Axis Communications and Tenevia help CNR optimize its photovoltaic energy production.

Axis network cameras help visualize local cloud cover in real time and predict drops in photovoltaic energy production.

Organization:
CNR (Compagnie Nationale du Rhône)

Location:
Lyon, France

Industry segment:
Critical infrastructure

Application:
Remote monitoring

Axis partner:
Tenevia

Mission

CNR (Compagnie Nationale du Rhône) is France's number-one producer of certified 100% renewable electricity. Part of its production comes from photovoltaic parks whose production may be randomly interrupted by cloud cover. However, starting in 2016, it became necessary for each new photovoltaic park to provide the most accurate possible production estimates. How could CNR anticipate cloud cover and meet this obligation?

Solution

Tenevia is a specialist in developing innovative environmental measurement solutions through image analysis. CNR contacted them to co-develop the Tenevia CloudBoard® system. This solution is equipped with an AXIS M3027-PVE Network Camera with a 360° fisheye lens and image analysis software — and it can predict approaching clouds. It allows CNR to intelligently manage its storage resources and additional production.

Result

When the testing phase is over, CNR plans to deploy the solution by installing Axis cameras at several of its photovoltaic parks by early 2017. For the future, the idea is to deploy this technology internationally at other latitudes to implement an intelligent camera network that will extend the forecasting range.

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> "This solution helps fine tune short-term production forecasting for the photovoltaic parks. With it will come intelligent management of storage resources and additional production so as to compensate for irregularities in photovoltaic production. This will allow us to provide a smoother energy supply over time, and to limit gaps in our forecasts. It will help balance out the electrical distribution network."
>
> Guillaume Bontron, manager of CNR's Management Center for Intermittent Production.

Accurate production forecasts

France's number-one producer of certified 100% renewable electricity, CNR naturally responds to the challenges of the energy industry's transition. The company is developing expertise in managing the intermittent energy it offers to third parties – from forecasting to marketing.

Legislation now requires that photovoltaic parks that are put into service as of 2016 provide the most accurate production forecasts possible, and the irregularity of renewable energies is a challenge in itself. For several years, CNR has responded by developing new tools that anticipate variations in production of intermittent assets.

In regard to production at its solar parks, CNR hoped to strengthen its forecasting system by integrating a very short-term approach: Is it possible to anticipate the effects of moving clouds that are already present in the sky? With the help of TENEVIA, a specialist in developing innovative environmental measurement solutions through image analysis, a technological answer was found thanks to a fisheye device.

Analyze and process hemispherical images

The Tenevia CloudBoard® device uses algorithms to analyze and process hemispherical images. These 180° images come from an AXIS M3027-PVE Network Camera and allow a map of local cloud cover to be created. The algorithms anticipate a cloud's arrival by identifying its speed and trajectory. This local prediction may cover a period of 1 to 15 minutes.

The device spent two years in development, is now in full-scale testing, and is a decision making aid for the operator. AXIS M3027-PVE is ideal not only because of its 360° panoramic vision – the widest view of the sky possible – but also because it resists bad weather. Its image quality and very competitive price make it right for large-scale adoption of this forecasting technique.

Tenevia brings its considerable expertise to calibration and use of the image processing software. "One of the Tenevia solution's innovations is its collection of data, like the speed and direction of clouds, just using our image analysis algorithms. This keeps us from developing complex, costly equipment. The software innovation is based on original algorithms and will result in three patents being filed in partnership with CNR," says Arnaud Brun, president and cofounder of Tenevia.

Towards an intelligent camera network

When the current testing phase is over, CNR plans to deploy the operational solution by installing Axis cameras at several of its photovoltaic parks by early 2017. Technologically, images are processed by a remote server, but one of the medium-term goals is to embed the calculator into the camera to reduce the amount of information transmitted on the network and the cost of data storage. Another goal is to deploy this technology internationally to implement an intelligent camera network that will extend the forecasting range.

Tenevia – http://tenevia.com

Tenevia is a company that develops innovative solutions in hydrology and environmental measurement through image analysis. Its goal is to promote new solutions for measuring and monitoring the environment (rivers, snow, clouds, etc.). Their unique expertise helps them design innovative software solutions that respond to the operational needs of field workers and decision-makers

CNR – www.cnr.tm.fr

CNR is France's number-one producer of 100% renewable electrical energy and is involved in multiple related sectors along the Rhone river, such as hydroelectric power production, management of navigation and port zones, irrigation and other agricultural applications. CNR offers its services in managing and using intermittent energy and its engineering expertise in 30 countries. As part of the energy transition, it works on network intelligence, energy storage and sustainable electric mobility.