

DE NORA

Coatings, Elektroden und Zellen - von Materialinnovation zur
Serienproduktion

Robert Scannell, April 2021



De Nora - Key Company Highlights



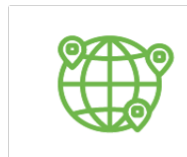
GLOBAL LEADER

Unequivocal leadership in long-established Electrode business supported by high market share and patented technologies.



TECHNOLOGY PLATFORM

Water business expected to accelerate the planned growth with sustainable improvement of margin through strategy execution and establishing itself as a partner of choice recognized in the water space globally



TRUSTED PARTNER

Large installed base drives predictable growth in aftermarket sales, leveraging on long and trusted customer relationships (about 38% of total sales)



SOLID FOUNDATIONS

State-of-art facilities designed to maximize efficiency and flexibility, recently renovated, providing a local presence across key geographies



DIVERSIFIED EXPOSURE

Diversified exposure to attractive end-markets with well-established megatrends sustaining growth in both Electrode and Water Technologies



FINANCIAL STRENGTH

Strong cash generation in established and stable markets funding organic growth and M&A opportunities



GROWING MARKET

Growth driven by continuous innovation and business development in new and growing markets, where electrochemistry is expected to play a key role



EXPERIENCED TEAM

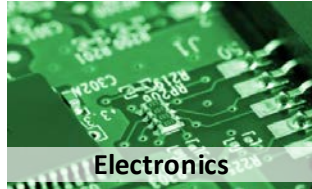
highly experienced management team with significant industry standing and length of tenure

ELECTRODE TECHNOLOGIES

electrochemistry at your service



Chlorine & Caustic Soda



Electronics



Cathodic protection



Renewable energy storage



Surface finishing



Mining



Pulp & Paper



Municipal



Energy & Power



Marine



Industrial water treatment



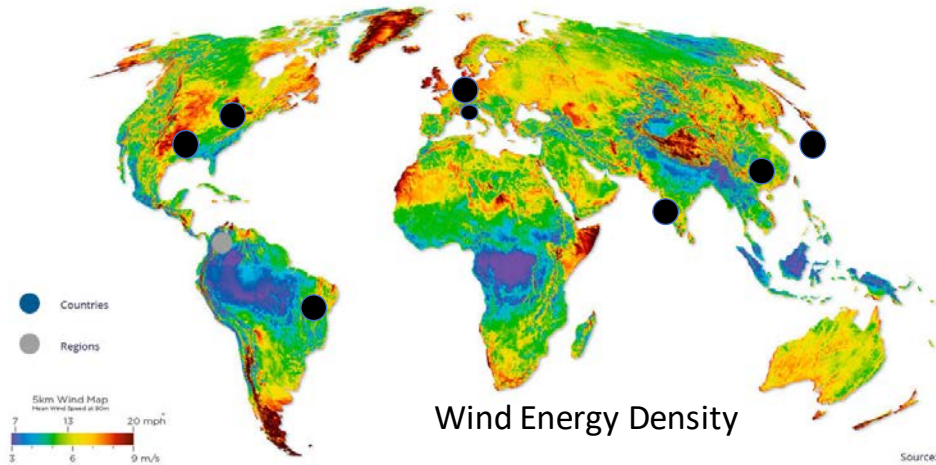
Food Processing & Sanitising



Swimming pools

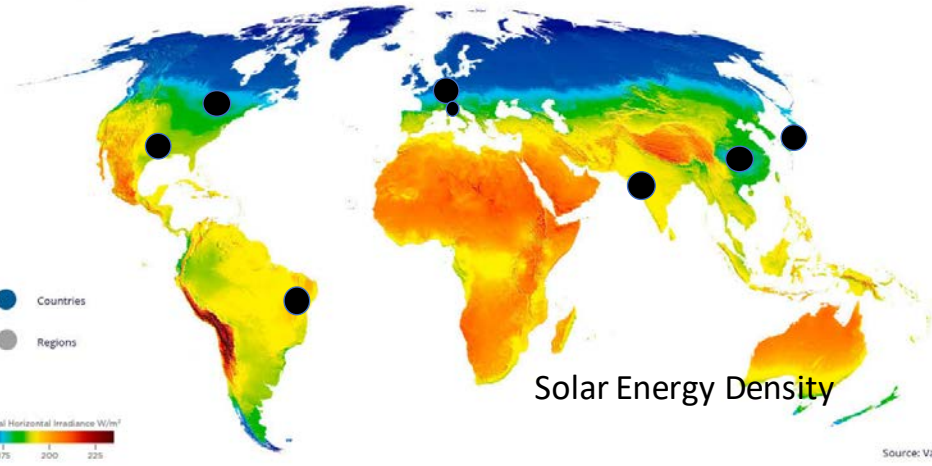
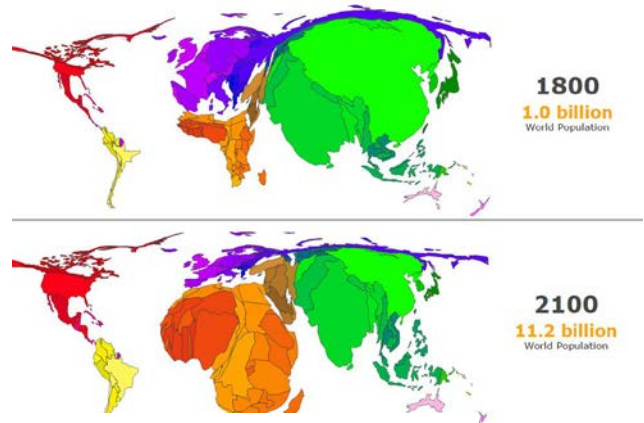
WATER TECHNOLOGIES

water made easy



Wind Energy Density

Source: Vaisala



Solar Energy Density

Source: Vaisala

DE NORA Production Sites

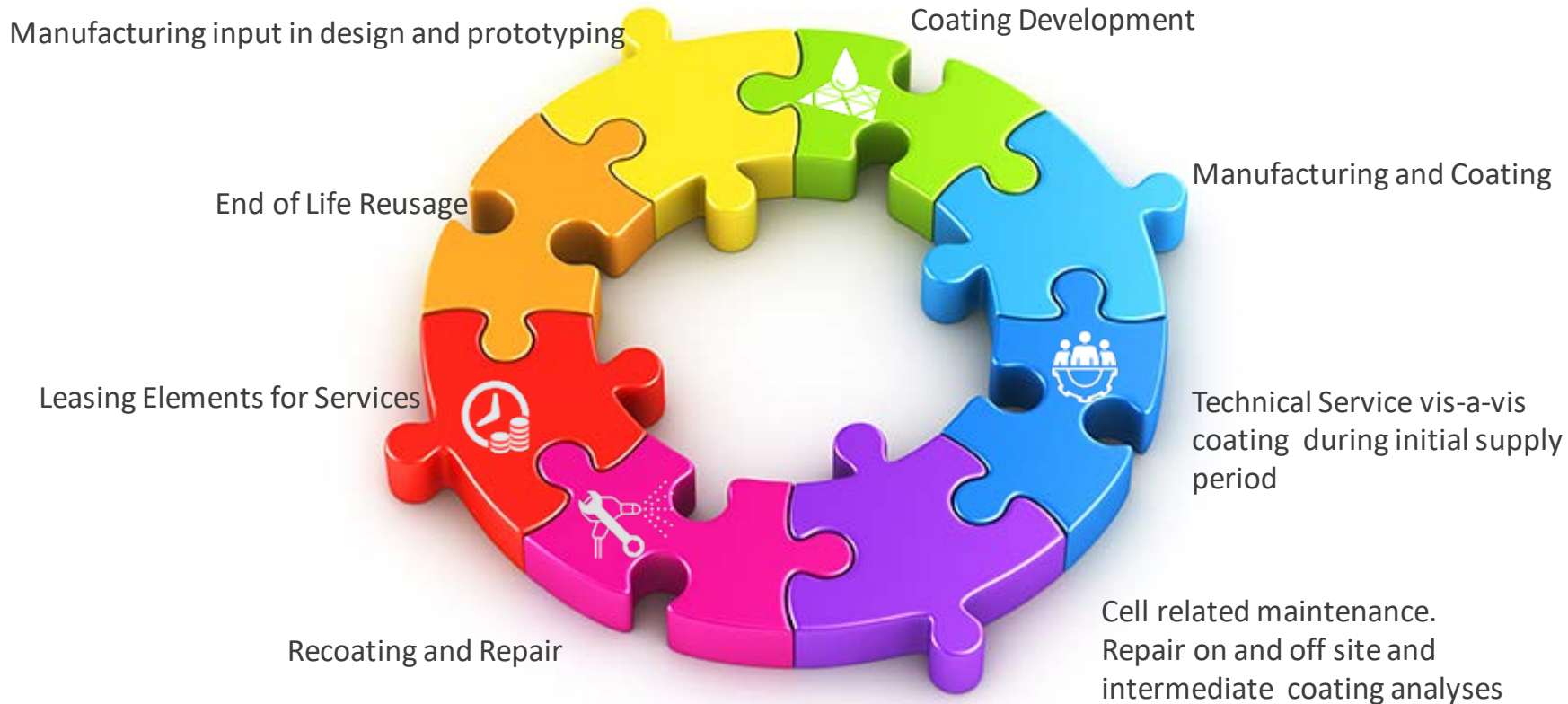
De Nora global manufacturing and service footprint



Global reach complemented by local presence to better serve our growing global installed base



DE NORA Service





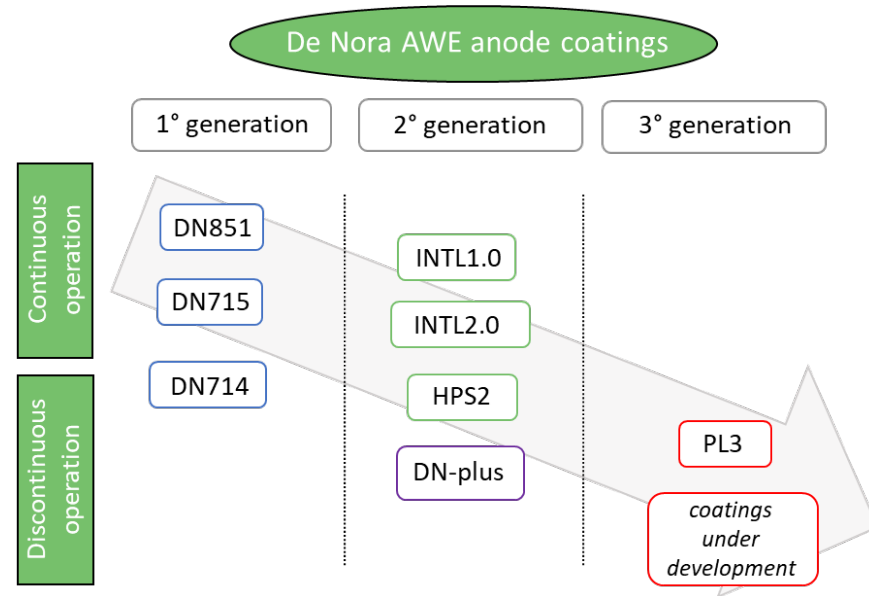
DND



Example of manufacturing and coating
Facilities in DeNora , Rodenbach

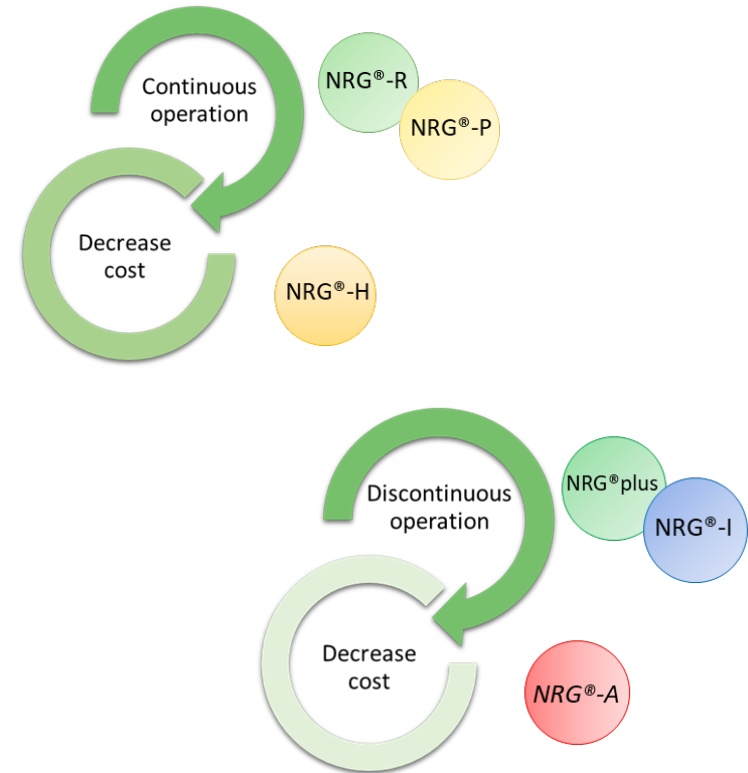
De Nora AWE anode coatings

- Different **anodes** coating families for **oxygen evolution reaction (OER)** have been developed to match different AWE operating conditions and market requests:
 - compatible with both **pressurized** and **atmospheric** operation
 - compatible with standard **temperature** (up to 90-100°C) and ready to be operated at even higher values (>100°C)
 - ready to withstand **cycling load** with fast load variation within the system operating window (e.g. 20-100%)
- De Nora offer of **MMO anodes** is based on different formulations and different catalysts which cover all the known combinations of operative conditions & market opportunities
- Efforts to remove critical raw materials are also carried out, developing new anode coatings, always ensuring state-of-the-art performances
- De Nora anodes are specifically tailored to allow high current density operations (up to 15kA/m² at the moment) and the smooth synergy with **Renewable Energy Sources (RES)**



De Nora AWE cathode coatings

- De Nora is continuously improving cathodes belonging to the well-known **NRG®** coating family for **hydrogen evolution reaction (HER)**, originally conceived for Chlor-Alkali application and recognized as best-in-class for proven performances and stability and now further developed for Water Electrolysis
- Similarly to anodes , NRG® cathodes are ready to match different AWE operating conditions and market requests:
 - compatible with both **pressurized** and **atmospheric** operation
 - compatible with standard **temperature** (up to 90-100°C) and ready to be operated at even higher values (>100°C)
 - ready to withstand **cycling load** with fast load variation within the system operating window (e.g. 20-100%)
- A suitable NRG® cathode can be selected based on different operative conditions (**continuous** or **discontinuous**)
- NRG® different formulations (in terms of quantity and type of PGMs) are developed to sustain critical raw material scarcity



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