Jaya Singh
Ph. D., Director, BKC WeatherSys Pvt. Ltd.

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Energetica India learns more about application of Solar Weather Monitoring Systems in India's solar and wind sector from Jaya Singh, Ph. D., Director, BKC WeatherSys Pvt. Ltd.

ENERGETICA INDIA: Please give a brief history of BKC WeatherSys?

JAYA SINGH: Founded in 1990, BKC WeatherSys Pvt. Ltd. is one of India's first private sector meteorology companies. We provide turn-key technology solutions for weather, power, aviation, agriculture and solar energy industries.

Our foundation lies in weather forecasting and meteorological instrumentation- we were the first company in India to run numerical weather prediction models, allowing us to deliver high resolution 7 day weather forecasts to news & print media for the first time in India. Another key milestone in the company's history was being appointed system administrator by NASA for five years for the Indo-US Satellite Data Exchange Center set up at IMD in the 1990s. That gave us the experience to design weather based decision support systems for use by the Indian Air Force and Navy. We also have a long history of working with meteorological instruments. For example, we have delivered major turn-key projects like an ultrasonic high speed wind recording system along the east and west coasts of India to India Meteorology Department, and our online (weather) briefing system for pilots is in use at Delhi, Mumbai, Kolkata, and Chennai airports.

Entering the renewable energy space in 2010 was a natural consequence of our meteorological forecasting and instrumentation expertise. Our corporate clients in solar energy include First Solar, L&T, Siemens, Lanco, Acme, Forbes-Marshall, Green Infra, Punj Llyod, and Madhav Infra.

ENERGETICA INDIA: What kind of services does BKC WeatherSys offer to the Indian power sector?

JAYA SINGH: Our history of working with the power sector dates back to 2002 when we delivered high resolution weather forecasts to ONGC (Oil and Natural Gas Corporation) to help inform operational decisions for their off-shore oil stations.

Currently, we are a one stop shop for all weather and radiation measurements and applications. We provide solar and weather monitoring instruments and systems, as well as solar resource assessment & forecasting services. We also provide consulting services for specialized applications.

We have installed and maintain over 60 weather stations in India, including the commissioning of a high-end BSRN station (Baseline Surface Radiation Network) and a solar weather monitoring station at India's largest solar power plant in Jaisalmer. We routinely publish case studies like an analysis of meteorological parameters for insurance claims for damaged panels, and analysis of local environmental conditions to account for plant performance. We make these publically available on our website.

ENERGETICA INDIA: How much importance are Indian solar developers putting on solar radiation and weather monitoring?

JAYA SINGH: Although solar and weather monitoring present a negligible fraction of total project cost (less than 0.1%), it has been largely overlooked until recently.

But now, we are seeing a shift towards increased demand for more accurate solar and weather monitoring. As plants become operational, people are evaluating performance, and there, accurate solar radiation measurements are critical. It serves as the baseline for how much energy a plant can expect to produce. The amount of solar radiation incident on panels is almost directly related to how well the plant is able to convert and harness that radiation into energy.

Also, there is increased awareness that local environmental conditions affect plant performance. We know only too well the effect of dust on power production of solar plants in Rajasthan and the unanticipated costs associated with cleaning of panels. Likewise, high ambient temperatures are not always predictive of high performance and module performance starts to decrease with high temperature depending upon the panel technology as we see in plants in Northern India. We've recently looked at how relative humidity affects plant performance in Gujarat. Wind also impacts the performance of solar power

plants and their impact will come to light with time as data from plants in coastal regions of Tamil Nadu become available.

The point is that customers are now aware that basing investments on solar radiation maps alone may not be the best approach. So we now see an increased demand for solar resource data for picking plant sites. Moreover, customers are commissioning us to measure solar and weather parameters for extended periods, as well as once a plant is up and running to arrive at a meaningful measure of plant performance.

Energetica India: How does a solar weathering monitoring system work?

Jaya Singh: A high quality solar weather monitoring station (SWMS) can provide the information on solar radiation and other meteorological parameters which impact the radiation values. The number of the SWMS systems required depends upon the site area and local geography.

A basic solar weather monitoring station is comprised of a pyranometer for measuring solar radiation, which can be installed in few different configurations depending upon the aim to measure tilted global horizontal irradiance (TGHI), global horizontal irradiance (GHI) and/or diffused horizontal irradiance (DHI) as it done in most PV plants. Direct normal irradiance (DNI) measurements required for CSP projects require a pyrheliometer. Apart from measuring solar radiation, as meteorological measurement also play an important role on solar radiation, an SWMS will also include temperature, humidity, wind speed, wind direction, barometric pressure, and rain sensors. The output from these sensors can be viewed directly on a data logger, be viewed remotely using GSM telemetry, and also be directly integrated in to a SCADA system.

Energetica India: Please share details of some of your success stories in India's power sector.

Jaya Singh: We have over a decade of experience working with power companies in India. In the solar power industry, our solar weather monitoring stations are up and running in over 60 sites across India. We've worked with almost most major EPC contractors, plant owners, and solar module manufacturers in the country. Most recently, we've installed and commissioned a high-end BSRN station at CSIR. Our solar weather monitoring station has also been installed at India's largest solar power plant in Jaisalmer in 2012. In 2013, we were nominated by National Thermal Power Corporation (NTPC) to be their authorized vendor for the supply of solar and atmospheric sciences sensors.

Energetica India: How good is India's net-work of ground based monitoring system?

Jaya Singh: India's solar monitoring network is in a nascent stage. Historically, India Meteorology Department (IMD) has had a network of ~45 stations. More recently, Centre for Wind Energy Technology (C-WET), Chennai for MNRE commissioned 51 stations in its first phase of its Solar Radiation Resource Assessment Plan, with plans to commission an additional 60 stations in a second phase. I believe 34 of the stations in phase II have been commissioned.

Energetica India: There are not many private companies in this space. How do you see the market shaping up in the next few years in terms of competition?

Jaya Singh: Having been in this business for almost 25 years, we have an early entrant advantage. But more importantly, as we are the only company that we know of in India that brings both engineering expertise and forecasting ability to the table, we are uniquely competitive in this market.

Energetica India: What is the company's strategic path over the next 3-5 years in the power sector?

Jaya Singh: Our mission is to be India's most trusted and valued company for providing solar and weather radiation measurements and forecasts to the power sector ◄◄