

Manufacturing and sourcing



“ This was another busy year with MW produced and shipped up by 25 percent, while leveraging on our scale made us a cost-effective market player. We remain flexible and agile to adjust to market fluctuations.”

Jean-Marc Lechêne
Executive Vice President & COO

Manufacturing strategy

As is often the case in infrastructure businesses, national political climates around the world change, which calls for an agile organisation that can adjust quickly to changes in demand. By continuing to manufacture core components in-house, while acquiring non-core wind turbine components from a group of sub-suppliers chosen through a careful selection process, the current manufacturing setup of Vestas is lean and scalable, with the Vestas quality stamp on every single wind turbine sold.

Vestas' manufacturing strategy is built on four key pillars:

- leveraging scale,
- managing suppliers at a global level,
- building flexibility through outsourcing, and
- manufacturing and sourcing in best-cost countries.

Vestas uses its geographic reach to generate economies of scale on new projects and to ensure its manufacturing, transportation, and sourcing costs are continuously optimised.

Managing Vestas suppliers at a global level is key to ensure optimised manufacturing and sourcing. Vestas has continued its comprehensive global supplier selection process in 2016, resulting in a stronger supplier portfolio to better meet customer requirements.

Building flexibility through outsourcing made another step forward in 2016 with several new agreements in every region. The goal is to accelerate Vestas' flexibility and competitiveness by moving production to cost-efficient countries and outsource production where it is relevant.

In support of the corporate strategy, cost savings and achieving cost leadership within the wind power industry remains a priority for the company.

Safety is always number one

Safety is an integral part of achieving operational excellence. Over the last 10 years, Vestas has been through a remarkable journey building a strong safety culture. In 2015, Vestas changed its main safety-related key performance indicator to "Incidence of total recordable injuries

per one million working hours" and in 2016, the incident rate was 6.9, below the full-year 2016 target of 8.0. The 2016 rate corresponds to less than one recordable incident per day for a workforce of more than 22,000.

Flexible, asset-light, and low-cost manufacturing footprint

2016 was another busy year for Vestas. The number of MW produced and shipped reached 9,957 MW (4,264 wind turbines), compared to 7,948 MW (3,330 wind turbines) in 2015. A further ramp-up of the production was required in 2016 due to the high activity level. In the USA, Vestas increased produced and shipped MW by 25 percent to 4,150 MW from an already record-high activity level in 2015 of 3,315 MW.

Produced and shipped per region in 2016 compared to 2015

Percent

Produced and shipped, Europe, Middle East, and Africa:

Vestas produced and shipped 4,282 MW to Europe, Middle East, and Africa

- an increase of 18 percent

+ 18%

Produced and shipped, Americas:

Vestas produced and shipped 4,826 MW to Americas

- an increase of 27 percent

+ 27%

Produced and shipped, Asia Pacific:

Vestas produced and shipped 849 MW to Asia Pacific

- an increase of 66 percent

+ 66%

Total produced and shipped:

+ 25%

The increased activity level in 2016 was achieved without adding new factories to the current manufacturing footprint, highlighting the flexibility and strength of the operating model that was introduced during the turnaround years.

The collaboration with suppliers has generally moved to a new level of maturity, and a supplier account management programme is now being rolled out, similar to the one used for customers.

Vestas is forming close partnerships with large suppliers and involve these in the development of products and processes, as the suppliers often possess many years of knowledge and experience that can be utilised to the benefit of both parties. An example of this approach is Vestas' annual supplier day, during which workshops are held to identify initiatives through which suppliers can become more active contributors to developing new ways of working.

Vestas has an established manufacturing agreement with TPI Composites in China. In addition, Vestas has chosen to expand its business relationship with TPI Composites and further outsource parts of its blade production in the Europe, Middle East, and Africa and Americas regions. TPI Composites will also supply Vestas with blades from its factory in Turkey.

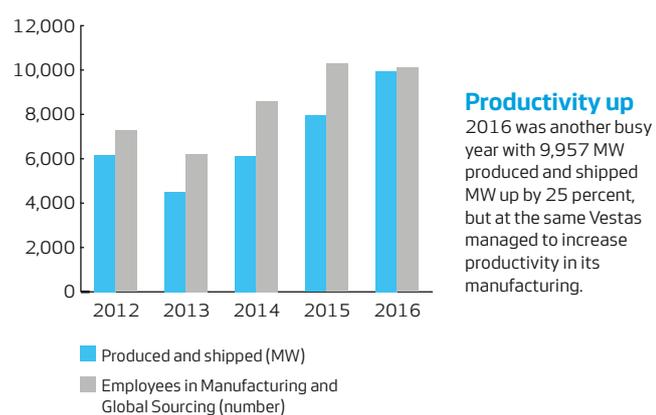
Work continues in close collaboration with R&D to phase-in the various new subsystems for the 2 MW and 3 MW platforms at Vestas' factories. During 2016, Vestas took a great step forward with cost-out programmes in all markets, making its cost set-up even more competitive. Competition remains high in all markets so further progress on the cost-out journey will have to continue in coming years.

Warranty consumption was EUR 90m in 2016 compared to EUR 95m the year before. The Lost Production Factor remains at a low level of under 2 percent. Both indicators demonstrate Vestas' high quality levels and that Vestas has maintained a well-functioning operation throughout the ramp-up.

In 2016, Vestas unfortunately had to reduce the staffing levels at the blades factory in Lem, Denmark by approx 300 employees. The reduction at the Lem factory was necessary due to its high manufacturing costs compared to the market level as well as the need to strengthen Vestas' overall manufacturing and supply chain competitiveness in response to evolving market conditions. However the factory in Lem remains a very important part of Vestas' global manufacturing footprint.

Globally in 2016, Vestas decreased the workforce in Manufacturing and Global Sourcing by 1.7 percent compared to last year. Total recordable injuries was reduced with an even higher rate (10 percent), showing the strength of Vestas' safety culture.

Productivity MW · Number



Evolution of manufacturing footprint

To ensure profitability in new markets with high growth potential, Vestas has outlined separate plans for the target markets China, India, and Brazil. Local presence and local sourcing is of great importance in these countries, be it for reasons of proximity to customers, cost-effectiveness, or fulfilling local content requirements in manufacturing.

In 2016, Vestas announced that it will manufacture and intend to sell its largest onshore wind turbine in China the V136-3.45 MW turbine. Vestas is continuously bringing its latest technologies, products, and service solutions to China and is determined to grow together with its partners in the country while simultaneously leveraging on the continuous supply chain localisation.

Beside China, the V136 blade is also produced in Lauchhammer, Germany.

The Brazilian Development Bank (BNDES) has in recent years required increasing levels of local content supply for developers seeking the low-rate BNDES financing through the FINAME programme, which in turn reflects on the wind turbine manufacturers.

Vestas has been present in Brazil since 2000 and announced 371 MW in firm orders in 2016. In addition to the sales office in São Paulo, Vestas inaugurated a hub and nacelle production facility in Aquiraz (Ceará) as well as established successful partnerships for producing blades and generators locally. Vestas is today included in BNDES' approved list of suppliers.

Late in 2015, Vestas announced that it would build a blade factory in India, the construction of which is progressing according to plan. This will be the first significant addition to the manufacturing footprint since 2011 and is an example of Vestas' ambitions to grow in its strategic focus markets. The new factory will support Vestas' operations in the Indian market as well as potentially servicing activities in other markets. It is expected to be fully operational by early 2017.

Equally important, during 2016, Vestas started sourcing of blades from third parties in China, Turkey, and Brazil. Integrating external manufacturers into Vestas' global manufacturing set-up illustrate the scalability and flexibility of Vestas' supply chain and its ongoing commitment to providing cost-effective wind power plant solutions for its customers.

In addition to these three specific growth markets, Vestas continues working on establishing supply chains in new markets with growth potential around the world. Strategic collaboration with large, global suppliers that have an understanding of the market conditions to be able to meet regulatory and customer requirements in new markets is key to succeed. As the company is maturing, the need for flexibility and agility is also extended to supplier partnerships, requiring key suppliers to be able to act quickly and adapt to market shifts.

Working capital management

Due to the high activity in 2016, focus was mainly on keeping working capital under control. This highlights the fact that the efforts undertaken during the turnaround period have not been forgotten but remain an inherent part of the DNA of the transformed business. Vestas continues to work on improving all parameters in net working capital, which will remain important focus area.

In 2016, Vestas introduced new tools to optimise make-to-order and standard lead times. Overall, Vestas has taken a further step to align its working capital management with the goal of reducing levelised cost of energy.