Distributed DC/DC architecture for an LVDC hydrogen production microgrid based on concentrated photovoltaïc sources
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In the context of the decrease of fossil fuels and ecological transition, hydrogen production has been identified as a solution for storage consumption of renewable energies. High efficiency solar cells can be used in conjunction with solar concentration to further push the limits of photovoltaic energy production. In order to maximize this production, high precision solar tracking in addition to optimized conversion devices are needed. In this study, a distributed DC/DC architecture is proposed with a Low Voltage DC microgrid, aiming to optimize energy flows between high efficiency concentrated photovoltaic production and hydrogen production from electrolyzers.

**Distributed converter architecture**

One Single DC/DC Boost converter for each CPV cell + separate MPPT for each.

Exploiting different functioning points, optimizing energy flow

**Perspectives**

Experimental test with small size electrolyzer cells + CPV

Modelizing Electrolyzer cells in collaboration with RCAST, Tokyo (Equivalent circuit models, EIS)

Extrapolating results for bigger scale hydrogen production.

**The ADREAM platform**

LAAS-CNRS, Toulouse, France

AC microgrid for energy production and consumption. DC microgrid + storage: Lead-acid batteries + supercapacities

**Concentrated PV + Tracking**

RCAST, Tokyo

High efficiency cells + fresnel lenses and concentrators

2 axis Solar Tracker

TdAPS (Time derived Astronomical Positioning System)

RCAST, Tokyo

LAAS, Toulouse

**LVDC microgrid for hydrogen production based on concentrated PV**

LAAS-CNRS, Toulouse

Modelizing CPV, converters and batteries

LAAS-CNRS, Toulouse

/ Laboratoire d’analyse et d’architecture des systèmes du CNRS