



Sustainability through team work

As the effects of climate change continue to be felt around the world, the need for sustainable resources to dampen the effects of our environmental impact becomes ever greater. PES had some more questions for Alessandro Anderlini Business Manager responsible for the EMEA markets in Coveme's PV Solar and Specialty Films Divisions and Steve Davies EMEA PV Market Manager, DuPont Teijin Films. Together they discuss the important role that collaboration plays in mapping out a sustainable future.



Steve Davies



Alessandro Anderlini

PES: Welcome back to PES Steve and Alessandro. After the success of your previous joint interview, it's great to have you both talking to us once again. I think what came across very clearly in our last conversation was your shared ethos on sustainability, would you agree?

Steve Davies: From a DuPont Teijin Films point of view we increasingly see sustainability as central to everything we do, and believe as an innovative science-based company, we are well placed to play our part in addressing some of the global challenges we are all facing. As well as taking our responsibility seriously to constantly improve the environmental impact of our products and services, it is also becoming a licence to operate in certain markets, as well as providing opportunities for future growth.

I believe collaboration across the supply chain is critical in delivering on our sustainability objectives and our joint developments with Coveme are a good

example of what can be achieved by working together to deliver on common goals.

Alessandro Anderlini: We share the same concern and the steps we have been taking since a few years back are going in this direction, as well as being addressed more frequently also from our customers.

PES: Perhaps we can start with you Steve and take a look a little more in depth at the sustainability programme at DuPont Teijin Films. As a global supplier of polyester films, how important is this issue to you?

SD: Our company first invented and commercialised polyester way back in the 1940s and perhaps that helps to focus our minds more clearly on not only minimising the environmental impact of our products, but also seeking out opportunities where we can deliver positive benefits to the communities we serve.

We believe polyester is a great building block for a sustainable product strategy as it is the most widely recycled plastic, has a low carbon footprint and water usage compared to other materials and has an excellent performance to weight ratio, which often means reducing the weight of material in any given structure.

PES: And of course, Alessandro, Coveme then takes this material and transforms it ready for use in the renewables industry. So again, your sustainability programme must be quite rigid?

AA: Coveme started converting PET films back in 1996 and introduced PET based backsheets already in 2007, being the first mover presenting a High UV and hydrolysis resistant PET based backsheet. Therefore, our concern on sustainability has long roots fuelled by a global circular economy view in the very first place.

In fact, recyclability and much lower impact in CFP are the result of this choice.

PES: How important is it, do you think, that companies take a holistic view of sustainability?

SD: I think we all have a responsibility to measure the environmental impact across the full product lifecycle as there are no simple solutions to complex problems and often chasing one aspect of sustainability can have a conflicting negative effect somewhere else in the chain.

A classic example of this would be looking at non-oil derived alternatives, where undoubtedly reducing the reliance on fossil fuels is a positive, but if that means an increased carbon footprint, higher water usage and diverting land from food production or an increase in GM crops then all of those conflicting factors need to be taken into account as well.

AA: At Coveme sustainability is the core of our company goals to constantly improve behaviours, processes and products from treatment and cleaning of harmful fumes and water to self-powering production lines, from differentiation and recycling of production waste to differentiation and recycling of office waste, from a new product range made with recycled PET to EoL and LCA assessment and certification of products and processes.

PES: How does sustainability play a part in the lifecycle of your particular product, so start of life, performance during its life and at the end of its life?

SD: As I mentioned earlier, polyester is a great building block as at the start of life it has a low carbon footprint, with low water usage and there are no hazardous waste products generated during production.

At the end of life our products are compatible in all recovery and recycling processes and there is the really exciting prospect of future closed loop recycling processes through monomer recycling.



However, the start of life and end of life are irrelevant if our products do not perform in their primary role to protect the module throughout its life time, and it is the proven track record of Mylar® UVHPET™ based backsheets which gives us the confidence to state that you can have a more sustainable backsheet without compromising product performance.

AA: Coveme UVHPET™ based Backsheet has a long track record having been on the market since 2007 and installed in different weather conditions, from extremely dry to highly humid environments all over the world.

In addition, our UVHPET™ based backsheets performed extremely well in both PVEL and MAST tests, which are considered the current gold standard of PV backsheet reliability assessment.

The MAST test was performed by DuPont Teijin Films on the Mylar® UVHPET™ outer layer film and a well-known North American PV module manufacturer has undergone a PVEL test using PV modules made with our backsheet.

In both cases the backsheet performed very well as the colour change and mechanical properties remain intact.

PES: Where does the use of recycled content fit within your product base?

SD: The use of 33% recycled content allows us to further reduce our carbon footprint by about 10%, and also has the benefit of giving another valuable life to single use plastic waste.

On the scale that the solar industry operates, those benefits start to add up, with a typical MW of capacity using backsheets with recycled content giving another life to the equivalent of 16,300 waste bottles.

We have developed the LuxCR™ process at our plant in Luxembourg which upcycles the waste PET material, enabling its use in applications as demanding as backsheets without any drop in product performance.

We recently were announced as one of the winners of the Intersolar award for this development, which is an achievement we are really proud of and I am really looking forward to presenting this in more detail at the Intersolar exhibition in October.

AA: As a matter of fact, we are already offering to the market our 1000 VDC backsheet, with DTF recycled film which has undergone the same qualification test and proved to be equal in performance, as well as in reliability, as the standard backsheet.

We also developed the 1500 VDC backsheet version using DTF recycled film, which is currently under internal evaluation, and we expect to get similar results.

PES: Is this something that you see developing even further as technology advances?

SD: The use of our LuxCR™ recycling process has made the use of post-consumer recycled content in our products possible, and our aim is to increase the use of recycled material across our entire range of backsheet films.

Working with Coveme, we are also researching

future models which would enable closed loop recycling of backsheet material.

PES: Are there any particular initiatives that you have trialed or may be trialing now to improve sustainability that you can tell us about?



AA: COVEME and DuPont Teijin Films completed an experimental project with ENEA, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development. We provided EoL PV modules with PET based backsheets to ENEA, who used their own internal method, patent pending, to remove the PV backsheet and part of the encapsulant through successive steps of surface abrasion.

This recovered plastic material was then depolymerised through a glycolysis technology to generate the monomer material BHET with a high purity suitable for any subsequent production of PET.

Finally, DuPont Teijin Films closed the loop by polymerizing the material and producing PET film, demonstrating the potential of circularity in this area.

The next challenge is to find industrial partners across the supply chain that will be able to run this process at mass scale.

PES: Steve you mentioned previously that you believe there will be a drive to reduce the use of materials which represent an economic, technical or safety barrier to future recycling processes. How do you think this will evolve and how soon?

SD: Increasingly, I believe that legislators are looking at policies that can boost recycling rates and reduce environmental harm. A good example of this is 'Safe and sustainable-by-design' principles adopted by the EU.

When it comes to modules, I believe that hazardous materials should only be used where there is a clear technical need, and when it comes to backsheets I believe we

offer a more sustainable option without compromise in product performance.

PES: Where does Coveme fit into this do you think? What solutions do you offer that will help with this drive?

AA: All Coveme PET based backsheets are already in line with these requirements being technically performing, safe and sustainable.

Furthermore, we are collaborating with various institutes to evaluate the sustainability of our products, when compared to different materials-based products.

For example, back in 2017 we commissioned the Fraunhofer ISE institute to undertake a scientific, quantified and comprehensive analysis aimed at comparing the recyclability processes of fluorinated backsheets vs. fluorine-free backsheets.

The incineration of fluorinated backsheets showed a more negative environmental evaluation than the incineration of fluorine-free backsheets, whereas pyrolysis of fluorinated backsheets appears not to be feasible, both from economic standpoint and the technical pyrolysis product application point-of-view.

The conclusion of the report was that the use of fluoropolymers, or halogenated polymers in PV modules should be avoided and alternate PET based backsheets should be encouraged. If halogenated backsheets are used, they must be properly marked or labelled to inform both the users as well as the EoL managers.

PES: And for you Alessandro would you like to give your opinion on what you think will happen next with regards to sustainability within your industry?

AA: The EU is heading the quest to introduce a specific legislation that promotes the sustainability of PV starting from the design of PV modules and using recycling or non-hazardous materials in the BOM, provided that technical specs are met. legislative measures in the form of extended producer responsibility, eco-design, design for recycling requirements promotes this transition.

For example, the eco-design is debating the introduction of a label to be applied on each PV module indicating the content of hazardous materials.

The EU is also trying to harmonize sustainability rules run by single states like France, where public tenders are already requiring the use of PV modules with a certain limited carbon footprint content.

We strongly believe that other countries will soon follow in ensuring that the solar sector abides by high circularity standards.

PES: Finally, how do you both think that collaboration between companies and the sharing of ideas may continue to help? What are the main advantages of such partnerships for your clients?

SD: It is impossible to make the big changes that we need to as a society without open collaboration across the supply chain. In the past the main focus has been on how products perform during their life, and although that is still critically important, I think increasingly we need to address end of life outcomes as well at the start of the product design phase.

This requires a shift in thinking from manufacturers and involves collaborating much more closely with the parts of the value chain who have expertise in areas such as recovery and recycling.

It is a challenge to keep the end of life at the forefront of design decisions when we are talking about lifetimes of modules of more than 25 years, but what we have learnt from other industries is that if we only consider waste when it has been generated then it is too late.

AA: The integration between companies should be proactive, starting with R&D projects through to the final product design. We believe the collaboration should include both the downstream and upstream part of the supply chain in order to benefit from a broader perspective and technical requirements.

A good example of this is the partnership with DuPont Teijin Films (production of PET) and COVEME (converting) that allowed the design of a finished product with exceptional performance combined with sustainability.

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