

# RENEWABLE ENERGY REFRESHER

BERGEN GROUP NEWSLETTER



## HAPPY NEW YEAR 2021

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Due to Covid-19 pandemic in 2020, activities in PV sector like any other sector, have been drastically slow down. Most of the interactions have taken place on digital platforms through video conferencing. No new manufacturing plan either in Solar Cell or Solar Panels have been established. We sincerely hope that the new year 2021 will change the scenario & PV sector will thrive again.

Among few good things which have happened in 2020 are :

- clear cut goal set by PM in PV for installing 450GW solar by 2030 and
- announcement of BCD of 25% on cell and 40% on Modules from April 2022.

We are sure in coming few years, PV will grow at fast pace due to these announcements.

## Solar Panel Manufacturing -Getting Transformed

In PV sector - the sunlight is converted directly into electricity through silicon solar cells. The solar cells are packaged first in the form of Solar Panels before those are installed in solar farms or on rooftops. Solar Panel manufacturing technology has been comparatively very stable and standard so far but in the last few years it is being upgraded /improved for better efficiency, less loss and better long term reliability.

Earlier 60 full cell solar panels have long given way to 72 cell panels. Now "Half-cut" cell-144 pieces panels are becoming norm. In India, however, we have always been slow in adopting the new technologies, as a result in India "Half-cut" cell technology is hardly visible, but it can not be wished away longer due to higher power density (power gain is 3-5%) , less thermal loss and high reliability.

As MONO-PERC technology has almost replaced AI-BSF Multi-Technology , the bi-facial is going to be the norm soon. This leads to double-glass solar panel manufacturing technology on the forefront.

On cell side, the size of the wafers is changing towards 210mm\*210mm, which require one third cut cell- 150 piece (3\*5\*10) panel technology to achieve the most optimum results.

Shingled cells (cell stripes glued together) panels and paving cells (without gap) are also emerging fast.

Automation in Panel Manufacturing has been sparingly used in the past. However, the skill of manufacturing moving from MW level to GW level complete automated lines will be the norm in future. Even Auto-Bussing which has been not deployed in India so far, will be required for scale as well as quality purposes. We at, Bergen want to push these technologies in India fast with our principals and our in-house innovation specifically in automation.

Dr. DN Singh  
CEO

Bergen Solar Power & Energy LTD.

## BERGEN SPOTLIGHT

Bergen Solar Power & Energy Limited (BSPER), a BERGEN GROUP Company, has been serving the PV industry from the beginning. We have set up manufacturing facilities of MOSERBAER, INDOSOLAR, ADANI GREEN, TATA SOLAR, EMMVEE SOLAR, and many more. We hold the 90% market share in solar cell manufacturing lines sold in INDIA and have supplied more than 2GW cell and module manufacturing equipment. We are now offering LOCAL INTEGRATION OF MODULE LINES where we do ROBOTICS & CONVEYORS locally at our 5000sqm facility in BAWAL, Haryana. There are some unique solutions we have developed for cost reduction in Glass Loading, EVA Sheet Placing, and Template Placing equipment, etc.

**BERGEN**

**Localised Integration for Automatic Module Line- Cost-Effective Solutions**

**FULLY AUTOMATIC MODULE LINE**  
STATE OF THE ART TECHNOLOGY  
TURNKEY SOLUTION  
COMPATIBLE WITH DIFFERENT CELL SIZES INCLUDING HALF-CUT, TRI-CUT.

**LONG TERM PARTNERSHIP**  
FULL INSTALLATION & COMMISSIONING PROGRAM  
MAINTENANCE PROGRAM  
AFTER SALE SERVICE

**COST EFFECTIVE** **100% SATISFACTION** **PREMIUM QUALITY**

Contact us today for custom consultation for your new line or existing line upgradation

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## NEWS UPDATE

### No Net Metering for Rooftop Solar Systems Over 10 kW: Ministry of Power

One noteworthy provision in the rules is the provision that mandates net metering for loads up to 10 kW and gross metering for loads greater than 10 kW. This provision was created under the section addressing the rights of consumers as prosumers. The section said prosumers would enjoy the same rights as the general consumer. They will also have the right to set up renewable energy generation units, including rooftop solar systems themselves or through a service provider.

### COAL INDIA PLANS SOLAR PROJECTS FOR Rs.5650 CRORE. AIMS TO BECOME A NET ZERO ENERGY CO. BY 2023-24.

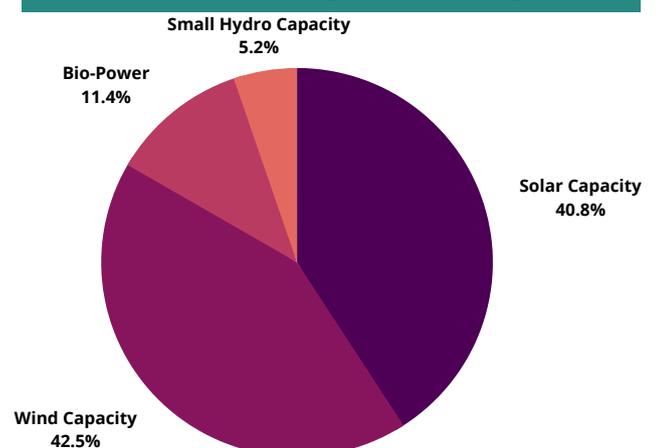
The company plans for building 3000MW of solar power projects as a part of a plan to become a net-zero energy company by 2023-24. The state-run behemoth's solar foray is part of the Narendra Modi government's larger strategy for meeting rather exceeding the commitment made at the Paris climate meet, to reduce India's carbon footprint. CIL has formed a joint venture with NLC (Neyveli Lignite Corporation) called Coal Lignite Urja Vikas, to synergize resources. This venture has a target to set up 1000MW solar Project. It has also tied up with NTPC and inked an MoU with SECI for solar projects of 1000MW each.

### Five Lowest Solar Tariffs of 2020

- Over 12.8 GW of solar projects were auctioned in 2020, and the lowest discovered tariff in these auctions was ₹1.99 (\$0.0270)/kWh – a 19.8% decrease compared to the lowest tariff of ₹2.48 (\$0.0329)/kWh in 2019.

### INSTALLED RENEWABLE ENERGY CAPACITY BY NOVEMBER

A total of 763.47 MW of renewable energy (RE) capacity was added, taking the cumulative installed RE capacity to 90.39 GW as on November, 30th, 2020. Further, projects of 49.28 GW capacity are at various stages of implementation. Projects of 30.29 GW capacity are under various stages of bidding.



## NEWS UPDATE

### Solar module imports to face 40% customs duty, cells 25%

The finance ministry will issue an order to impose a basic customs duty of 40% on modules and 25% on solar cells as part of the Atmanirbhar Bharat or self-reliant India strategy, Singh said in an interview. The customs duty will replace a 15% safeguard duty that is being imposed on imports from China and Malaysia.

### India to have 220 GW Renewable Energy capacity by 2022 -PM MODI

Prime Minister Narendra Modi on Tuesday, 24th November, exuded confidence that India will increase its existing capacity of 134GW to 220GW by 2022 and stressed on reducing tariffs further through technological advancements. "Technology holds the key to scale up the use of solar energy. Technological advancements have already brought about a significant reduction in the price of solar power. A further reduction in the cost will provide a major boost to the use and expansion of renewable energy," Modi said.

### Ajmer DISCOM Floats Tender to Solarize 29 Agricultural Feeders Under KUSUM Program

#### Ajmer: Solarization of Grid-Connected Agriculture Pumps under Component-C of KUSUM Program

Lot	Lot Name	No. of 11kV feeders	No. of agricultural consumers with sanctioned load				EMD	
			3 HP	5 HP	7.5 HP	Total	₹ in million	~\$ million
Lot 1	Bhilwara, Chittorgarh & Rajsamand	28	39	120	34	193	0.65	0.009
Lot-2	Banswara (VII)	1	250	36	0	286	0.62	0.008
Total		29	289	156	34	479	1.27	0.017

Source: AVVNL

Mercom India Research

### Cabinet approves PLI Scheme to 10 key Sectors for Enhancing India's Manufacturing Capabilities and Enhancing Exports - Atmanirbhar Bharat

The Union Cabinet chaired by the Prime Minister, Shri Narendra Modi has given its approval to introduce the Production-Linked Incentive (PLI) Scheme in the following 10 key sectors for Enhancing India's Manufacturing Capabilities and Enhancing Exports - Atmanirbhar Bharat.

- Pharmaceuticals drugs
- Telecom & Networking Products
- Textile Products: MMF segment and technical textiles
- Food Products
- High Efficiency Solar PV Modules
- White Goods (ACs & LED)
- Speciality Steel

#### Advance Chemistry Cell (ACC) Battery

- Electronic/Technology Products
- Automobiles & Auto Components

## NEWS UPDATE

### DGTR Imposes Countervailing Duty of 9.71% on Solar Glass Imports from Malaysia

The Directorate General of Trade Remedies (DGTR), Ministry of Commerce and Industry, has imposed a countervailing duty at 9.71% of the cost, insurance, and freight (CIF) value for five years on the imports of textured and tempered (whether coated or uncoated) glass from Malaysia.

### A 1 kW Rooftop Solar System to Cost Just ₹22,200 for Residential Consumers in Punjab

The Punjab State Power Corporation Limited (PSPCL) has announced subsidies for grid-connected rooftop solar systems ranging between 1 and 10 kW in the residential sector, which could make solar very affordable. The state body said that it had selected agencies and vendors for the installation of these grid-connected rooftop solar systems in the residential sector, and the projects must be installed and commissioned only through these empanelled vendors to be eligible for the subsidy. It was also added that the solar cells and modules used in these projects must fall under the Domestic Content Requirement (DCR) category.

### With 2,245 MW of Commissioned Solar Projects, World's Largest Solar Park is Now at Bhadla

The Bhadla Solar Park has become the world's largest solar park, with 2,245 MW of solar projects commissioned. With Hero Future Energies (HFE), commissioning a 300 MW project at Bhadla-III Solar Park, the solar park is now fully operational.

### Coal India to Set Up Integrated Solar Wafer Manufacturing Facility

Coal India Limited (CIL) has received approval from its board to venture into the solar power value chain and aluminum value chain. In a BSE filing, the coal giant said that the board has approved the creation of a special purpose vehicle (SPV) to set up an integrated solar wafer manufacturing facility to boost the solar value chain. It will also set up an integrated aluminum complex — a greenfield project of Central Coalfields Limited (CCL), a CIL subsidiary. The company is also planning to start a new and renewable energy business vertical

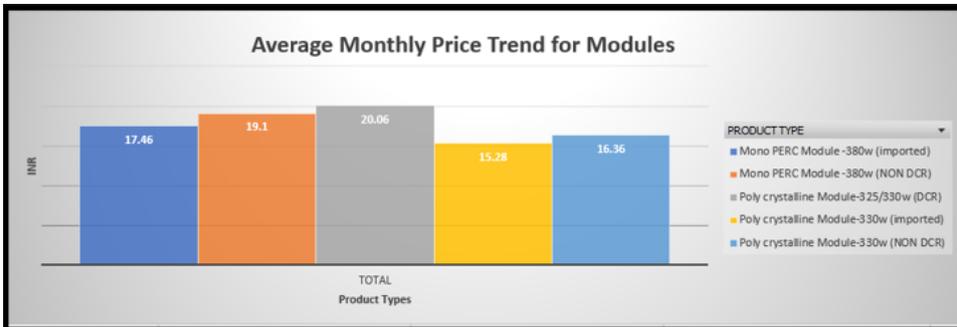
### Goodbye Polycrystalline Solar Modules, Hello Mono PERC, HJT, Bifacial

Technology shift in the solar industry has been taking place rapidly across the globe, but India, a notoriously cost-sensitive market, has been slow to adapt and accept newer products. Higher efficiency products are gaining market share, and costs are dropping quickly. The newer products are not only more efficient, but their benefits include longevity and the ability to reduce BoS (balance of system) costs. In India, the price differential between polycrystalline and monocrystalline continues to decline, and the shift is well underway.

# MARKET ANALYSIS

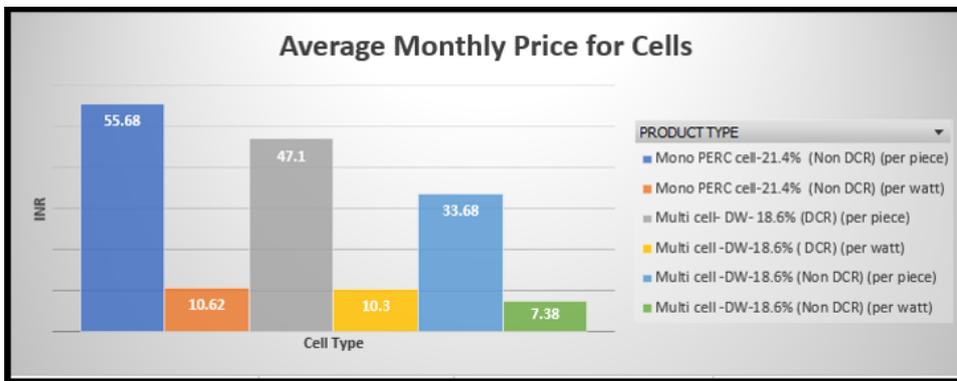
## PRICE UPDATE

- Module Spot Price Update- Multi/Mono



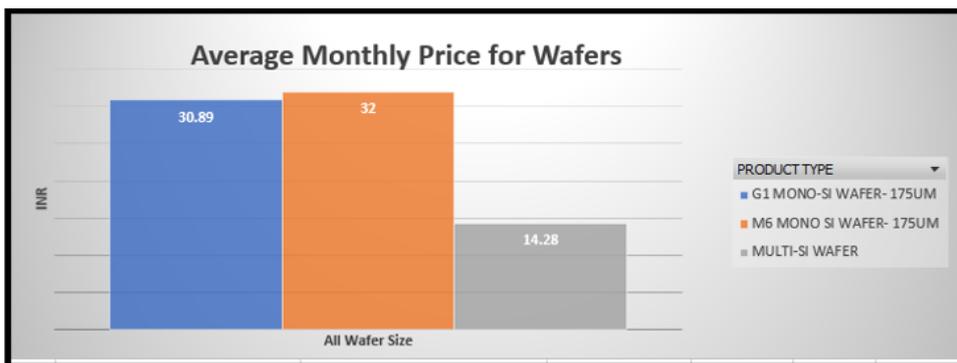
Source : esun solar

- Cell Spot Price Update- Multi/Mono/PERC



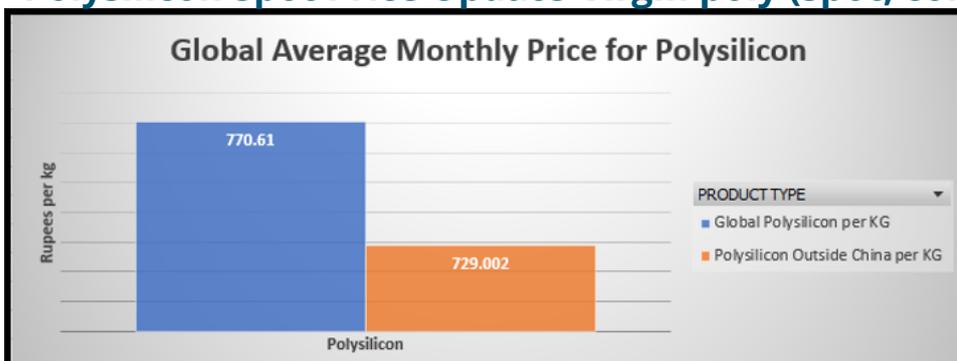
Source : esun solar

- Wafer Spot Market Price Update- Multi SI/MonoG1M6



Source : EnergyTrend

- Polysilicon Spot Price Update-Virgin poly (spot, contract)/Granular



Source : EnergyTrend

## TECHNOLOGY UPDATE

Source: ITRPV

We found for 2019 a share of about 30% for BSF and more than 60% for cell concepts with diffused and passivated pn-junctions and passivated rear sides (PERC/PERL/PERT/TOPCON). This is in line with IHS Markit assumptions as shown in the fig. PERC/PERT/PERL will dominate the market over the next years. HJT cells are expected to gain a market share of about 10% in 2024 and 17% by 2030.

### Different cell technology



The fig. confirms again the market dominance of double sided contact cell concepts. Rear-side contact cells are not expected to have significant market share : we assume a change from ~2% in 2019 to nearly 5% in 2030. Si-based tandem cells are expected to appear in mass production after 2022, again a delay compared to last ITRPV editions. BSF is assumed to be produced mainly on cost efficient mc-Si and will probably disappear after 2024.

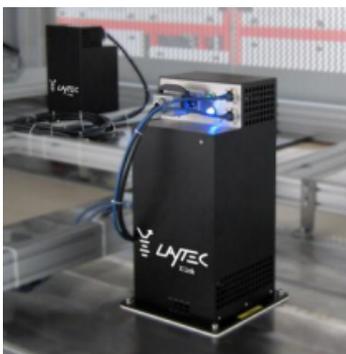
## PRODUCT UPDATE

### LayTec X-Link :

#### Tool for in-line testing of EVA cross-linking degree.

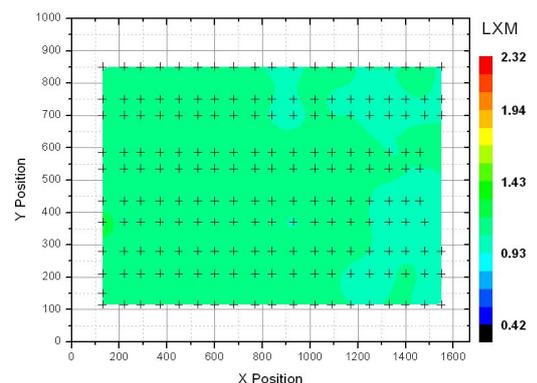
Lamination is one of the key processes in solar Panel manufacturing. The Solar Panel performance with respect to power output, quality & reliability quite depends on the lamination process. In lamination process, cross-linking of polymer takes place in EV sheets. The degree & uniformity of this cross-linking is very important for good quality solar panel. So far, this aspect of the process has been checked through gel content testing which is not very definitive & does not tell anything about uniformity of the cross-linking.

The Laytec X-Link tool can check the degree & uniformity of the cross-linking by non-destructive method in-line as well as off-line.



#### Innovative Solution :

- Non Destructive
- Test Duration <10s
- Precision 3%
- All types of backsheet modules with cross linking encapsulant.
- Developed in collaboration with Fraunhofer USA.
- Patented Method



Sample take out of Module Production : spatially resolved cross-linking test

## EDITORIAL TEAM



**Rajinder Kumar Kaura**  
CMD

With nearly 43 years of contributions in conventional and non conventional power & electronics field, he is pioneer and pathfinder in developing solar & electronic industry in India. His contributions in bridging the gap in standards of living between rural and urban population through generation of solar power and skill development has earned him tremendous respect and recognition by countries like Norway, Japan, Germany, etc besides State and Central organizations.



**Dr. D.N. Singh**  
CEO

Dr. D.N. Singh is a one of the most prominent leaders in solar PV and Semiconductor technology and widely known professional in India and abroad. He has a total of 46 years of experience in Industries, research and academia. He has published over 40 research papers in international and national journals. He has been invited speaker at PV Cell Tech and PV Module tech international conferences. Dr. Singh is Vice-President of Microelectronic Society of India, member IEEE and member of National Nano-Technology working group.



**Dronveer Kaura**  
Director

After completion of academics from The OHIO State University, US, he returned to India to share the knowledge gained in his academic and serve the nation. He founded and engaged himself and his team in Industrial Automation Projects to follow industry 4.0 standard and keep India intact and way forward in the state of art technology of Automation. Under his guidance and knowledge sharing, we could develop a efficient solution for Robot Automation in the field of automobile to boost per day production. He is currently pursuing Phd in Hydrogen Fuels & Technology.



**S.K. Kaul**  
Vice President

Having more than 20 years of experience in the field of Manufacturing, Operation, Material Management & Factory Administration. and looking after complete solutions & supply of Capital Equipment, Technology for the manufacturing of Printed Circuit Boards, Electronic assemblies, Photovoltaic Cell & Photovoltaic Modules and undertaking the turnkey installation of the solar based power projects.