Securing the Future of Energy

Studies and discoveries in alternative energy resources have been made over the recent decade, spurred by both environmental and political concerns. The glaring ramifications of overreliance on fossil fuels and oil to power our planet have led governments to create incentives for private companies to funnel investments into renewable energy, with the help of grants and subsidies.

At the moment, the bulk of renewable energy plants rests in solar- and wind-friendly European countries, such as Spain, Germany and the U.K. The U.S. is following suit, with President Barack Obama passing a clean energy stimulus package worth US$787 billion in 2009. Despite the economic instability, there has been tremendous growth in the development of solar and wind farms over the past five years. Although the percentage of growth may plateau over the next decade, the actual number of renewable energy farms will continue to rise, calling for more attention to suitable physical security measures.

BY MARIKO HIGASHIYAMA

The market for renewable energy has grown rapidly for some years, according to Ted Campbell, Senior VP of Renewable Energies Business, Schneider Electric. "However, we are expecting the world economy to be affected in 2011 and this will translate to budget cuts for many large countries. Thus, we expect a flat market in 2011 and over the coming years, yet solar energy will continue to grow at an excess of 20 percent over the next five years within the U.S.," Campbell said. "We produced 18 to 20 gigawatts (GW) in 2010 from solar farms, and predict a doubling of this number at 44 GW by 2015."

By 2020, renewable energy should account for 20 percent of Europe's final energy consumption. To reach this goal, there has been a boom in renewable installations in different countries, thanks to the support policies implemented by several governments, said Ippazio Martella, President of Marss. In Italy, there is still much room for growth. "We have entered into a Third Budget Law which includes having 7,000 megawatts (MW) of solar panels installed by 2010. We are still far from the goal set for 2020, so it is easy to understand that this market will continue to increase."

Germany and Spain are among the countries leading the march in harvesting renewable energy. According to the German Trade and Investment Office, the photovoltaic (PV) industry posts an annual turnover of approximately $14 billion and employs more than 133,000 workers. Government incentives within these European countries are also encouraging research and development within the field. In a report by the European Photovoltaic Industry Association and Greenpeace International, current investment in PV development is worth $47 to $54 billion and could reach $95 billion within the next four years. "The cost of PV panels is going down," said Chuck Scifers, Head of Business Development, Jet Protect. As PV panel prices fall at a rate of 3 to 5 percent each year, it will advance the growth of large solar farms. "There are three areas of solar development: residential, commercial and farms. Utility and financing companies are entering into agreements to develop large solar farms and we should expect much development in this area."

▲ **Ted Campbell,** Senior VP of Renewable Energies Business, Schneider Electric

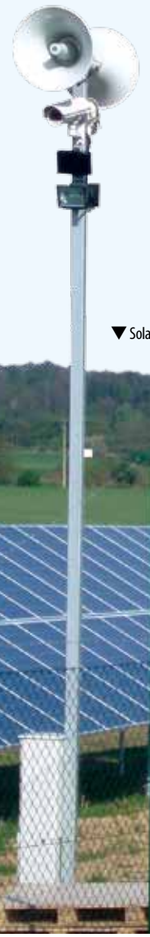
▲ **Ippazio Martella,** President of Marss

▲ **Chuck Scifers,** Head of Business Development, Jet Protect

INADEQUATE SECURITY

The design and planning concepts for each project varies, depending on country and budget. "The size of the farm also greatly affects the type of security required," said Hagai Katz, Senior VP of Marketing and Business Development, Magal Security Systems. "This is still a budding market, so it is difficult to grasp a clear concept of what is required in terms of security for every situation."

Due to the isolated nature of renewable energy sites, some places are equipped with minimal security.



"At a wind farm, there is little that needs to be done in terms of security," Scifers said. "Someone may drive to the site once a day but generally, no one is present at the site. This is often also true for many smaller solar farms. For some sites, a maintenance worker will simply go there once a week to log his visits into the system by swiping his RFID card, or by accessing the numeric key lock. It is not the type of facility where there are 200 people providing maintenance on a daily basis. Some solar farms may have secure structures to house the ancillary equipment."

As previously mentioned, the size of the farm affects the level of maintenance and security required. "It is common to see someone on-site if it is a very big farm, although they are not there for security purposes but primarily for performance purposes — to monitor the equipment and make sure disturbances can be fixed in a timely manner," Campbell said. "However having said that, there are still farms where there is no one on-site. This is because if, for example, a 500-kilowatt inverter goes down, the farm is only losing a tiny fraction of their generating power — it is not a catastrophe, compared to an oil rig or a nuclear power plant."

▼ Solar farms are often isolated and empty. *(Image courtesy of Navtech Radar)*

The lack of dangerous substances on-site minimizes the amount of security and surveillance deemed necessary on-site for both maintenance and security purposes, said Gaetano Capula, Director of Marketing, GPS Standard.

The requested access control is often basic. "One can think of it like any other factory, where only basic access control is required," Katz said. "This is because from a terror point of view, small solar and wind farms are not very high-profile."

Perimeter security could be comprised of a standard fence. "However, farms should know that fences can be easily cut and bypassed," Capula said. "Microphone cable or fiber optical systems may be in place to sound an alarm if a fence is being tampered with, but if the perpetrator refrains from touching the fence, such as by using a ladder, no alarm is generated."

Many wind farms do not have fences because they are in remote locations and not many people access these areas, said Robert Putnam, Head of Media Relations, LRAD Corporation.

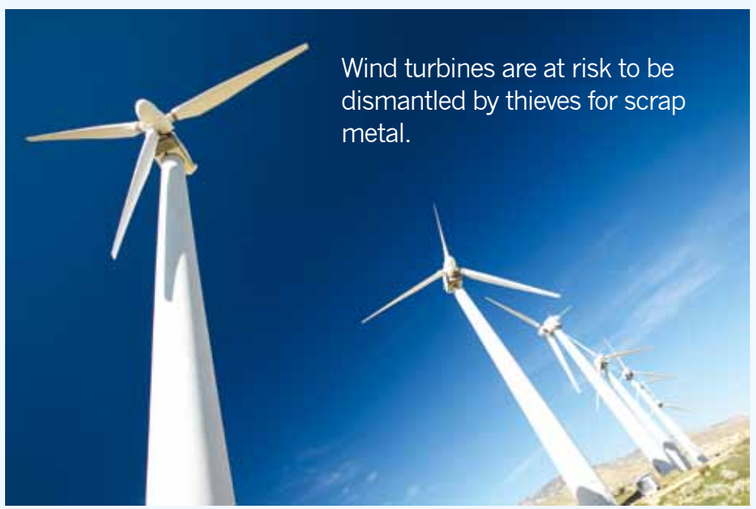
▲ **Hagai Katz,** Senior VP of Marketing and Business Development, Magal Security Systems

▲ **Robert Putnam,** Head of Media Relations, LRAD Corporation

Much of the security equipment in place is installed as a safety precaution. "Energy collected at a farm is converted and housed in structures similar to freight containers," Campbell said. "A 50 MW farm would have roughly 50 of these structures. Access control is simple at best and there may or may not be a security camera present. However, perimeter security is used to secure a group of houses within a grid-type substation to prevent unauthorized people from entering and accidentally electrocuting themselves."

Still, not all farms have these structures. "There are farms where the inverter and other equipment are sitting out in the weather," Scifers said.

More people are using video surveillance and recording, but it is not as prevalent as one may expect, Campbell said. "Large-scale security is not an area that is very developed at this point in time."



RAISING SECURITY AWARENESS

A low-level awareness of security will not last much longer, as emphasis is being placed on the necessary security measures required by renewable energy farms. "Issues such as theft and vandalism motivated by the lack of security are slowly gaining awareness," Capula said.

Parallel to the market growth of renewable energy, awareness and the need to protect such installations are also growing, Martella said. "The demand and the value of investments are high, especially if compared with the various incentives for these kinds of installations. Therefore, they have to be protected. Since 2007, the total value of stolen PV panels, just in Italy, is more than $271 million."

PV panels are hooked up in a series and if one panel is removed, then the power production capability of a whole chain of panels is destroyed, said Gregory Johnston, CTO of Jet Protect. "Solar farm racks are streamlined for quick and efficient installation. This also means that they can be removed fairly quickly and a thief can steal hundreds of panels in a night."

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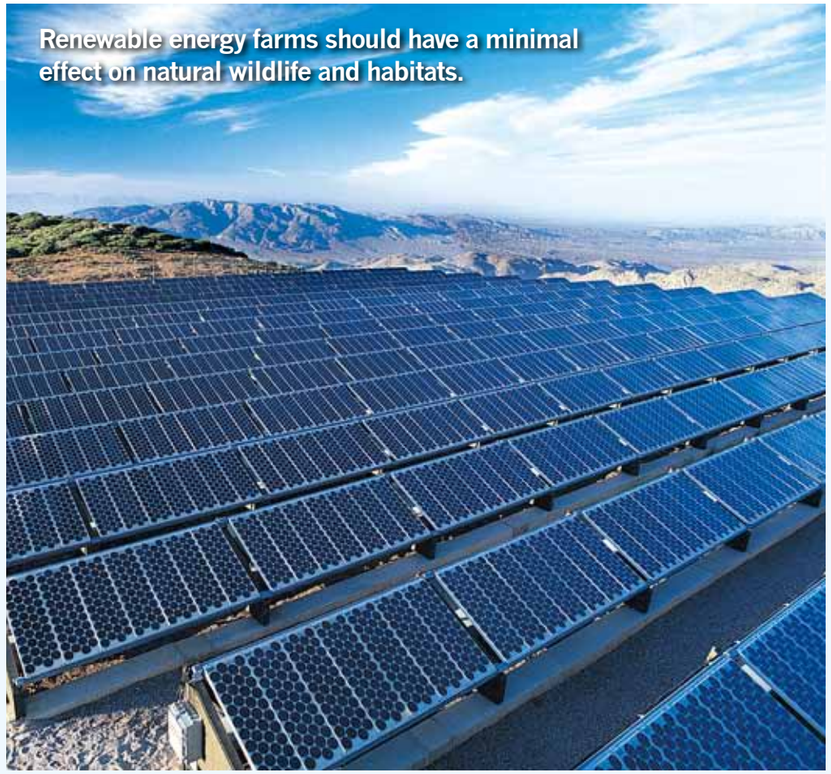
Wind farms are less prone to theft compared to solar farms, but it is not unheard of. "Wind farms do not have to worry about people coming in and walking away with turbines," Scifers said. "However, they still do not want people entering the site because turbines are at risk of being dismantled to salvage metal and copper for scrap metal."

Theft and vandalism can damage earnings from green power sites. "Solar and wind farms are huge investments and investors are expecting a certain level of return on their investment," Johnston said. "If panels are being stolen, power production is down and additional expenses will be needed to replace the panels. This is another reason why people are becoming more aware to these threats as it directly affects the financial plan for the project."

Security should be implemented from the beginning of a project. "For a long time, the emphasis has been placed on getting the renewable system up and running that security is the last thing on their minds. We believe solar farms are racking up loses from theft on a daily basis and things are being stolen from the construction site as soon as the workers leave at night. Uninstalled panels worth thousands of dollars can easily be taken," Scifers said. "To combat this issue, farms would often employ a contract security guard during off-hours to ensure the products meant to be installed will still be there in the morning. But from an economic standpoint, this may not be the best way to use resources compared to installing electronic security equipment."

There are currently plans for solar farms in the Sahara Desert, where there is optimal sunlight 365 days a year. "These will be national assets and will thus be more protected because damage to such a large site would incur grave consequences. These sites have central points where if damaged — even if it is only a small part of the site — can


Renewable energy farms should have a minimal effect on natural wildlife and habitats.

shut down the whole farm," Katz said. "Instead of PV panels, mirrors will be used and they are more risky because the core production is turbine operated, just like a regular power-plant. There will be organizations wanting to, and capable of, undermining the production ability of these sites. Also, in large power plants, a few stolen copper wires could cause the whole farm to lose its grounding and thus create massive technical as well as economical damage."

INSURANCE AND ANIMAL RIGHTS

As the market continues to grow, a driver for more advanced security systems will be insurance. Another growth factor is the desire for a minimal effect on the natural wildlife and habitats surrounding these sites.

Insurance will advance the level of security required on renewable energy farms in the future. "Investments that can total up to $1 billion must be protected, and it must be protected in order to be insured. Still, only the minimum level of security will be implemented to help mitigate risk, rather than provide high-level security," Katz said. "This is because it is still too early in the game to confirm if high-level security is needed, or if a lot of damage is being done — unfortunately, security will always grow on the study of previous cases. Once large-scale damage occurs — either due to terror, theft or vandalism — regulations will become tighter."

Animal-rights activism will also advance the installation of better radar and perimeter systems. "A solar installation in Southern California was shut down because it interfered with the habitat of a specific species of turtles. Another wind farm ran into issues because the propellers on the turbines were killing falcons, which are Environmental Protection Agency-endangered birds," Scifers said. "In the U.S., construction of solar farms are extremely regulated. One farm went through numerous meetings and ended up with a 650-page document regarding the erection and maintenance of the site. It is exponentially easier in Europe and Canada compared to the U.S."

New technology may be the answer for renewable energy farms. "Response from environmental groups is getting louder due to the high number of birds being killed on a regular basis by the wind turbines. Their voices are going to weigh more and more heavily over the next few years," Putnam said. "For now, in the U.S., avian radar systems are set up to shut down the turbines until the birds leave, but this affects the productivity of the site due to shutdown costs and no energy is being produced when the birds are around. Research is being done now to deter birds and animals from entering the farm area completely, using long-range acoustic devices."

It will take some maturation time to determine concrete security needs for renewable energy farms. Yet this is a space that should be noted due to the fast-paced growth of such farms and the numerous security needs that will develop within the next decade. Investments continue to pour in and these investments must be protected — with a little help from capable electronic security systems. ASIS