

ENERCON Success stories

The E-Nacelle – The next level of electrical engineering

The introduction of the E-nacelle in the EP5 programme represents the next major milestone on ENERCON's technology and product roadmap towards the sustained reduction of the cost of electricity. The E-nacelle will house the electrical systems that convert the electrical energy produced by the generator. The E-module located in the tower base that was previously used in ENERCON wind energy converters thus becomes obsolete; the power conversion is performed at hub height. The inverters and the transformer required for this purpose are placed into a new section at the rear of the E-nacelle. The machine house will therefore have to be significantly longer: Compared to the E-160 EP5 E2, the length of the E-160 EP5 E3 machine house will double from 7 to 14 metres. The height of the nacelle will be slightly reduced, while the width remains below 5.0 metres to facilitate transport. With regard to weight, the developers are shooting for a transport weight of 80 tons.

The primary focus is on optimising production, transport, and installation. ENERCON's plan is to manufacture components that are fully equipped with all mechatronic systems at the factory. This will make the machine house fully plug & play enabled. The advantages for installation are clear: No more time needs to be allocated to the installation of the E-module at the construction site. Likewise, no more separate transports will be required for the E-module, which was previously a separate component. On top of that, the new design will simplify cable installation in the tower.

Technology benefits

The transformer is located directly behind the generator in the machine house. This means cable losses can be reduced and higher yields achieved. In the new design, the inverted electrical energy runs through one medium-voltage cable down the tower. This simplified cabling also reduces the costs for the corresponding materials.

The design engineers also accounted for servicing and even the replacement of major components where necessary. All replacements, whether of sub-components or of entire transformers, can be performed using the familiar tools and aids. The transformers do not contain conventional mineral oil but instead a special synthetic oil that has better environmental properties. Still, the E-nacelle is fitted with an oil tray in order to safely catch any leaks or spills. This tray is built into the floor of the machine house. A particularly nifty feature: For servicing, the floor including the transformer can be winched down to the ground – and winched back up after being fitted with a new component.

In addition, the E-nacelle casing has a modular design that provides Service personnel with more options. If necessary, individual sections can be removed. The components will be transported to the assembly plant using standard shipping containers.

Benefits for production optimisation

The new nacelle design provides substantial benefits for production, too, because the E-nacelle can be manufactured using an integrated manufacturing process. The machine house is fitted with all mechanical and electrical components at the factory, undergoes functional testing and is then transported to the construction site ready for installation. The entire process chain of 'production, transport and logistics, installation, commissioning' is simplified significantly. This saves time and money, contributing to ENERCO's overarching goal of CoE optimisation. After starting with the E-160 EP5 E3 model, ENERCON is planning to successively switch more plant types of the EP5 and EP3 platforms to E-nacelles.

