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If you have a news item for the newsletter or want to share your experiences with Kipp & Zonen applications and contribute to our next issues, please e-mail the editor: kelly.dalu@kippzonen.com

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Kipp & Zonen B.V. - 2013

Solar Energy Predictions

The world has been in a financial crisis for several years now. This has been felt on a global scale and the tendency to generate energy as cheaply as possible is seen more and more in such times. Even the growth economies, the so-called BRICS countries (Brazil, Russia, India, China and South Africa), are showing reduced growth. This is a serious point of concern as Renewable Energy initiatives may be seriously impacted by these developments. So, do we need to worry about the implementation of solar energy for the future?

The EPIA (European Photovoltaic Industry Association) published a report at the end of 2012 with the title 'Global Market Outlook for Photovoltaics 2013-2017'.

For the second year in a row, PV was the number-one new source of electricity generation installed in Europe. Under a pessimistic Business-as-Usual scenario, the global annual market could reach 48 GW in 2017; under a Policy-Driven scenario, it could be as high as 84 GW in 2017.

There is much excellent information in the EPIA report. The conclusion that the new PV capacity installed in 2012 still exceeded that of 2011, together with the pessimistic scenario of 4 to 5% growth in capacity by 2017 (in the optimistic scenario the growth could be as much as 12%), shows that solar energy implementation is very much alive! Among the countries in the prime solar belt with the highest growth potential we see China, India, Mexico, Singapore, Australia and others.

The EPIA has published a good report, indicating that solar energy is considered an excellent natural resource and that despite the global financial crisis, it is recognised as one of the most important renewable energy sources. The future for solar energy is looking bright and this is a good thing for all of us.

All the best,



Foeke Kuik -
Business Development Manager
Kipp & Zonen B.V.

A Completely Redesigned Website!

We are very excited to have launched our new website after almost a full year in development. You'll see things are now looking pretty different, it's been completely re-styled in line with the latest trends in web design. We're especially proud that our new website is responsive. This means that the format and layout changes to fit the device you're using to view the website. So it also looks amazing on tablets and smart phones!

Key goals for the new website were to make it easier to navigate for visitors and to improve the functionality. Most of all, we want to help visitors understand our products and their possible applications, without losing the quality and passion for precision of the previous website. If you take a tour around the site we believe you'll get a pretty good idea of who we are and what we do as a company.

The homepage is now much more visually based, with a big slideshow, direct links to our three product categories, and previews of the latest news and upcoming events. The helpful distributor search is right there on the homepage and so is a short corporate video.

Major improvements have gone into the product pages. Not just in the look, because all products have been re-photographed in a new style, but also in the navigation. We now make use of tabbed pages spreading information such as specifications, accessories and application examples over the different tabs. You can also click on and enlarge the beautiful new product pictures.

Furthermore, it is now possible to select from three different languages on our homepage; English, French and Spanish. We hope to expand the number of languages in the future.

Please visit and check out the all-new www.kippzonen.com. Don't forget to let us know your opinion through the poll function on the homepage ■



Solar Energy Massive Open Online Course by edX and TU Delft

Renewable energy is now accepted as a competitive and reliable source of energy around the world. With the growing number of photovoltaic projects the demand for qualified specialists is growing. More and more students choose solar energy and other sustainable energy courses as their major study. New engineering, management and law programmes specialising in sustainable energy are being established at leading educational institutions.

One of the initiatives that deserve special attention is the course organized by the Delft University of Technology (TU Delft). TU Delft is a world renowned Dutch university with leading positions in applied physics, sustainable energy and semiconductor technologies. The Massive Open Online Course (MOOC) Solar Energy started on 16th September 2013 and is organized through edX.

Founded by MIT and Harvard University, edX unites leading educational institutions around the world with the goal to provide top level education for free. It is the leading platform for massive open online courses for technical disciplines, with more than 1,200,000 users.

The TU Delft Solar Energy Course provides a comprehensive overview of topics that are crucial to keep in mind when designing PV systems. It explains the various aspects of solar energy and system components; such as the photovoltaic cells, converters, batteries and power electronics used in installations. The participants learn how to design and optimize complete PV systems for different applications.

The course is organized as a series of video lectures presented by Dr. Arno H.M. Smets who is Assistant Professor at the Faculty of Electrical Engineering, Mathematics and Computer Science at the TU Delft in the Photovoltaics Material and Devices group. His research work is focused on the processing of thin silicon films, innovative materials and new concepts for photovoltaic applications. At TU Delft Dr. Smets is a lecturer of the new BSc courses in 'Sustainable Energy', 'Solar Cells', and the MSc courses in 'PV Technology' and 'PV Lab'.

You will find more information, and the link to register for the course here:

www.edx.org/course/delft-university-technology/et3034tux/solar-energy/770 ■

Passion for Precision

Solar Monitoring Station for Moscow Environmental Protection Department

A city can be compared to a complex living organism where it is important to keep all its organs and systems working well. The state of the urban environment is also similar to the health of a living organism and it needs continuous monitoring and diagnostics.



ATTEX engineer Aleksey Lykov on the roof of the Central Aerological Observatory in Moscow

Moscow is a huge urban ecosystem with 2500 km² of territory and almost 12 million inhabitants. The task of the Moscow Department for Environmental Management and Protection is to keep this system fit and healthy, using data from its 'MosEcoMonitoring' enterprise. MosEcoMonitoring continuously measures all important parameters of the ecological situation; such as the quality of air, water and soil, noise pollution and the state of urban green areas.

In July 2013 MosEcoMonitoring started to measure solar radiation with a new, state-of-the-art, Kipp & Zonen research station. The data from the station will be used to model processes of air pollution in the urban climate. One of the most important factors in cities is photochemical smog. Smog causes various health problems, including inflammation of breathing passages and lung disorders. It is formed from reactions of industrial gases such as sulfur dioxide, nitrogen dioxide and carbon monoxide with ground level ozone produced in industrial chemical processes.

From international scientific data it is known that there is a correlation between the concentration of ground level ozone and ultraviolet radiation. The researchers expect that

continuous precise measurement of solar radiation in the ultraviolet, visible and far infrared wavelength ranges can provide estimates of ground ozone levels. These data will be used to verify the data obtained from open path gas analyzers used in the Moscow ecological monitoring system.

The measurement of UV is also important to determine the UV index that characterizes the harmful influence of UV radiation on human skin. This information is included in meteorological forecasts in countries with developed resort infrastructures and high solar radiation levels but it is also relevant for such regions as Moscow, especially in the summer period.

The solar radiation monitoring station of MosEcoMonitoring is installed on the roof of the Central Aerological Observatory in Dolgoprudny and consists of a SOLYS 2 sun tracker with CHP 1 pyrhemeter for DNI measurements, a CMP 21 pyranometer for GHI measurements and a shaded CMP 21 pyranometer to measure diffuse radiation (DHI). A CGR 4 pyrgeometer mounted on the tracker is used to measure downward long-wave radiation. The pyrgeometer and pyranometers are fitted with CVF 3 ventilation units to assure the cleanliness of the domes and to prevent dew, snow and ice deposition.

The system also has a CMP 21 pyranometer and a CGR 4 pyrgeometer facing downwards to measure the reflected short-wave and upward long-wave radiation to enable calculation of albedo and the complete radiation balance. Finally, a UVS-AB-T radiometer measures the incoming UVA and UVB radiation. The data from all the instruments are recorded by a COMBILOG data logger. There is a meteorological station to monitor parameters such as ambient temperature, pressure, relative humidity, wind speed and direction.

The monitoring station was supplied and installed by our distributor for Russia RPO ATTEX Ltd., of Moscow. ATTEX has a long history of working in meteorological research projects and also developed and realized the data transfer and integration of the new station into the existing systems of MosEcoMonitoring.

You can find more information about ATTEX at www.attex.net and about MosEcoMonitoring at: www.mos.ru/en/authority/activity/ecology/index.php?id_14=22254 ■

The New CMP10, because we know what makes a Secondary Standard Pyranometer better

Kipp & Zonen is proud to present the CMP10 Secondary Standard pyranometer. Thanks to its housing design and large capacity internal drying cartridge, it is no longer necessary to inspect or replace desiccant. The only maintenance necessary is to periodically clean the dome of a pyranometer.

CMP10 is the secondary standard pyranometer with the best price-quality-performance ratio on the market. Based on the established CMP 11 technology, CMP10 extends this quality to applications where maintenance is difficult and/or forms a major part of the cost of ownership. With 30 years of high quality measurement data, and over 25,000 CM 11 and CMP 11 pyranometers sold, CMP10 continues an impressive tradition.

One of the main reasons for a maintenance visit to a solar monitoring site is to check or replace the desiccant in the pyranometers. With CMP10 this period is extended by a factor of 20! Instead of the typical 6-monthly intervals of conventional pyranometers, the CMP10 has an internal drying cartridge that will last for at least 10 years if the housing is not opened.

When a CMP10 is re-calibrated by Kipp & Zonen, the desiccant is always renewed. Therefore, the remaining desiccant lifetime is known simply by adding 10 years to the

last calibration date as given on the instrument label or in the calibration certificate.

In pyranometers with desiccant in external drying cartridges the cartridge itself (the material and its sealing) is one of the main causes of humidity entering the instrument housing. Removing the opening for the drying cartridge, greatly increasing the desiccant volume and adding special sealing between the dome ring and the body, a guaranteed desiccant lifetime of 10 years is achieved.

The interval for dome cleaning can be extended, and the quality of measurements maximized, by fitting CMP10 with the recently launched CVF4 ventilation unit.

To prove that we are convinced of the benefits of this unique concept, Kipp & Zonen provides every CMP10 with a 5-year warranty as standard. This warranty applies provided that the CMP10 is used only under atmospheric conditions, that the housing is not opened and that the Kipp & Zonen cable and connector is correctly fitted ■

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Solar Energy Challenges in the Gobi Desert

The Gobi is a large desert region in Northern China and Southern Mongolia. It is a cold desert with frost, and occasionally snow, occurring on its dunes. The climate of the Gobi is one of great extremes, ranging from -40°C in winter to $+50^{\circ}\text{C}$ in summer, combined with rapid changes of temperature of as much as 35°C within 24 hours.



This year our Chinese distributor Beijing Techno Solutions installed a unique meteorological observation system in the Gobi for its customer Beijing Hua Sheng Ji Zhi New Energy Technology. This is a solar energy field test station in Dunhuang, Gansu Province, China.

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The observation field has a size of 40 by 30 meters and is divided into 6 zones for; spectral measurement, tilted global radiation measurement, wind speed and direction, dual axis tracking solar radiation, rainfall observation and comprehensive meteorological measurements.



The spectral measurements of direct solar radiation in zone 1 are measured with our PGS-100 Sun Photometer. This spectrophotometer is mounted on a SOLYS 2 sun tracker with integrated active sun sensor correction. The SOLYS 2 is mounted on a platform and the PGS-100 is directly connected to a computer to download spectral data in the wavelength range from 350 to 1050 nm.

The data can be processed to obtain the following parameters; optical thickness, scattering coefficient; aerosol distribution, energy distribution, absorption rate through the atmosphere and the irradiance.

Zone 2 is installed with seven tilted CMP 11 pyranometers. Each pyranometer is tilted at a different angle (10° , 20° , 30° , 40° , 50° , 60° and 70°) to determine the optimum angle for fixed solar panels in this region in the future. The measurement data is recorded by Campbell Scientific CR3000 data loggers.

There is one more zone with Kipp & Zonen instruments, zone 4, with a complete solar monitoring station based on a SOLYS 2 sun tracker. A CHP 1 pyr heliometer measures direct solar irradiance and there are three CMP 21 pyranometers to provide measurement of global, diffuse and 2-axis tilted solar irradiance. All the radiometers are connected to a data logger.

The remaining zones are installed with a wind observation system that includes a 10 m high tower, a rainfall observation system, with a horizontally mounted precipitation sensor, and a general observation platform with temperature, humidity and pressure sensors.

With this scientific meteorological observation site, Beijing Hua Sheng Ji Zhi New Energy Technology is testing the possibilities of the Gobi region for solar energy installations. The data obtained will help to choose the best technology, the best angle for fixed PV panel installation, and the expected solar energy budget ■

With special thanks to our distributor for China, Beijing Techno Solutions Ltd. of Beijing.

Brewers Come Together for a Joint Calibration

By David Godoy, Brewer Product Engineer



Every two years the Spanish Brewer network of the Agencia Estatal de Meteorología (AEMET), plus Brewers from various other countries in Europe and North Africa, gather together in order to transfer calibrations from the World Meteorological Organisation Global Atmosphere Watch (WMO-GAW) reference Brewers to the participating instruments.

The inter-comparison campaign takes place at El Arenosillo Atmospheric Sounding Station of the 'Instituto Nacional de Técnica Aeroespacial' (INTA) in Huelva, Spain. Reference MkIII Brewers for the measurement of Total Column Ozone and direct ultraviolet radiation are provided by the Regional Brewer Calibration Centre for Europe (RBCC-E), located at the Izaña Atmospheric Observatory on Tenerife, Canary Islands.

The QASUME instrument of the Physikalisch-Meteorologisches Observatorium Davos World Radiation Center (PMOD-WRC) provides the reference for spectral global ultraviolet (UV) radiation measurements.

Naturally, Kipp & Zonen was there with our Travelling Standard Brewer MKIII and to provide assistance to the attending Brewer users. This year there were 16 instruments, one coming from as far away as Korea, all pointing at the sun above a green sea of pine trees. There were an even larger number of scientists, Brewer operators and technicians, who had travelled to Huelva. All came with the goal of ensuring the best data quality from each Brewer.

The campaign lasted two weeks, during which there were Ozone, UV and spectral UV calibrations, with respect to the WMO-GAW and PMOD-WRC reference instruments.

I have always enjoyed spending time at with the AEMET Brewers, but this year was even more special. It was my first time back since I have been working at Kipp & Zonen. It was great to see old colleagues, catch up with things, and to meet new people.

In the years between the Arenosillo campaigns, Brewer inter-comparisons are held at the Lichtklimatisches Observatorium of MeteoSwiss in Arosa ■

Kipp & Zonen APAC Expands Customer Services

Kipp & Zonen is pleased to announce the arrival of a new team member, Ong Chee Hiong. He recently joined the APAC office in Singapore as our dedicated Service Engineer.

Ong will be providing support, installation, maintenance, calibration and repair services of Kipp & Zonen instruments for our customers and distributors in the Asia-Pacific region.

His area of specialty is in electronic measurement and instrumentation. With years of experience as a field service engineer; handling analytical products in the process, environmental, scientific and automotive sectors, he knows how to manage service matters efficiently.

Ong is excited at acquiring expertise in the field of solar radiation measurement and looks forward to helping customers from our office in Singapore. His goal for the next months is to raise customer service to a higher level, reduce turnaround times and to improve the service processes.

He is also managing the recently installed calibration facility for pyranometers, albedometers and pyrgeometers. We can now offer our Asia-Pacific customers the calibration of our most popular instruments locally in Singapore, without the need to ship to the factory in Delft.



Please join us in warmly welcoming Ong to the Kipp & Zonen team ■

Fairs & Events

Meteorological Technology World Expo Brussels • Belgium	15 - 17 October
Solar Power International • Chicago • USA	21 - 24 October
LAS Scintillometry Workshop Edmonton • Canada	4 - 5 November
AGU Fall Meeting 2013 San Francisco • California • USA	9 - 13 December

Passion for Precision

Passion for Precision

Kipp & Zonen is the leading company in measuring solar radiation and atmospheric properties. Our passion for precision has led to the development of a large range of high quality instruments, from all weather radiometers to complete measurement systems.

We promise our customers guaranteed performance and quality in; Meteorology, Climatology, Hydrology, Industry, Renewable Energy, Agriculture and Public Health.

We hope you will join our passion for precision.

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