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VAN WIETMARSCHEN (43) **Pub. Date: Nov. 10, 2022**(54) **DC-DC CONVERTER**(57) **ABSTRACT**(71) Applicant: **Nowi Energy B.V.**, Delft (NL)(72) Inventor: **Luc VAN WIETMARSCHEN**, Delft (NL)(21) Appl. No.: **17/621,092**(22) PCT Filed: **Jun. 22, 2020**(86) PCT No.: **PCT/NL2020/050402**

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The present invention relates to an electrical power energy converter unit for converting Direct Current to Direct Current, DC-DC, with improved efficiency and cold-start capability. In an aspect there is provided a Direct Current to Direct Current, DC-DC, converter for converting a low-voltage input to a higher-voltage output according to a conversion factor for powering a load such as a wireless sensor node, the converter comprising: a first DC-DC converter circuit arranged for converting the low-voltage input to a first higher-voltage output during a start-up mode of the load; a second DC-DC converter circuit arranged for converting the low-voltage input to a second higher-voltage output during a normal operational mode of the load; a control circuit for control of the conversion factor; wherein each of the first and second converter circuit comprises: an input stage for receiving the low-voltage input; an intermediate stage in series with the input stage for converting the low-voltage input to the first higher-voltage or second higher-voltage output circuit at a conversion factor being defined by the ratio between the input and output; a final stage in series with the intermediate stage for outputting the first higher-voltage or the second higher-voltage output; wherein each of the stages comprises: a shared capacitor for boosting voltage of said low-voltage input to said first higher-voltage output of said first converter or to said second higher-voltage output of said second converter.

