



# DCSMART

## DC Distribution Smart Grids

”DCSMART aims at enabling the integration of smart grid system technologies, creation of market opportunities and stakeholder’s adoption.

### DCSMART is meeting current electrical power system’s challenges.

The electrical power system is facing challenges due to the increasing amount of distributed energy resources with stochastic behaviour. While the distribution grid has traditionally operated with alternating current (ac), nowadays most devices operate with direct current (dc) internally, and most distributed renewable resources generate power in dc. Moreover, storage components as batteries and supercapacitors have a dc character.

### DCSMART is aiming at integrating DC smart grids technologies.

DC distribution grids have the potential to facilitate smart grid applications in a more straightforward way. DC sources and loads could be connected to a DC bus directly, eliminating the need for DC/AC or AC/DC conversions. DCSMART comprises several innovative elements, ranging from the development of smart grid-enabling components to the design of new smart market mechanisms. The DC distribution smart grids will be based on modular and scalable concepts and tested at two demonstration sites, one in the Netherlands and one in Switzerland.



DCSMART Project kick-off meeting was successfully performed by the Delft University of technology in April 2016.



#### Project Duration

01.02.2016 - 31.03.2019

#### Project Budget

Total Budget: € 2,063,286.-

#### Project Coordinator

Delft University of Technology (The Netherlands)

#### Project Partners

- Fraunhofer IISB (Germany)
- CSEM (Switzerland)
- TU Eindhoven (The Netherlands)
- DCBV (The Netherlands)

#### Project Website

[www.DCSMART.eu](http://www.DCSMART.eu)

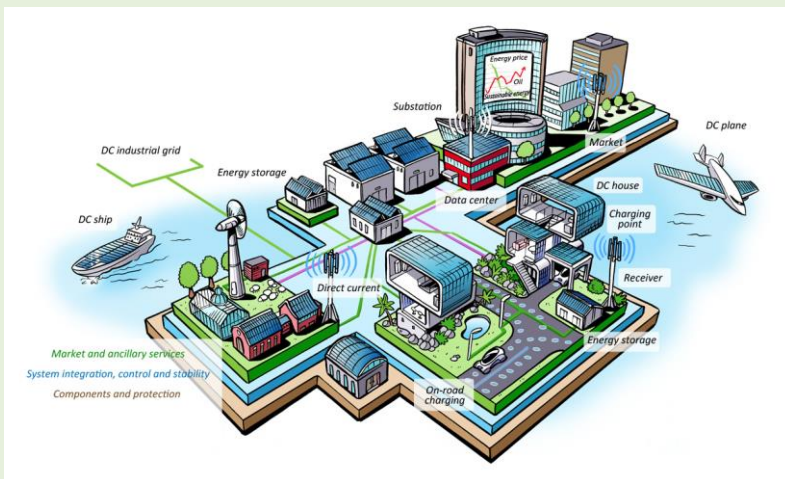
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## Main Objectives



The main goal of DCSMART is to enable a straightforward integration of smart grid system **technologies**, creation of **market** opportunities and **stakeholder's** adoption through the development and implementation of direct current distribution smart grids.

**Technology innovation:** 1) design suitable converters for dc smart grids, 2) develop new protection strategies and design topologies for meshed dc distribution smart grids, 3) create models and algorithms to enable congestion management taking advantage of the flexibility provided by dc distribution smart grids.

**Marketplace development:** 1) develop solutions that couple smart markets with the physical system, 2) develop decentralised real-time markets and market models.

**Stakeholder adoption:** 1) overcome barriers to widespread user adoption by supporting the on-going standards, 2) show the effectiveness and applicability of the developed solutions by means of the demonstration sites.

## Main Results

The expected results of the DCSMART project over the course of the coming years are as follows:

- New protection strategies and design topologies for meshed dc distribution smart grids
- -Advanced models and algorithms for congestion management in DC distribution grids
- Intelligent algorithms to increase system reliability by automatic islanding/anti islanding
- Innovative decentralized real-time markets and market models for the prosumers and distribution system operators
- Widespread user adoption by supporting the on-going standards and specific standardization for dc distribution grids
- Proof-of-concept of some above mentioned solutions in two demonstrations sites in the Netherlands and Switzerland.

From Local Trials towards a European Knowledge Community

<http://www.eranet-smartgridsplus.eu>

**DC Smart**  
[www.dcsmart.eu](http://www.dcsmart.eu)

**TU Delft**

**Fraunhofer**  
IISB

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**TU/e**



This project is part of the 1st Joint Call for transnational RDD projects of the ERA-Net Smart Grids Plus initiative. More than EUR 31 million of funding have been made available to 21 projects from 19 regions/countries.

**ERA-Net  
Smart Grids Plus**