# No power plant is an island: connecting to the grid

**The renewable energy industry has a firm grip on investors' attention, with more and more RES-E plants about to connect to the grid. At the Access to the Grid conference organized by the Federation of Associations of Energy Utility Companies (ACUE) and *The Diplomat – Bucharest* in late March, the main renewable energy players explained the entire connection procedure, proposed solutions and shared their predictions. The event was organized together with the Federation of Associations of Energy Utility Companies and in partnership with Adrem Invest, CEZ Distributie, EgnatiaRom, Eversheds Lina&Guia, ISPE, Marsh, Siemens, Vestas and Wolf Theiss.**

**By Alexandra Lopotaru and Diana Mesesan**

In mid-March, the Romanian Authority for Energy Regulation (ANRE) approved the indexing of the minimum and maximum values of green certificates (GC) according to law 220/2008. From EUR 27, as was originally stipulated in law 220/2008, the minimum GC value reached EUR 28.876, while the maximum GC value increased to EUR 58.823 from EUR 55. "The minimum and maximum values are annually indexed according to the inflation rate in the euro area," says Zoltan Nagy, member of the ANRE regulatory board. "Of course, we index penalties as well, which must be paid in the event of an unpaid GC quota. Thus, from EUR 110, the penalties increased to EUR 117.646."

In December, ANRE approved the GC quota for 2013, estimated at 0.2117 GC/MWh, while, in February, the authority approved the final GC quota for 2012, at 0.1188 GC/MWh. As a result, investors who had purchased fewer permits than the final quota provides can buy more on the market and those who have more GC can decide whether to sell or keep them for 2013.

In November last year, ANRE put up for public debate the calculation methodology for the feed-in tariffs for the renewable power plants with capacity below one MW (two MW for CHP), but the tariffs will be approved in April this year. "We originally wanted to finalize these tariffs by March, but we couldn't. So we'll probably approve them in April," says Nagy. "After this procedure, we will complete the notification papers and will initiate discussions with the European Commission. By the end of the year we may obtain authorization from the European Commission and we can apply these feed-in tariffs for manufacturers."

Some 2,291 MW of renewable resources (wind, solar, hydro, biomass) are operational and more than 700 MW are in the testing phase. Moreover, ANRE has issued connection permits (ATR) for over 25,400 MW and set up authorizations for almost 2,000 MW. "In terms of set up authorization, we have noticed dynamic development in the solar power sector," says Nagy. "In every meeting of the ANRE regulatory committee we authorize between 50 and 100 MW. From 200 MW in early 2013, we have today reached over 450 MW. Taking into account the short execution period of a photovoltaic park, all these set up authorization projects could be commissioned later this year."

## Solutions involve all sides

"There have been issued technical connection permits (ATR) for about 20, 000 MW," Silvia Vlasceanu, General Director at the Federation of Associations of Energy Utility Companies, says. "If only 20 percent were

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to be operational, we would still be talking about some new 5,000 MW."

Assessing the significance of these numbers in the context of the energy system does bring about some worries, as the energy consumption has decreased not only in Romania, but also in all neighboring countries, so the export is not a genuine possibility.

"Adding to all this, there is a lack of vision regarding the industrialization of the country, which could bring some clues about the use of this energy," Vlasceanu adds.

She also points out that any energy strategy has to be backed up by a macro-economic strategy. "If the irrigation system worked, it would a way to consume the energy produced from photovoltaic sources; there is also the possibility to encourage domestic consumption. However, all this has to be thought through not only by the energy authorities, but by all those involved."

As for the rumors regarding the change in the RES-E system, Vlasceanu says that any discussion is futile until a public document is issued. "Let's not amplify the rumors and discourage the investments. We need to have a discussion paper and then we can talk."

However, she opines that no further changes in the PV sector and specifically in the number of green certificates shall be carried out until January 1, 2014.

"The maximum price of the certificates won't be altered," Vlasceanu adds.

Most importantly, the energy system should be regarded as an assembly, which involves not only the producers, but also the transport, distribution and the consumers and all should be willing to search for solutions, Vlasceanu concludes.

## Transelectrica needs to build new power lines

Transelectrica is the transport and system operator, providing infrastructure for the electricity market. In the solar sector, the company has contracts for 1,010 MW installed capacity and 2,094 MW installed power in terms of connection permits issued. Regarding wind power, it has contracts for an installed capacity of 15,759 MW and 5,448 MW power for the ATR issued. "In the wind power field, we have great movement from Romania's south-east towards other areas of the country," says Octavian Lohan, deputy general manager of Transelectrica. "In the future, new plants will be concentrated in the east, all over Moldova, and in the south-west of the country, in Semenic, a high wind potential area. Therefore, we must consider the transport network development, in order to carry large amounts of production from the east to areas of consumption."

Regarding the transport network, Transelectrica needs new investments in order to balance the system. One of the main problems it faces involves the two major power lines that cross Dobrogea. "From Isaccea station, the lines go straight to two Bulgarian stations, in Varna and Dobrudja," says Lohan. "An important goal is to insert these two lines into the Medgidia station and afterwards to build a line to north Constanta, thereby forming a Dobrogea circle to regulate the movement."

Moreover, power line construction is also necessary in western Romania. "To be able to take energy from the Semenic area, we need to build a new Portile de Fier-Resita overhead line," says Lohan. "Moreover, all the Portile de Fier-Arad line, of 220 kV, must be increased to 400 kV. Unfortunately, the investments required cost around EUR 600 million."

In Romania, the 8,500 MW consumption peak is relatively low, according to Lohan. The average annual value is 7,000 MW, while the smallest consumption value is 5,500 MW in winter and 4,500 MW in summer. "In the spring holidays, consumption will reach the lowest value of the year," concludes Lohan.

## Grid connection steps

The document that regulates the connection of users to public grids is GD no. 90/2008, which provides specific stages. First and foremost, the user receives from the grid the operator information required for the grid connection, subsequently submitting documents in order to obtain the connection permit. "The first document that must be obtained in order to get an ATR is the location permit, so that the grid operator can approve the location of the project," says Ciprian Glodeanu, partner and head of real estate and renewable energy practice at Wolf Theiss. "After this procedure, the next step is to obtain a solution study. Some of the options proposed in the study must be accepted by the user within two months. If the approval comes after this period, the solution study loses its validity. From the legal point of view, we think this is a problem."

For ten MW projects, the ATR's validity is six months, but for projects under ten MW, it decreases to three months. These periods can be extended by an additional period of six and three months, respectively. "There are two legal conditions that prolong the ATR's validity: both the end of the connection contract, and also the payment of the connection fee," says Glodeanu. "After payment, the validity of the ATR is extended for the

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next 25 years."

A number of causes can invalidate the ATR, such as a change in the user's administrative and energy data. "Unfortunately, the term 'energy' is a pretty broad one. I think grid operators can provide more details regarding the data change. As lawyers, we have different interpretations and opinions, so I encourage customers to turn to officials."

The next step is the completion of the contract connection procedure, which begins by filing a request to conclude the contract, followed by an execution contract signed between the grid operator and a contractor, who will perform the connection works. "One problem is that the contract is not signed directly between the contractor and the user," says Glodeanu. "In practice, I've often encountered connection works delays that have affected the projects," he says. As a final connection point, the power-user installation is required, and the project is then connected to the public grid.

## More PV plants, less consumption

In Romania's Oltenia region, CEZ Distributie has issued connection permits to power 1,117 MW, signed connection contracts to power 585 MW, while another 89.5 MW has been commissioned. However, in the discharge process of electricity produced by renewable plants, CEZ Distributie is currently facing a number of limitations as a distribution operator. "We're facing a huge number of requests for grid connection from photovoltaic projects in Oltenia," says Doina Vornicu, executive director of CEZ Distributie. "The explanation is simple: Oltenia is a sunny area, with a lot of potential. In addition, we think that this year there will be a peak for commissioning photovoltaics, of around 900 MW. This means that if all the stations that have received the connection permit become operational, we could cover the consumption for seven Oltenia counties with renewable resources alone."

The requested power from PV projects is higher than consumption in the area, according to Vornicu. Moreover, the new projects generate voltage level fluctuations, meaning that the voltage at the grid connection point is increasing, the power's quality parameters are getting worse and there is movement in reactive power. "About 80 percent of all applications for photovoltaic distribution projects in Oltenia are below the dispatching limit of ten MW, which means they are not controllable," says Vornicu. "CEZ Distributie is not ready to approve a large number of photovoltaic projects. Therefore, we believe it is necessary to create a new renewable energy dispatcher. But there are very few training suppliers for specialized dispatchers."

There are some positive aspects for photovoltaic projects too. The main one is that a larger volume of renewable energy could help reduce energy prices, according to Vornicu. "With the emergence of these photovoltaic projects, we have managed to increase the use of electric distribution networks, which, until now, were being underused," she says. "Moreover, the general solution to encourage investment in any form of renewable resource is energy efficiency and client education in efficient electricity use, leading, ultimately, to increased energy consumption . This is the solution."

## Grid connection solutions

The first local Siemens firm, Electricity Company Siemens Schuckert Romania, was established in 1905. It currently has representative offices throughout the country, 11 companies and four factories. In 2012, Siemens Romania had a sales volume of EUR 330 million. "We are the preferred supplier of products, systems and solutions for efficient grid connection projects," says Petru Ruset, head of the energy fossil, wind power, solar & hydro, energy transmission division at Siemens. "We innovate for our customers by developing, producing and delivering valuable products, systems and solutions for power utilities and power-intensive industries."

Siemens operates in four areas: energy, healthcare, industry and infrastructure & cities. "In the energy division, we have fossil energy, power generation, wind power, hydro & ocean, oil & gas, energy services and power transmission," says Ruset. "We have installed 275 MW of wind power in Romania, a capacity that will be increased in the future. Globally, we installed over 3,000 MW in 2012."

Moreover, in terms of renewable projects, Siemens offers a wide range of solutions. The company covers the project management field and performs necessary studies for grid connections, such as dimensioning and power compensation, reactive power capability, dynamic study and harmonics as per norm 51. In addition, the company handles project warranty, civil works (roads, foundations, crane pads) and even cables (route design, size checking, supply, installation, testing).

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## Managing risks for renewable resource projects

Lately, the main concerns in the renewable energy industry have been fluctuations in the political and legal framework governing the support scheme, according to Radu Mustata, development coordinator at the insurance broker and risk adviser Marsh. "We've conducted extensive discussions in recent weeks with our colleagues from the United States and United Kingdom, in order to identify solutions that can cover these types of risks," says Mustata. "The insurance market has declined to quote them though. However, even if the legislative framework is constantly changing, the risks associated with a project, be it wind, solar or biomass, are constant."

In the wind field, projects can have different risks, such as turbine damage, theft or natural hazards such as storms, fires, landslides, floods or lack of wind. For photovoltaic projects, one of the main risks is the lack of sunlight, leading to 'business interruption'. Moreover, even during construction different risks may occur, such as equipment damage during transportation.

"Basically, the solutions offered by our company are integrated solutions from the development phase to the operational stage. For example, in the development stage, one of the solutions is to insure the title deed." says Mustata. "We have both insurers, specialized in these types of risks, and law firms, specialized in property risk management."

In the operational stage, a wind or photovoltaic plant can suffer material damages, being exposed, again, to various natural hazards such as storms, hail or frost. "The operational stage comes with the civil liability of the park, which needs to be insured. During a frost, for example, even if the wind turbines move slowly, the blade tip can reach considerable speeds, similar to catapults, and can propel pieces of ice up to one kilometer. This can cause damage," says Mustata. "It is important these risks are considered overall, not separately, because they can transfer liabilities from one side to another, from construction to operation and vice versa. That is why it's better to have an integrated solution encompassing both the construction and operation phase."

## New paradigm for the grid

"Unlike the wind power plants, there is no significant regional concentration of photovoltaic power stations, as they are evenly distributed in the three regions, operated by Electrica, Transilvania Nord, Transilvania Sud and Muntenia Nord," says Ioan Silvas, deputy director of operations at Eletrica.

Along with the technical connection permits (ATR) and the connection contracts (CR) on power stroke average , the penetration rates for photovoltaic projects are as follows: 48 percent for Transilvania Nord, 53 percent for Transilvania Sud and 39 percent for Muntenia Nord, he adds.

"We are witnessing a fairly aggressive penetration rate for these new energy sources, which is not matched by an increase in the projected domestic consumption over the coming years," Silvas explains.

He adds that the grid is now facing a complex issue regarding the management of a high number of energy sources, and while such concepts as "smart grid" are generous, they remain vague and, most importantly, need to be translated into practice. "The smart grid must be built first."

He also believes that the old paradigm of power plants and electric machines will disappear, as an inverter is something else and requires different capabilities from an electric machine. Silvas explains that any photoelectric panel connected to the network through an inverter must have the capability to remain connected to the network and to operate continuously, without any time limit, in the 47.5 - 52 Hz frequency and to remain connected to the grid even when there are frequency variations of up to two Hz/sec in speed.

Silvas says that various legal and technical measures must be taken, among them the updating of the Technical Code for the Power Distribution Networks according to the requirements of the new codes developed by the European Network of Transmission System Operators for Electricity (ENTSO-E). He also considers vital the establishment

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of the maximum photovoltaic power that can be installed and the additional power reserves necessary for the safety of the National Power System (NPS).

## RES-E trends in Enel operated areas

Adrian Pascu, head of network department at Enel Distribution, says that the company, which provides about 30 percent of the energy distribution for Romania, operating in Bucharest, Giurgiu, Dobrogea and Banat, has so far provided connection solutions, brought about thorough technical connection permits (ATR) for about 5,100 MW.

"As domestic consumption is somewhere near 7,000 MW, if all these connection permits materialized, they would cover about 75 percent of the entire energy consumption," Pascu explains.

The distribution of the connection permits issued by Enel follows a certain geographical trend, Pascu says. In the Dobrogea area, technical solutions for producers cover about 3,500 MW; in the Banat area, about 1,000 MW; and in Muntenia, close to 590 MW, of which about 95 percent of the issued connection permits are for wind power plants and only about 4.4 percent for PV power stations.

The Enel head says that in the Dobrogea area, about 1,035 MW are in operation. He adds that the average time between the issuing of the connection permit and the power plant beginning to operate decreased from 2.7 to 2.1 years between October 2012 and February 2013.

"We are facing a power surplus that can

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now be dealt with either by the distribution network or by the transport network, but in the future, if all these connection permits reach fruition, the problem will be real," Pascu says.

While grid reinforcements were optional in the past, they have now become a necessity, he adds. "There are no more connection permits without grid reinforcement provisions. These are absolutely necessary in order for the producers to connect to the grid."

Medgidia-Constanta, an area which has seen connection permits for about 2,250 MW issued, is also the region that most needs grid reinforcements. "For this area (plus the Tulcea zone) grid reinforcements are an absolute must, as there have been no solutions for a long time now," says the Enel head. "The 110 kV grid needs reinforcements, which, had they been completed, would mean extra 100 km of grid."

For the Banat area, there is a general favorable trend towards photovoltaic projects, given that the Resita area is saturated with wind projects. "In Resita, along with areas such as Medgidia, Tulcea and Constanta, there are already major wind production capacities," says Pascu.

The power approved for the Banat region stands at 1,011 MW, out of which158 MW is operational. "The area also has an imbalance between the number of technical connection permits issued and the average daily energy consumption," says the representative.

Although the figures for the Muntenia area are lower than in other regions, they are rising quickly. "At the end of October 2012, about 360 MW had been approved; at the end of February 2013, the total stood at 589 MW," Pascu says. "This marks a 40 percent increase in only four months. This is an extremely aggressive growth pace." About 89 percent of the RES-E projects in this area are photovoltaic projects, adds the Enel head.

## Hints for the authorities

A clear distinction must be drawn between access to the grid for a consumer and for a producer, says Gabriel Sirbu, deputy general manager at E.ON. "We think that there should be different regulations for the two categories – consumers and producers – and the regulatory authority should take action about this."

Another required measure is the grouping of production plants, in order to avoid fragmentation into small capacities, based on artificial criteria, Sirbu says. "This would ease access to the grid and would generate lower costs than separate production areas, each one connected to the grid."

Distribution companies also need clarification of the terms under which they can refuse access to the grid. "Some connection permits only block the overall capacity and are extended for various reasons, such as a change in ownership, or in the production solution," Sirbu explains. "This leaves us unable to issue new connection permits."

Another pressing issue in relations with the authorities is the need for a clear methodology regarding grid reinforcement. "The participation of the distribution companies raises certain issues, as money is no longer being used to improve the services offered to the other consumers," Sirbu concludes.

## Demons around overcompensation

Although law no. 134/2012 was meant to provide investors in the PV sector with the guarantee that the current support scheme, which offers six Green Certificates (GC) for one MWh, would not change until after January 1, 2014, recent developments regarding the issue of overcompensation have worried investors. There have been rumors of a possible decrease in the number of certificates before January 1, 2014.

"We have received a lot of feedback from our clients and they are all lamenting the legislative risks and uncertainty and asking questions about the future," says Cristina Popescu, partner at Eversheds Lina & Guia. "Many investors have long-running projects and they are already in the preliminary stages of construction; therefore the future of the legal scheme is vital."

The authorities seem to have suddenly understood that there is a support scheme and that the state should support it with money, Popescu adds. "Above all this, there is a clear misconception in the media regarding the

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She adds, "In his recent statements, the delegate minister for energy, Constantin Nita, threatened a change in the law no. 220/2008, reducing the number of GC from six to 3.5. The minister also referred to two other measures, such as setting a maximum limit of 3,500 MW for RES-E production at the national level in one year and decreasing the trading level of the GC from 58 percent to 30 percent."

Although no legal change has been produced yet, these statements do have an impact on investments, Popescu says. "A lot of projects have been put on hold. We need to discuss all this with ANRE or the Government, in order to secure the investments."

The future of the legal scheme is vital for PV producers. "As far as we know, about EUR four billion of investments in the PV sector have been put on hold."

The PV sector needs an extra degree of clarity, as January 1, 2014 is fairly close, Popescu concludes.

## Greenhouse gas emission allowance

The scheme for greenhouse gas emission allowance trading was established by Directive 87/2003 and subsequently modified by Directive 29/2009. A greenhouse gas emissions permit covers a tonne of carbon dioxide, says Adrian Catalin Uscov, senior lawyer, head of the energy oil and gas department at Bostina & Associates. "The holder of the permit is granted authorization to emit a tonne of carbon dioxide or other greenhouse gases. These permits can be traded; therefore if one

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operator emits extra greenhouse gas, it has to buy more emission permits, while if it emits less greenhouse gas, it can sell its surplus permits." He adds, "For the third period, 2013-2020, the total allowances allocated free of charge will decrease gradually until the complete elimination in 2020."

There is no similarity between the Green Certificates (GC) system and the greenhouse gas emission allowance system. The GC support scheme is a measure aimed at increasing investments in the green energy sector, while the greenhouse gas emission allowance system covers only pollution and greenhouse gas emission limitations, Uscov explains.

"There is also an important difference in the trading system. GC can only be bought by energy suppliers, while greenhouse gas emissions permits can be traded on the national and international stock exchange by companies with surplus permits," he adds.

## Smart solutions for an insecure future

The outlook for the global energy system does not look hugely promising, as energy demand is increasing while resources are reducing and most energy technologies are not environmentally-friendly, says Corneliu Bodea, vice president at Adrem Invest.

Given the considerable input of energy from renewable sources, transmission and distribution networks will have to be prepared and adapted to a form that we do not yet fully know, he adds.

One of most important issues is energy efficiency, as Romania ranks last in terms of efficiency at European level. "In order to gain more efficiency, grid reinforcements need to be addressed from two different perspectives," Bodea says. "First of all, there is the physical reinforcement of the grid, its modernization. Secondly, we can talk about a reinforcement which brings an increase in the intelligence of the grid."

The "smart grid" concept boosts the intelligence of the grid, not only in the transport and distribution area, but also in production.

"There are solutions that can bring about added-value, such as the so-called virtual power plants, which involve the grouping of producers into virtual schemes which can generate predictable energy in the grid," Bodea says.

Another solution, smart metering, relates to energy consumption and involves the creation of a communication system between consumers and producers, to ensure the predictability of consumption, Bodea concludes. ■