

Massive investment in R&D reaps rewards

Investment into Research and Development is important for many global operators within the wind energy sector, but for The Dow Chemical Company, it's the cornerstone of its operations. Ram Ramachandran, Director of End Use Marketing for Dow Wire & Cable, discusses his company's \$1 billion annual R&D outlay, its commitment to collaboration, and his thoughts on the future of the industry.

PES: Welcome to PES, can you first explain a little about how wind power fits into your company's product offerings, and give us an idea of the strength of the market at present?

Ram Ramachandran: Wind power and other renewable energy solutions are a natural fit for Dow Wire & Cable. No matter what the power source, reliable long-life power cables are essential to transmit and distribute power. We are a global leader in providing exceptional jacketing, insulation and semiconductive materials for LV, MV, HV and EHV power cables.

Obviously, the renewable energy market will continue to get stronger as long-term viable solutions are realised. Dow Wire & Cable certainly sees the opportunity for growth in this arena and we are working to get in front of the appropriate influencers to grow along with the market.

PES: We note that your AIRSTONE solutions further serve the market, can you tell us a little about them?

RR: AIRSTONE Systems are a product family based on Dow's epoxy chemistry and technology. The products are used to make wind turbine blades lighter, stronger and easier to manufacture. With continuing efforts to develop and offer turbines of higher capacity, such technology improvements will be of value to the industry. The business can be contacted at: www.dow.com/epoxysystems/solutions/windenergy

PES: The company works with industry experts to refine its products – do you

feel that collaboration is a valuable working practice?

RR: Absolutely. For cable makers, materials' consistency, ease of processing, and manufacturing efficiency are crucial. For utilities, long-life, reliable power supply is essential. We collaborate with both to ensure that our materials are optimised to deliver the result desired. Beyond that, our 60 years experience uniquely positions us to engage in conversations and collaborative activity within the entire value chain, including industry professional associations, testing institutes, legislators and non-government organisations (NGOs).

Regarding alternative energy, the global renewables market is still in a 'toddler' phase. Currently, there is not a tight collaborative structure within the renewable energy value chain. For instance, in certain regions, developers or Independent Power Providers (IPPs) may deal directly with installers or cable makers when making a purchase decision about the cables that will transmit power from the source (wind turbine, solar array, etc.) to the grid. This excludes the local/regional utilities and certainly the materials provider from the decision making process. However, at the end of the day, to ensure long-term system reliability you have to make cable purchase and installation decisions based on more than just price.

Dow Wire & Cable is working hard to help the market understand the value that 60 years of power industry experience along with up front R&D,

testing and validation of cable materials brings to the table.

PES: In our last issue, we touched upon the proposed European Supergrid. Is this a project that Dow is seeking to be involved with? In what regard?

RR: We are very much interested in the major renewables arena. This proposal seems to be a major undertaking to bring together wind farms across Europe. As these projects will undoubtedly require cables of all voltage classes, on-shore and off-shore alike, we will monitor this development closely.

PES: After-sales support is a massive concern for potential clients. How do you address this concern?

RR: Customer support has always been a priority for Dow Wire & Cable – before and after the sale. Our technology expertise, which includes in-house testing and validation services, ensures that our materials are optimised before cable manufacturing begins. Dow Wire and Cable has dedicated technical service representatives available globally that can troubleshoot any issues that may arise during the manufacturing process and even post-installation.

PES: The company manages to stay one step ahead through its Global Technology Centres. Can you tell us a little about them and your commitment to R&D in general?

RR: R&D is the cornerstone of The Dow Chemical Company. It invests over \$1 billion annually in R&D with two thirds slated for development of new products and materials. As a business unit of

Dow, Dow Wire & Cable is able to leverage that investment to develop solutions specific to the power and telecommunications industries.

At Dow Wire & Cable's Global Technology Center in the USA, we are continually evaluating, anticipating and responding to environmental demands and industry trends. As new ideas become reality, they are put through rigorous in-house testing, including computer modelling, physical testing, burn and smoke tests as well as electrical and analytical testing.

Throughout the testing and validation process, Dow Wire & Cable employs the latest research technology and tools to ensure reliable results. Once this testing is complete, new product solutions are moved into our pilot plant. Both a pilot compounding facility and fully-formulated pilot wire line helps us validate laboratory research. These efforts put Dow and our clients in a much better position for commercial scale evaluations and to implement new and improved solutions for the industry.

These efforts are complemented by our satellite technical centres in Europe and Asia to cater to regional needs.

PES: How important is the European market to your global operations? Is there one particular area where you are seeing growth?

RR: Europe is very important to our global operations. We have manufacturing and a satellite testing facility in Germany, as well as sales, marketing and technical service offices in Switzerland. The MV and HV market is growing in this region as old infrastructure is replaced or rehabilitated and as new energy sources come online – primarily in the wind market. We are seeing general industry growth in Eastern Europe and Russia and growth in renewable energy sources throughout the region.

PES: What are the 2015 Sustainability Goals to which you've subscribed?

RR: A company the size of Dow is a huge consumer of energy and resources. With that in mind, The Dow Chemical Company has set goals for all of its facilities worldwide to be more energy-efficient and environmentally-conscious in its own consumption of power and resources in the production and distribution of its goods and services. As a business unit of Dow, Dow Wire & Cable subscribes to the same goals.



Analytical testing at Dow Wire & Cable technology lab in Germany

Dow's Sustainability Goals reach much farther. They include:

- Sustainable chemistry
- Breakthroughs to world challenges
- Energy efficiency
- Addressing climate change
- Contributing to community success
- Product safety leadership
- Local protection of human health and the environment.

For more information, visit www.dow.com/commitments/sustain

In addition, the corporation is aligned with Responsible Care, a voluntary initiative of the global chemical industry to safely handle its products from development through end use.

PES: We saw you at the recent Windpower 2010 conference and exhibition – does attending events such as these yield worthwhile results?

RR: It may be a bit early to tell. It certainly is a great gathering place to understand the breadth of products and services available to support this growing market. We've always been a proponent of going direct to the people we want to influence. If nothing else, these conferences can provide a central location for the value chain to connect.

PES: Can you explain the difference between Dow Inside and DOW ENDURANCE?



Manufacturing process monitored from central control room

RR: Dow Inside is an umbrella ingredient branding program, while DOW ENDURANCE is a product family within that brand to cover power cable materials.

Dow Inside is a new initiative from Dow Wire & Cable that benefits cable manufacturers and utilities alike. Under the Dow Inside program, select cable manufacturers will have the opportunity to become licensees that will manufacture cables with Dow Wire

& Cable materials according to high standards. In exchange, Dow Wire & Cable will support cable manufacturers with forward-thinking technology, proven products, enhanced service and the strength of a creative and responsive partner that will give them a competitive edge in a demanding industry.

For utilities, municipalities and electrical co-ops, Dow Inside combines Dow Wire & Cable's unique and compatible system offerings with a high-quality network of cable manufacturers to produce reliable cables that meet or exceed rigorous performance specifications.

DOW ENDURANCE is a family of semiconductive and insulation materials for medium voltage (MV), high voltage (HV) and extra-high voltage (EHV) cable constructions that are developed to last for decades of service. Dow Wire & Cable has developed quality guidelines where the use of DOW ENDURANCE materials together with quality manufacturing processes, help deliver cables that exceed the minimum standards globally for reliability and longevity.

PES: Environmental conditions must have an impact upon the integrity of your products – how do you ensure quality in these circumstances?

RR: Environmental conditions are among the key factors that have influenced our technology development

over the years. We are a proponent of underground (UG) power systems. UG has increased reliability due to its protection against weather events like storms, wind, ice, etc. Obviously, for UG systems, moisture intrusion is the biggest concern for cable failure and power loss. As an example, we are happy to celebrate the success of our medium voltage water tree retardant cross-linked polyethylene (TR-XLPE) technology, which has seen excellent UG service for over 27 years with little to no wear.

PES: What other factors affect the life of a cable?

RR: There are many factors that affect the life of the cable. Apart from external issues such as dig-in etc., that can impact any cable, the biggest factor is the quality and consistency of the materials and of the cable. There is a wealth of materials that can go into the construction of power cables, and there are many suppliers of those materials.

However, the purchase decision has to be made on more than just price. If you want to worry about material degradation and electrical losses, system interruption, and replacement of cable every 5-10 years, buy and install the cheap stuff. If you're a big picture thinker that wants lower total cost over the lifetime of the cable system with decades-long reliability, buy cables made with thoroughly tested and validated materials that well exceed minimum industry standards.

With cables forming a very small percentage of the total owning costs through the life of the system, and polymeric materials an even smaller cost, it is imperative that the industry takes the broader view to focus on reliability that rests on quality and elevated performance standards.

PES: If you could look into your crystal ball, what would you say the future holds for your company and the wind power sector?

RR: Dow Wire & Cable sees the wind power sector as an opportunity for growth and to further push our advocacy of long-term, reliable UG power systems. With several global regions targeting significant fractions of energy delivery from wind power, our global reach, breadth of technology and dedicated service professionals, we are well poised to help support these efforts. We have put our experts to work on understanding the specific needs of this market and how to connect with the various decision makers within the value chain. Working together, we can optimise solutions that will benefit both the market and the consumers of wind energy. ■

About the expert

Ram Ramachandran is Director of End Use Marketing for Dow Wire & Cable, a business unit of The Dow Chemical Company. Responsible for leading the group of dedicated end use marketing managers, Ram directs the initiative to work closely with end users to demonstrate Dow Wire & Cable technologies and solutions for the transmission, distribution and consumption of power, voice and data.

Ram and his End Use Team interface with global end users, such as utilities, communications groups, off-shore drillers and regulatory boards, to understand their cable needs, issues and trends. This information is then shared with customers and Dow

internal teams to help develop products and services that meet the needs and interests of the end users.

Prior to his current assignment, Ram served as Senior Program Manager for Dow Wire & Cable's End Use Marketing. He also held various research and technology positions at Union Carbide in metals, specialty gases, and wire and cable. He is a Senior Member of the Institute of Electrical and Electronic Engineers (IEEE) and is the Chair of the Power Cable Standards Discussion Group of IEEE/Insulated Conductors Committee. He holds eight patents and is the author of more than 20 papers.

Ram is based in Bound Brook, New Jersey at Dow Wire & Cable's Global Technology Center.



For more information, please visit: www.dowwireandcable.com

Experience
the Power
of Dow Inside



WHEN IT'S YOUR JOB TO CAPTURE THE POWER OF THE WIND.

Specifying cables that won't fail when the wind is blowing. That's your job.

All cable compounds are not created equal. When you choose cables made with the power of **DOW INSIDE**, you will get reliable cable performance you can count on for the lifetime of your development. The **DOW ENDURANCE™** family of products from Dow Wire & Cable for MV, HV and EHV underground or submarine cables delivers that peace of mind for a lower cost over the total lifetime of your system. For reliable power transmission and distribution from turbine to grid, there's only one choice. The power of **DOW INSIDE**.

That's the confidence you need when it's your job to keep the power on.



www.dowinside.com

©™Trademark of The Dow Chemical Company. Dow Wire & Cable is a global business unit of The Dow Chemical Company and its subsidiaries.