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Energetica - India was at PV Taiwan 2017, a visit report.

Energetica India was privileged to attend the PV Taiwan 2017 event which happened on 17th Oct 2017 at Taipei held for the 11th time. There was the Taipei times carrying the biggest news on the front page the interesting news where Taiwan announced the grant merger of the three major solar cell makers Neo Solar Power Energy Corp, Gintech Energy Corp and Solartech Energy Corp in order to be able to compete with the global rivals. Let us get to know more details on this piece of news.

Highlights of the Big News on the Merger from the Taipei Times.

The companies said they would be emerging as the world's second largest solar company in terms of installed capacity. Taipei Times said In December 2017 these firms plan to sign the trilateral agreement and they would complete the transaction in the next year in the third quarter.

The Chairman of Neo Solar Sam Hong said that the nation's solar power industry has been struggling for years and he believes that this merger will create a competitive business model.

Each of the companies capacities will be welded to offer vertical integration services from cell to solar manufacturing and photovoltaic systems assembly.

Mr. Hong also mentioned that the new company would have an installed capacity of 5 gigawatts of solar cell and 10 % of global market based on the projected worldwide installed capacity of 500GW this year.

The total capacity the company plans

to expand combining their annual capacity of solar modules to more than 3GW in two to three years after the merger compared to their current capacity of 1 GW.

Gintech and Solartech would merge into Neo Solar, the company is to be renamed United Renewable Energy Co (UREC) and Mr. Hong to be chairman and Gintech President Pan Wen-Whe will serve as the chief executive officer.

The deal has received verbal government support and as it corresponds to their administration policy for developing the countries renewable energy industry and increasing the contribution of the green power.

PV Taiwan 2017

Energetica - India magazine had the privilege to attend this international exhibition on Photovoltaic industry in Taipei, Taiwan. The event was held from 18th to 20th October 2017. Organised by Taiwan External Trade Development

Council (TAITRA) and Taiwan Photovoltaic Industry Association (TPVIA).

The total exhibitors were 160 compared to the previous year's number of 131 spread out in around 600 booths, which included the Domestic players in majority.

The Pavilions were divided as PV Systems, Smart Energy and Storage, Green Transport, Green Finance, Wind Taiwan and Hydrogen Energy.

PV Systems pavilion offered a variety of solutions on "Rooftop Energy Generation", which featured international companies such as Winaico and Hotsunn.

Smart Energy and Storage invited companies in battery, system, equipment and materials fields, including UrVOLT, Formosa Electronic, NYPI, TBA and TSGIA, exhibiting the latest technology breakthroughs on rooftop and ground installation, showcasing innovative solutions to more efficient electronics generation, storage and allocation.

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Green Transport: Sustainability being the top priority of the Governments around the world, Optimistic about the market potential of green transportation this year, SEMI hosted the Green Transport Taiwan for the first time ever.

Banks and other Insurance companies explored the other opportunities in green economy. Wind Energy along with Hydrogen was also viable options to clean energy occupied a prominent place at the event.

The event was inaugurated by the Hon. President of Taiwan Tsai Ing-wen and other dignitaries from TAITRA, SEMI, Deputy Mayors of various counties, Expo Union Corporation, and also from the Ministry of External affairs.

Hon. President of Taiwan Tsai Ing-wen spoke on the climate change and how green energy has gained importance in Taiwan and the government is fully supporting this initiative to achieve the new goal and improve Taiwan's PV capacity. The foreign exhibitors according to her have doubled this year and also there has been technology upgradation and innovation this year to increase the module capacity.

One of the main focus of the event was to help transform products with new technology and innovation. The Government of Taiwan has shown its support for promoting green energy through their continuous support and inviting international buyers and also green financing.

In Taiwan the photovoltaic industry has been transformed from sole manufacturing to power system integration. The Taiwan administration also announced that the road map to PV power system generation will be 20 GW by 2025.

Updates and challenges faced by the Taiwan PV Market:

Taiwan's total 1.4 GW of installed solar capacity comes from rooftops and the manufacturers are know well that the ground mounting capacity needs to be developed in order to meet the 2025 target of 20 GW.

Taiwan has significantly increased its rooftop installations and the government plans to see the 20GW target by installing them in most sunny and rural counties.

There is boom in Yunlin County where solar energy has become more acceptable along with other counties such as Chiayi and Changhua which still are in development stages.

Motech, Taiwan's local solar manufacturer announced more plans to increase the capacity of their modules and plans to add around 400 MW in Pingtung county if Taiwan.

Taiwan's residential market is growing very slowly and its export sector is right now struggling. This is exhibition was a forum to increase the technology advantage of their market through innovations. It faces tough competition from the Chinese market in terms of their huge manufacturing capacity for a demand of around 24 GW installed in first half of 2017.

The Chinese manufactured cells however face antidumping tariffs from US from 2014 and still continues to thrive. Taiwan cell makers are facing losses due to increases wafer prices and some of them now seem to be recovering from the losses as said by the marketing manager of AUO.

The tariff on the manufactured cells by

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Taiwanese makers has been reduced by the US. However cells when used with Chinese made modules attract higher tariff compared to when used in non Chinese modules.

The challenge Taiwan faces is tough and steep mountainous terrain which leaves very less land for solar installations, and also being an island the air quality is very heavy making the OEM costs high plus the modules has to be corrosion resistant. In a way reduces the life of the modules. The manufactures such as Gintech, AUO Electronics and TSEC are bringing innovation and upgradation of the module features to make their products better weather resistant. Unless the land availability increases it will remain a major challenge to achieve their goal of increasing the renewable energy capacity.

Green Energy Technology

Green Energy Technology (GET) is the largest Multi crystalline solar manufacturer in Taiwan, and also a leading solar wafer company on a global scale. Their production sites are located in Taiwan and in Mainland China. It is a member of the Tatung group founded in

June 2004 with a capital of NTD 4.14 billion.

As we know the main products of the company are solar wafers from a wide range of silicon raw materials, including polysilicon, and reclaimable silicon raw materials such as scrap wafers, pot scrap and tops and tails of ingots sourced from suppliers and semiconductor manufacturer.

GET has superior technology to ensure high quality and their Wafer average efficient currently stands at 18.6 % to 18.9% and this along with PERC Technology goes upto 19.9%. The shipment and capacity Utilisation at the end of 2017 Q2 showed 620 MW.

The total production capacity of their plants in Taiwan are :

- Taoyuan plants - Ingot => 1,490 MW and Wafer => 370MW
- Sanchia pant - Ingot => 360
- Southern Taiwan Science Park - Ingot => 670MW, Wafer => 270MW

New product from GET: GET Light Weight Waveguide Module

Features and advantages:

- Composed of Waveguide material, no

conventional soda-lime glass need

- Lightweight design decrease to 13kg compared to the traditional module of 20 kgs.
- Resists wind pressure capacity 10,000 p.a and able to resist severe typhoon.
- Reduces possible PID (potential induced degradation) risk
- Increased energy absorption rate of diffused light by 5% to 10 %
- Generates 10% more power output during early morning and late afternoon.
- Can be customised in any shape.

AUO Optronics

It was formed in September 2001 by the merger of Acer Display Technology, Inc. (the former of AUO, established in 1996) and Unipac Optoelectronics Corporation. In October 2006, AUO acquired Quanta Display Inc.

AUO entered the green energy industry in 2018 and making efforts to produce highly reliable and premium quality solar solutions, including high efficiency solar module offerings. They also provide customers with alternate solutions for extreme environmental challenges.



AUO



AUO_Smart monitoring system

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They have experience in providing solar power plant services. The company has expertise in project management with its lineup of high performance solar modules, power plant engineering and construction. They provide business portfolio for rooftop, ground - mounted and floating solar power plant to their customers.

AUO established a smart cloud PV monitoring solution combined with a data recorder which helps the users in recording and tracking their system performance on a real time basis. In Taichung county (Taiwan) the Rooftop Capacity is 24.35MW and in Taiyuan it is 9.87MW. It has global PV projects in UK, Japan, France, Korea, India, Italy , Germany and Australia.

Showcase products at PV Taiwan 2017.

High efficiency, High Humidity and Salt resistant Solar Modules for Diverse Power plant Demands.

AUO has continued to develop solar modules fit for special environments. On Sun forte and SunVivo mono-crystalline solar module production lines, AUO offers the 72 cell high efficiency N-mono-crystalline module and the 310W P-PERC mono-crystalline module. Both of these products possess 12 Bus-Bar design which enhances power efficiency and higher ability to resist micro cracks within Solar cells. The N-pert mono-crystalline module, with an impressive power output of 395, is specially designed for floating and ground mount power plants, which increases the power generated per unit, per area compared with other mono-crystalline counterparts.

Multi-Crystalline Photovoltaic Modules and their unique features

SunPrimo PM060PWI

- Power Range - 275 - 285 Wp
- strong wind resistance
- PID resistance passing 1000- hour tough environmental test.
- Resistance to Salt Corrosion and



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- Humidity
- Reliable in ammonia rich environment.

SunForte PM096B00

- Power Range - 325 - 335 Wp
- Back contact cells which means no string in front side to enhance light conversion space
- IP-68 Potted Junction Box for better protection of electrical components from humidity and high temperatures

SunVivo PM60MW2/PM060MB2 has a Power Range - 290 - 335 Wp

SunPrimo PM060PWI has a Power range of 275 - 285 Wp

Darfon Electronics Corp:

Founded in May 1997 and their product lines include Power and Energy Devices Integrated Components & Material, and Green Devices.

Darfon Electronics' Solar Division is dedicated to producing high-quality, solar power solutions.

Products showcased at PV Taiwan 2017

They have self developed high efficient string and micro inverter which

will gain extra 15% power than string inverters and it has also developed power storage system for rural area.

G640 Microinverter

This product offers benefits of a micro inverter and cost-per-watt of a string inverter, the Darfon G640 is the most economical solution for residential and commercial systems. It can be a single or dual-input micro inverter with just one AC connector and can be used with standard trunk or daisy chain cables. This can be installed with the G320 for flexibility in designing arrays.

Darfon H series Integrated Hybrid Storage system

These hybrid storage systems integrate hybrid inverter, control panel, display panel, communication board and batteries into industrial racking enclosures. They make power sharing possible with various power sources for a wide variety of applications.

Conventional solar inverters cannot directly store energy into batteries or handle power back up supplies where as this hybrid inverter solves both problems in one integrated package with direct

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Hamak Solar



SPECIFICATIONS	
Dimensions	1576x440x1087mm (L.W.H.)
Weight	113kg* including two H ₂ canisters
Motor Type	DC brushless motor
Wheels	front 3.0-10", rear 3-10"
Maximum Current	100 amps
Max Speed	50km/hr
Climb	10 degree@15 kph
Fuel Storage	metal hydride canister
Fuel Consumption	1.13g H ₂ /km@30km/hr (@30km/hr)
Refuel	canister exchange
Range	86.6km@30km/hr/62.1km@city mode
Refuel Time	less than 30 seconds
Fuel	hydrogen

solar DC input in conjunction with AC charging capabilities.

How does this work?

Essential load circuits are connected to Darfon's hybrid storage system. Power from Solar panels, batteries and the utility are effectively controlled by the system to supply power to the essential loads

Hamak Solar

Hamak Solar are the 1st PV system company in Taiwan which hold a professional team of core technology, research and development, system integration and installation. They are EPC

manufacturers, their products are designed and manufactured in Taiwan. Hamak is the agency for the well known brand Delta: Inverter, meanwhile also develop and research BOS equipment for solar power system. They have distributors in Japan, Philippines, Australia, India and Pakistan. They are currently working on a 2MW project.

New product showcased

Hamak Solar Motor Drive - Likely to be launched in Dec 2017 or January 2018 which has 5HP. It has Auto - control detection by 2 external sensors. Gives maximum torque even with minimum sunlight and there is no need for battery.

This product is suitable for Water Pump, water aerator and also industrial fans.

Hamak Hybrid PV/Grid Converter - Likely to be launched in the month of Dec 2017 or January 2018, which has both solar plus the Grid power. It has instantaneous self-use solution with grid assisted. Solar power is set as first priority and has also dynamic power configuration. It is flexible and can be switched from AC to DC as per requirement.

The local Hamak Solar team manages systems and provides services for their projects in local areas. Hamak uses Delta On-Grid inverter for their projects.

Asia Pacific Fuel Cell Technologies.

Asia Pacific Fuel Cell Technologies Ltd (APFCT) was founded in March 2000 headquartered in Taiwan. As a professional technology provider, APFCT has been dedicated specifically to the field of proton exchange membrane fuel cells (PEMFC) and low pressure hydrogen storage systems for fuel cell light vehicles. These include scooters, mobility scooters, golf carts, mini cars and pallet trucks.

Their hybrid fuel cell system is suitable to power the range of light electric vehicles. When integrated with APFCT fuel cell systems, such vehicles successfully show high performance whilst eliminating the shortcomings of pure battery powered vehicles - i.e. long charging times, short range and insufficient charge stations.

At the PV Taiwan 2017, the Fuel Cell Scooter was showcased. It is a short range transport tool for city commute. It has used APFCT's unique and service proven low pressure metal hydride hydrogen canister in combination with canister exchange model, each scooter is equipped with two canisters. When hydrogen is depleted the empty canister can be easily removed and exchanged for fully charged ones at existing gasoline stations and convenience stores located.