensions on the PTC can potentially slow wind development, raise costs, require a greater reliance on foreign manufacturing, produce transmission issues, and most importantly can reduce the amount of research and development of

wind energy. The world energy council has estimated that new wind capacity worldwide will amount to $150 to $ 400 billion in new business over the next twenty years.

State Policy

Wind energy policy mostly comes from a state level due to the limited access to relevant federal incentives. Most states in the US have energy policies to help support wind energy development. State policies offer incentives and tax credits for both producers and consumers to make wind energy more affordable. These tax credits are towards personal finances or property value. Renewable Portfolio Standard (RPS) and state grant programs are also used to increase wind energy usage in the United States. By using these incentives, the US can make wind power more prominent to push for renewable energy sources, in an effort to lessen its dependence on foreign oil, protect the environment, and stabilize its energy costs.

Tax Credits

Tax credits for renewable energy technology support the adoption of clean energy technologies by reducing net project costs to consumers, and encouraging market acceptance of clean energy practices. They offer personal financial incentives and property value financial incentives for investing in renewable energy technologies like wind power. They can be used to exempt wind energy equipment from sales taxes to reduce capital investment. They can also be used to reduce property taxes for wind power facilities, or to reduce federal income taxes for qualified tax-paying owners based on the capital investments incurred in wind project development. At the state level, the terms of credit, the amount of credit, and the cost of the credit differs between states. Using state incentives and tax credits helps meet state clean energy policy objectives.

According to the Department of Energy, tax credits are generally more valuable than an equivalent tax deduction. They reduce dollar-by-dollar as opposed to removing a percentage of a tax that is owed. They target and benefit: manufacturers, purchasers, building operators, and commercial, industrial, and residential customers. Tax credits and incentives appear to be most effective when linked to other policies, which is important to consider when designing state tax incentive programs to most effectively leverage the tax credits in EPAct 2005.

Below is a table that shows tax credits by state for wind development in the United states. For more information on wind policy see also Database of State Incentives for Renewables & Efficiency.

Table 1: Personal and property state tax credits for renewable energy taken from the Database of State Incentives for Renewables and Efficiency (DSIRE)

State	Tax Credits
Alaska	Local Option - Property Tax Exemption for Renewable Energy Systems: amount varies,

	maximum varies.
Connecticut	Property Tax Exemption for Renewable Energy Systems (PTI): amount: 100% exemption for renewable energy property
Hawaii	Solar and Wind Energy Credit (PTC): amount: 100% exemption for renewable energy property
Illinois	Commercial Wind Energy Property Valuation (Property): Valuation: $360,000/MW (annually adjusted for inflation) for commercial wind devices larger than 500 kW; Depreciation: Up to 70% of the trended real property cost basis. Expiration date: 2016.
Indiana	Renewable Energy Property Tax Exemption (PTI): amount: 100% exemption. Maximum incentive: the value of the device.
Maryland	- Clean Energy Production Tax Credit (Personal): amount: $0.0085/kWh, maximum incentive: $2.5 million (total credits allowed during five-year period). No specific system size restrictions; however, the initial credit certificate minimum is $1,000. Credits are refundable Property Tax Exemption for Solar and Wind Energy Systems (PTI): 100% property tax exemption for wind energy property
Massachusetts	Renewable Energy Property Tax Exemption (PTI): 100% exemption for 20 years.
Michigan	Alternative Energy Personal Property Tax Exemption (PTI): Amount: 100% exemption, eligible system size: 2-MW limit for single alternative energy systems; 10-MW limit for combination of technologies (except for wind, photovoltaics and fuel cells, which have no capacity limit), expiration date: 12/31/2012.
Minnesota	Wind and Solar-Electric (PV) Systems Exemption (PTI): amount: wind: 100% exemption from real and personal property taxes, eligible system size: for wind, full exemption without compensating production tax limited to privately-owned systems of 250 kW or less and systems of 2 MW or less owned by political subdivisions.
New Jersey	Property Tax Exemption for Renewable Energy Systems (PTI): amount: 100% of value added by renewable system
New York	Local Option - Solar, Wind & Biomass Energy Systems Exemption (Property): 100% exemption for 15 years. Eligible system size: Farm-waste energy systems: maximum size of 400 kW. Expiration date: 12/31/2014.
North Carolina	Renewable Energy Tax Credit (PTI): amount: 35%, max incentive: $1,400 - $10,500 (varies by technology); $2.5 million for systems used for a business purpose, eligible system size: No stated size limits for systems. Maximum of 50 kWh battery storage capacity per kW of hydro generator capacity (DC rated); maximum of 35 kWh battery storage capacity per kW for other technologies
Ohio	- Qualified Energy Property Tax Exemption for Projects 250 kW or Less (Property): amount: 100% exemption - Qualified Energy Property Tax Exemption for Projects over 250 kW (Payment in Lieu) (Property): 100% property tax exemption; payment in lieu of tax required.
Oregon	Renewable Energy Systems Exemption (Property): amount 100%, expiration date:

	7/1/2012
Pennsylvania	Property Tax Assessment for Commercial Wind Farms" (Property): amount: 100% of system value exempted, but provides alternative valuation method
Rhodes Island	Local Option - Property Tax Exemption for Renewable Energy Systems (PTI): amount: varies (local option)
Texas	Renewable Energy Systems Property Tax Exemption (Property): amount: 100%. Eligible system size: None specified, but system must be used primarily for on-site energy needs.
Vermont	Local Option - Property Tax Exemption (Property): amount varies.
Wisconsin	Solar and Wind Energy Equipment Exemption (Property): amount varies.

Renewable Portfolio Standards (RPS)

There are two types of Renewable Portfolio Standards: mandatory and voluntary.

Mandatory markets require the electricity service providers a minimum amount of renewable energy in their electricity supply while voluntary electricity markets allow the consumer to choose to surpass required policy and reduce the environmental impact of their electricity use further than required.

Mandatory RPS programs are rarely applied to municipal utilities which are usually self regulated, but rather to investor-owned utilities and electric service providers. Voluntary markets help create renewable energy capacity that exceeds what mandatory markets contribute nationwide.

Table 2: State Renewable Portfolio Standards for renewable energy from the Database of State Incentives for Renewables and Efficiency (DSIRE)

California	RPS: 20% by 2010 and 33% by 2020
Connecticut	RPS: 27% by 2020
Delaware	RPS: 25% by compliance year 2025-2026
District of Columbia	RPS: 20% by 2020
Hawaii	RPS: 40% by 2030
Illinois	RPS: 25% by compliance year 2025 – 2026
Maine	RPS: Total: 40% by 2017, Class I (New Resources) 10% by 2017
Maryland	RPS: 20% by 2022

Massachusetts	RPS: Class I (New Resources) 15% of by 2020 and an additional 1% each year thereafter; Class II (Existing Resources) 7.1% in 2009 and thereafter (3.6% renewables and 3.5% waste-to-energy)
Michigan	RPS: All utilities: 10% by 2015
Minnesota	RPS: Xcel Energy 30% by 2020, Other utilities 25% by 2025, Renewables Portfolio Standard Xcel Energy Wind and Biomass Generation Mandate: 825 MW wind
New Jersey	RPS: 22.5% by compliance year 2020-2021
New Mexico	RPS: Investor-owned utilities 20% by 2020; Rural electric cooperatives 10% by 2020
New York	RPS: 29% by 2015
North Carolina	Renewable Energy and Energy Efficiency Portfolio Standard: Investor-owned utilities 12.5% by 2021, Electric cooperatives, municipal utilities: 10% by 2018
Ohio	Alternative Energy Resource Standard: 25% alternative energy resources by 2025
Oregon	RPS: Large utilities 25% by 2025, Small utilities 10% by 2025, Smallest utilities 5% by 2025
Pennsylvania	RPS: ~18% alternative energy resources by compliance year 2020-2021
Rhodes Island	RPS: 16% by 2019
Texas	RPS: 5,880 MW by 2015; goal of 10,000 MW by 2025
Utah	RPS: 20% of adjusted retail sales by 2025
Vermont	Sustainably Priced Energy Enterprise Development (SPEED) Goals: 20% by 2017
Virginia	Voluntary Renewable Energy Portfolio Goal: 15% of base year (2007) sales by 2025
Washington	RPS: 15% renewables by 2020 and all cost-effective conservation
Wisconsin	RPS: 10% by 2015

Grant Programs

States offer a variety of grant programs to encourage the use and growth of renewable energy. Wind energy project grants are offered primarily for the use in the commercial, industrial, utility, education, and government sectors. Applying for grants offers consumers a way to ease the investments costs in wind development projects. They can also be used to support research and development. They are obtained by

applying to the different state programs and are offered in the form of cash or tax credits. Grant programs offer a way to pay for large portions of wind project initial costs and help support a national renewable energy system to be less dependent on traditional energy sources, and to protect the environment from future harm.

Table 3: State grant programs for renewable energy from the Database of State Incentives for Renewables and Efficiency (DSIRE)

Alaska	Alaska Energy Authority - Renewable Energy Grant Program
Connecticut	CCEF - On-Site Renewable DG Program
Delaware	Research and Development Grants,Technology and Demonstration Grants
Illinois	Illinois State Board of Education - School Energy Efficiency Grant Program
Maine	Voluntary Renewable Resources Grants
Massachusetts	DOER - Green Communities Grant Program, MassCEC - Commonwealth Wind Incentive Program - Commercial Wind Initiative Grant, MassCEC - Commonwealth Wind Incentive Program - Community-Scale Wind Initiative
Michigan	Energy Efficiency Grants
North Carolina	North Carolina Green Business Fund
Oregon	Community Renewable Energy Feasibility Fund Program
Pennsylvania	DCED - Alternative and Clean Energy Program, DCED - High Performance Building Incentives Program, DCED - Wind and Geothermal Incentives Program, High Performance Green Schools Planning Grants, Pennsylvania Energy Development Authority (PEDA) - Grants, Small Business Advantage Grant Program
Rhode Island	RIEDC - Renewable Energy Fund Grants
Texas	Department of Rural Affairs - Renewable Energy Demonstration Pilot Program
Virgin Islands	U.S. Virgin Islands - Discretionary Grant Program
Wisconsin	Focus on Energy - Renewable Energy Grant Programs

In 2010, the European wind energy market entered a new development phase, as its focus will increasingly turn to the offshore wind farm market in the countries of Northern Europe, and to new emerging markets. The mature markets will continue to wield influence but their growth will flatten out.

The National Renewable Energy Action Plans (NREAP), implemented under the terms of the Renewable Energies Directive, has set out a development roadmap for each renewable sector. EU Member State governments are now bound to adapt their legislation to incorporate the Directive's objectives.

The outline of the sector's development is thus fairly clear up to the 2020 dateline even if for economic reasons the roadmaps are not fully adhered to in the first years. Most of the national experts we surveyed reckon that their national target will be achieved, which means that our forecast resembles the NREAP forecast. These action plans can only be good news for the wind power sector because they safeguard the production capacity increases for the next decade.

The flipside of the coin is that some of the Member States are inclined to control the development of their sector, if not rein it in if they feel the market is overheating. In actual fact, the wind power industry can rapidly respond to high rises in demand and thus will enable the national targets to be achieved well before the 2020 deadline. This unbridled growth poses the problem of manufacturing industry support costs.

The example of Spain illustrates this eloquently as the country had to instigate emergency measures to check its runaway domestic market in its stride before the implementation of a new legal framework scheduled for 2013. Other countries such as Italy and Belgium are planning to overhaul their incentive systems as part of the transposition of the Renewable Energies Directive into national legislation.
France has repeatedly changed its legal framework to control the pace of its installations. The EU Member States also want to be certain that their investments serve their national interests in terms of new factories and job creations.

Considerable investments in grid infrastructures are called for in response to the development of production capacities, which will entail the creation of offshore infrastructures in the North and Baltic Seas, the strengthening of existing power lines and enhanced major transnational power grid interconnections in Europe.

Last November the European Commission published a communication entitled "Energy infrastructure priorities for 2020 and beyond" which aims to create a real European electricity market, increase security of supply, lower prices and increase the grids' capacities to incorporate renewable electricity.

This smart grid would optimise the balance between consumption and decentralised and intermittent electricity production inflows. Its purpose would be to link the major offshore wind farms in the North and Baltic Seas with the concentrated solar power plants in North Africa or Spain, routed via the major hydropower dams in Scandinavia and the Alps.

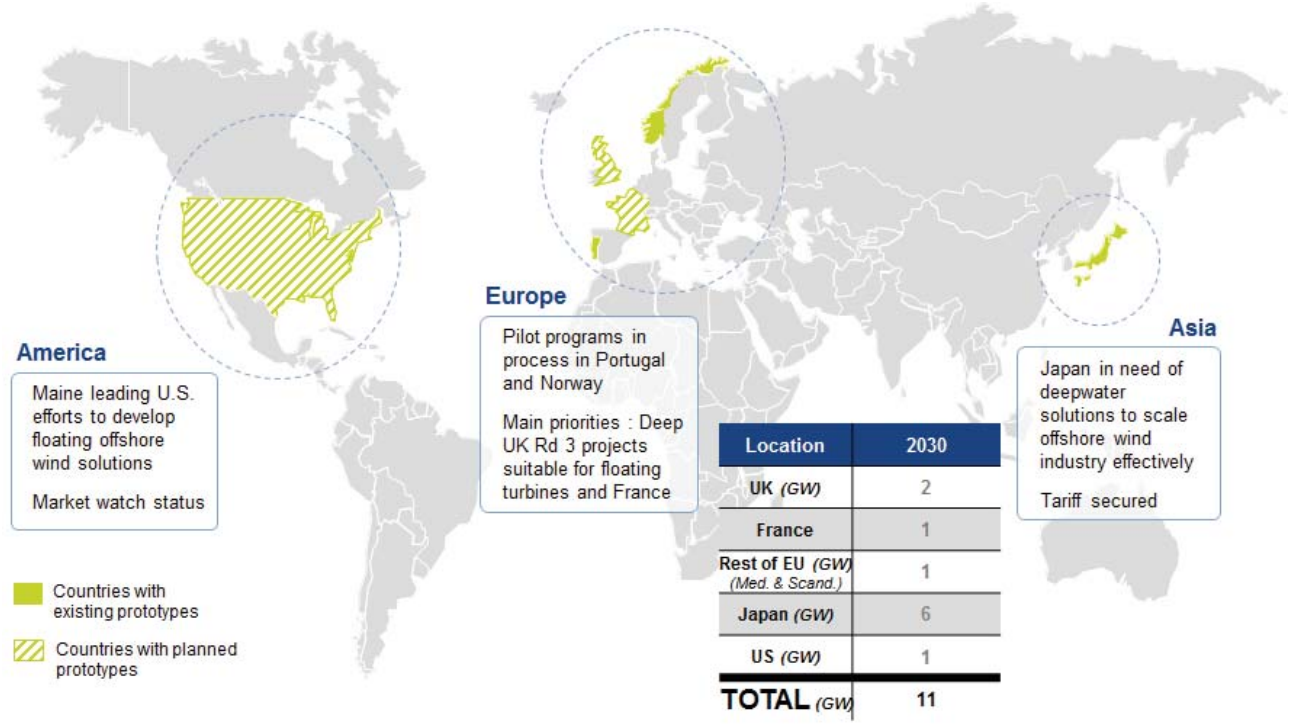
The stumbling blocks strewn along this path are legion –funding, the legal framework, technical innovation and most of all public acceptance of high voltage power lines – and the venture is colossal. According to this blueprint, the liquidation of the investments required for the energy infrastructures (electricity and gas distribution, energy storage, smart grids) could create another 775 000 jobs over the 2011-2020 period and add 19 billion euros to the EU's GDP in 2020. Europe was built in 1952 on the European Coal and Steel Community. The setting-up of this major grid in the 2010s could be tantamount to a new founding act of European construction. In December 2010, ten countries bordering the North Sea signed a memorandum of understanding on joint coordination of an offshore grid in Europe's northern seas.

Under this intergovernmental initiative Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Norway, Sweden and the UK agreed to work together to coordinate investments in interconnections, setting out deliverables with deadlines up to 2012.

3. Key markets targeted for Deepwind floating wind turbines

Based on the analysis done in parts 1 and 2 of this document, we have the following results:

- Norway, Portugal and Japan are the only countries with existing floating prototypes
- Other countries with both a relevant bathymetry and a political will for relevant feed-in tariffs are: the UK, France and the USA.



Location	2030
UK *(GW)*	2
France	1
Rest of EU *(GW)* *(Med. & Scand.)*	1
Japan *(GW)*	6
US *(GW)*	1
TOTAL *(GW)*	11

The proposed key markets for Deepwind are thus:

- Norway
- Portugal
- The United Kingdom
- France
- Japan
- The USA

DeepWind – Preparation of a Business Plan

Prepared as a report from

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