SMART ENERGISE
THE ART OF SOFTLY CONNECTING POWER TRANSFORMERS TO THE GRID
TRANSFORMERS & POWER QUALITY
Transformer energisation is an event known to negatively impact on power quality. At the moment of energisation, a transformer will draw a very large inrush current, which can be 5 to 10 times its normal rated current.

Nowadays, as increasingly large unit transformers are used in wind turbines, the impact of inrush currents is also increasing and deserves a greater awareness.

INRUSH CURRENT & VOLTAGE DIP
One of the biggest consequences of an inrush current is a subsequent voltage dip. Such voltage dip poses power quality issues known as «flicker», that can be perceived, for example by an unsteadily shining light.

Impact of the transformer energisation without (left) and with (right) the Smart Energise. Voltage dip (Top), Inrush current (Bottom).

SYSTEM OPERATORS REQUIREMENTS
Through grid codes, grid operators can impose a maximum voltage dip in case of transformer switchings. Therefore, in some specific cases, standard mitigation methods have been used, but with the drawback of a consequent investment cost.

THE ENERCON SMART ENERGISE
Smart Energise is a new, low-cost and highly effective technology, which reduces inrush currents to just 1 x rated current. The principle is simple: just before any energisation, the transformer is «prepared» by being submitted to a temporary low DC voltage, resulting in a known and desired residual magnetic flux. Once the residual magnetic flux is fixed, the transformer can be energised at the proper instant of the voltage sinewave.

This innovation, developed and patented by ENERCON, will be available in series production for ENERCON wind turbines by the end of 2019.
SIMPLE, EFFICIENT, INEXPENSIVE

Smart Energise offers a remarkable combination of simplicity, high efficiency and reliability. The transformer’s inrush current is consistently reduced to 1 x rated current, where otherwise 5 x to 10 x rated current would occur.

Even better, its simple design means that Smart Energise costs only a fraction of other industry-standard inrush mitigation solutions.

INRUSH CURRENTS, ONE LESS THING TO WORRY ABOUT!

Modern wind turbines, with multi-megawatt rated power, require increasingly large unit transformers. As transformer size increases, so too does inrush current, as well as the potential for power quality issues (voltage flicker). This affects both project developers and system operators.

Until recently, efficient strategies to mitigate inrush currents (oversizing of the transformer core, pre-insertion resistor, point-on-wave switching) have generally come with a significant investment cost.

Smart Energise is a new inrush current solution from ENERCON, which combines simplicity, efficiency, and reliability - all at very low cost - to give peace of mind for project developers and system operators alike.

This innovative technology can be used with power transformers in any field of application (solar PV, industrial / commercial, substation, etc). But today, Smart Energise is available exclusively in ENERCON wind turbines.

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