

Let there be Light

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Meet Our Heroes

RenewSys is uniquely poised to support the exponential growth that the solar industry is experiencing. This is because of the combination of two important industry expertises – Polymer and Silicon.

While the PV cell that converts sunlight to electricity is at the heart of solar PV, protecting this delicate component has been tasked to two very robust polymers, these are 'Our Heroes' at RenewSys the **CONSERV[®] Encapsulants** and **PRESERV[®] Backsheets**.

The PV Encapsulant is a complex polymer formulated to prevent harmful parts of the solar spectrum from impacting the cell and allowing irradiance through that will ultimately become electricity. The Encapsulant is responsible for maintaining the integrity of a solar module, it holds the Glass and Backsheet together, encompasses cells in a protective layer and performs several roles like a - Shield, Cushion, Screen and more.

The RenewSys **CONSERV[®]** range of Encapsulants is composed of EVA – Ethyl Vinyl Acetate or POE – Polyolefin Elastomer based products, both of which have their own strengths and benefits.

Similarly the Backsheet protects the Encapsulant and cells from external elements. It is a barrier for dust and moisture,

keeps the cells safe in adverse climatic conditions and provides support to the module. It also acts as a reflector, reflecting back sunlight that has passed through or missed hitting the solar PV Cells thus improving sunlight capture and ultimately output.

A key function of the Backsheet is to be an electric insulator in all modules and in special cases like Glass to Backsheet 'Bi-Facial' modules, where the cells generate power from both their front and back face, the Transparent Backsheet is engineered to provide the additional benefit of being transparent and allowing light to be reflected back onto the cells.



RenewSys CONSERV Encapsulant

The RenewSys range of Backsheets **PRESERV[®]** are an extensive range of specialised multi-layer polymers and include innovations like the Transparent Backsheet, Metallic Backsheets, 1500 VDC Backsheet and more.

Case Studies - Encapsulants

• **CONSERV® 10 UC (EVA Encapsulant):**

Encapsulants have been an area of significant study at RenewSys. Even a marginal improvement in encapsulant performance can lead to significant performance benefits and cost savings for modules and module manufacturers respectively.



*RenewSys Encapsulant and Backsheet inside

CONSERV 14 FC, a very popular Encapsulant, that has a cycle time of 13 - 14 minutes and was introduced by RenewSys a couple of years ago. It was called a Fast Cure or FC Encapsulant as it reduced lamination time from the erstwhile 17 minutes.

A further advancement in the formulation has now made it possible to reduce cycle time to just 10 Minutes! CONSERV 10 UC is hence labelled as Ultra-Fast Cure and is priced only marginally higher than its predecessor CONSERV 14 FC.

This has increased module manufacturing throughput – i.e. speeding up the manufacture of modules by 15-20% for those who have made the switch.

CONSERV 10 UC has enhanced profitability and has also helped some module manufacturers defer capital investment in module manufacturing equipment by 2 years!

• **CONSERV® E 360 POE (Polyolefin Elastomeric Encapsulant):**

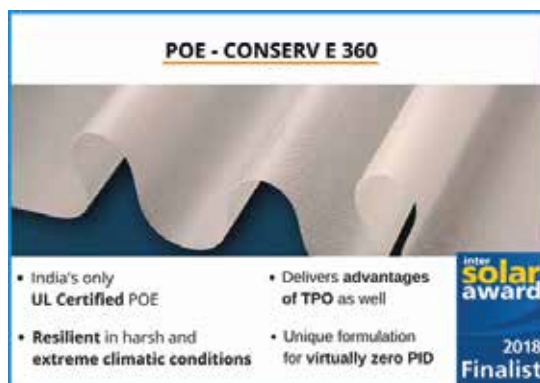
A breakthrough in formulation, this Encapsulant is a one of its kind innovation that combines the benefits of existing POE Encapsulants with TPO (Thermoplastic Olefin) i.e. a hybrid of cross linkable and non-cross linkable Encapsulants.

CONSERV E 360 It has successfully eliminated significant drawbacks of TPO – i.e. Formation of tiny bubbles and reduced mechanical resistance that caused thermal creep in frameless modules. It has addressed challenges faced in using EVA and existing POE in Glass- Glass modules like the production of excessive volatiles in field conditions leading to corrosion, reduced moisture permeability by reducing WVTR (Water Vapour Transmission Rate); and the elimination of PID thus making modules truly 100% PID free even in high voltage stress and humid environments.

The benefits of CONSERV E 360 are manifold:

1. Resistance of high heat and humidity
2. Eliminating thermal creep in Glass - Glass/ frameless modules
3. Dielectric properties
4. PID free
5. Very low WVTR
6. Highly transparent
7. Only Encapsulant compatible with Smart Wire Technology modules

CONSERV E 360 - POE Encapsulant has been recognised by the solar fraternity and honoured with a position as a Finalist at InterSolar Awards 2018.



Case Studies - Backsheets

- **B**acksheet innovation - WN1:

This innovation in Backsheet development has been named PRESERV 125 WN1 and is a non-fluoro based backsheet. This 'thermally integrated' inseparable layer of Backsheet qualifies for the new IEC standards, which require a minimum of **300 micron thickness**. This Backsheet is designed for an **improved scratch and delamination resistance**. This is also called a 'Co-extruded Backsheet' (Peel Proof) because of an inseparable layer that eliminates the fear of delamination. It also has superior resistance to moisture ingress and delivers higher performance at a price point equal to that of standard Backsheets.



RenewSys PRESERV Backsheet

Innovations

- **L**uminous Reflector Backsheet:

RenewSys is proud to announce the launch of an innovation in backsheet development. This high reflecting Backsheet is non Fluoro in composition and displays UV stability and weather resistance.



Specially formulated to increase the reflection of light on the cell-side of the Backsheet to the maximum extent possible, this Backsheet is expected to deliver 0.5% to 2% increase based on module design and configuration.

Field trials are underway and this design is also pending patent approval. This Backsheet will be commercially available from September 2019.

- **S**pecialised Backsheet:

RenewSys has been awarded a patent for a highly specialised Backsheet, formulated and designed at the RenewSys Bengaluru polymer specialisation facility with a unique structure that will increase the performance and life of solar PV modules and module production output by reducing the formation of micro cracks.

Formulated to increase Solar PV module productivity by speeding up the "Lay-Up" process it will shave off about 30% of the sheet cutting time and 10% layup time. This Backsheet will be commercially available in white and black colours from next year.



Automated Backsheet thickness measuring - RenewSys Bengaluru

Corporate Responsibility

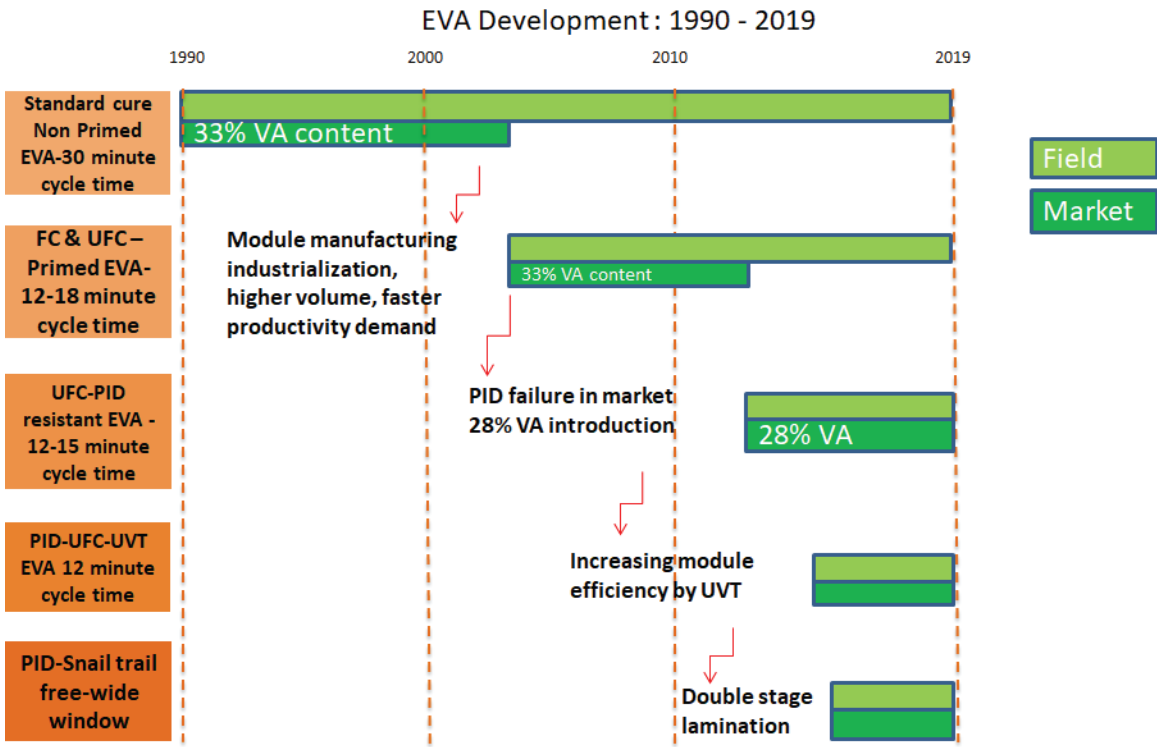
The outreach carried out by the ENPEE Group is touching lives across India. Through eye care and vision services in 5 hospitals supported by the ENPEE Group over 1.6 lakh patients were screened in FY 2018-19, and over 38,000 surgeries were performed.

Since its inauguration the Special Needs Vision Clinic inaugurated on November 14, 2018 (Children's Day) at LV Prasad Hospital, Hyderabad has conducted nearly 2900 eye examinations, 1500 baseline vision assessments and 2000 early intervention assessments.

Trends in Encapsulants and Backsheet

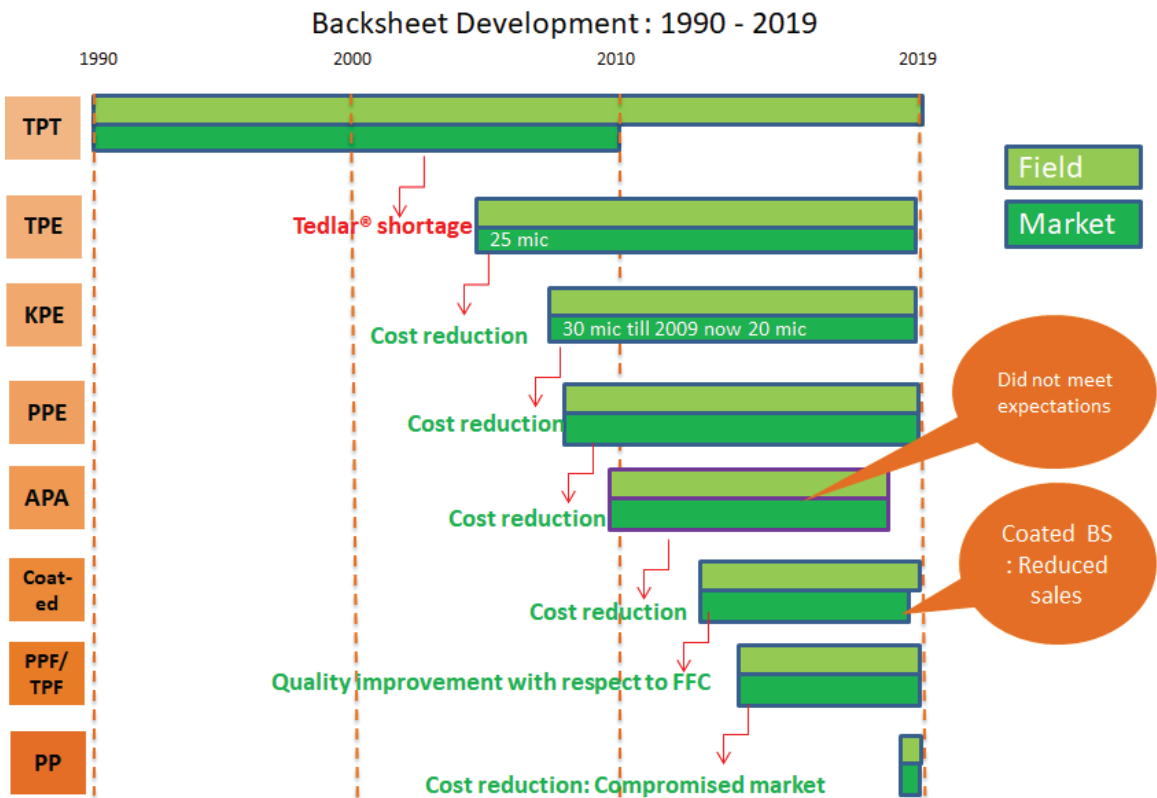
• Encapsulants Trends:

This graphic indicates the specifications of Encapsulants, their availability and use.



• Backsheet Trends:

This graphic indicates the material used in various Backsheets, their availability and use.



In Other News

Going Green, Staying Green!

RenewSys Bengaluru has been setting benchmarks for green manufacturing.

A series of trainings have been conducted along with contests focussed on strengthening the team's commitment to the environment further, and a discussion on air quality and reducing air pollution for the team was also conducted. As part of the commitment to Health and Safety of the team and communities around the plant CO2 – measurement and monitoring, air quality monitoring, noise pollution monitoring, drinking water quality and working environment monitoring are also being conducted frequently.

India's First PV Backsheet Patent:



RenewSys is thrilled to share that we have received India's first PV Backsheet Patent for our Specialized Backsheet. This innovation combines a unique formulation with design thinking to engineer a product that will save 30% of the sheet cutting time and 10% layout time.

Have No Fear, Dr. PV Is Here !



Dr. PV is a unique module wellness programme that will empower customers of RenewSys to access to comprehensive module testing. Once the samples are provided, RenewSys will test them and share a report with data that is crucial to assess the quality and reliability of module production process.



Training on Air Pollution Control - RenewSys Bengaluru Facility

NABL Accredited Lab:

RenewSys is committed to manufacturing quality Solar PV products to contribute to the advancement of solar PV and its widespread adoption. Taking this further, RenewSys is pleased to share that we are now home to an NABL accredited PV lab testing lab, the only solar manufacturer to have received this approval. We look forward to working together with manufacturers across India to improve the quality and reliability of solar PV material.



Additional 100 KW solar power plant:

We aim to increase our cost effectiveness, by commissioning an additional 100 KW solar power plant, dedicated power feeder and conversion of electrical heaters to gas-based burners on production lines.

Training for Progress

With new product innovation and developments, our vision of strategic growth is once again reinforced. RenewSys believes that its employees drive its success. Our workforce comprises individuals who come from diverse fields and new perspectives. To ensure that our efforts are aligned with our vision, we have implemented regular in-house training sessions at our facilities. These sessions were designed to address training needs of our staff, including workmen on topics like Communication, Safety, etc.



Safety Day poster drawing competition - winning poster

RenewSys Wins!

RenewSys Bengaluru's team added another feather to its cap with the Best Performing Vendor Award from our partners 'BHEL' (Bharat Heavy Electricals Limited) in the Backsheet Category.

The Award was presented by Mr. Raja Babu, General Manager, BHEL EPD.



RenewSys - Best Performing Vendor Awards, BHEL (Bharat Heavy Electricals Limited)

The Mysuru Convention was organized on Dec. 3, 2017 where RenewSys Bengaluru won the 'Par Excellence' award. We congratulate the participants for making RenewSys a winner in these awards.

Open House

RenewSys celebrated with an Open House where all our partners and friends visited...



Team TUV Rheinland (Indian and German delegates) & Team HHV Solar at Open House - RenewSys Bengaluru Facility

What's New?

RenewSys Bengaluru has also commissioned a visual inspection machine with a **23 mega-pixel camera** to identify and eliminate defects in finished Encapsulants and Backsheets, while increasing the throughput of slitting machines.

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