

Flexible DC-Energy Router based on Energy Storage Integrated Circuit Breaker

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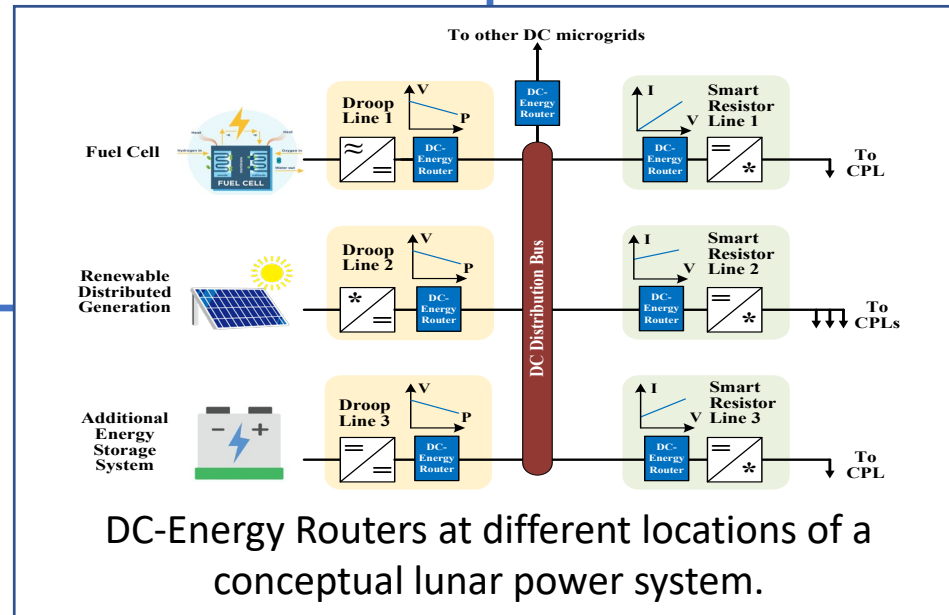
Raytheon Technology Research Center

Development Objectives

The goal is to combine the Smart Resistor concept, which is a wide bandwidth controller enabled by WBG devices and energy storage systems, and the T-Breaker, which is a modular and scalable dc circuit breaker, to realize a flexible DC-Energy Router between and within a

wide range of lunar microgrids.

A digital twin and a 120 V 10 kW GaN based high power density prototype would be built.



Impact and infusion

- Modular and flexible solution for control, protection and interoperability

Approach

- Modular design
- Co-optimization of system architecture and layered control strategies
- Flexible energy flow control and stability improvement by coordinating droop lines of energy sources and Smart Resistor lines of loads
- Fault current limiting, fast breaking, and system re-configuration with integrated energy storage devices
- Digital twin and prototype based validation

- Fuel saving and reliability improvement
- Reduction in fault energy and collateral damage
- The planned digital twin, the high power density prototype and hardware platform will enable many future research
- A group undergraduate and graduate students will be trained