

Meshed High Power 700/1400V DC Microgrids

Publieke samenvatting / Public summary

Aanleiding

The ongoing Energy Transition is driving the development of renewable energy generation, electrical mobility and broad electrification. This leads to growing congestion in the traditional AC distribution networks across the Netherlands and it is increasingly hindering the further integration of renewable renewable and electrification. This issue affects both industrial and domestic connections, it disrupts construction projects and drives up real estate prices while limiting emission-free construction. Addressing these challenges is vital for advancing Energy and Mobility Transitions, improving efficiency and reducing emissions. Adopting DC Microgrids offers significant benefits, as a 50% reduction in raw material usage, improved energy efficiency and inherently smart grids. This not only supports sustainable infrastructure but also alleviates AC grid stress, it enhances local renewable energy use and aligns with broader sustainability goals.

Doelstelling

The objective of this project is to evaluate the feasibility of an improved bipolar 700/1400V DC Microgrid system (1400V between positive and negative poles) for high-power energy distribution exceeding 500 kW in the Low Voltage Domain. By adopting a DC Microgrid approach, this system is designed to operate independently of the traditional AC grid, potentially relying on a minimal grid connection of just 55 kVA. This innovative setup aims to enhance energy distribution efficiency and reliability while reducing dependency on the grid. The project will explore the technical and economic

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Algemene informatie / General information

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DC Opportunities R&D B.V.

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viability of such a high-voltage DC solution, following earlier 350/700 Volt bipolar technology. The increased voltage range supports substantial high power loads and generation and facilitates seamless connections with existing infrastructure.

Korte omschrijving

DC Opportunities will carry the development of high-power protection equipment, power electronics converters, and power management algorithms for DC Microgrids operating at 1500V DC. Their activities include creating advanced EV chargers, solar power converters and sophisticated protection systems for DC. Furthermore, partners will study and evaluate the financial-economic impact of the technology together.

Resultaat

Future results will include the development of solar and battery converters, EV chargers, and electrical protection devices for bipolar 700/1400V DC systems, along with AC/DC bi-directional grid connections. Advanced software for power management and control will be integrated and tested at pilot sites. Contributions will refine NEC-64-DC standards for 700V bipolar networks and grid connections with and without galvanic separation. These advancements will support a follow-up project for a large-scale demonstration over 1 MW. Results will be shared through events and workshops at Stichting Gelijkspanning Nederland, Connectr (IPKW), and Topsector Energy.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.

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