

Greening DATA CENTERS!... sounds interesting?



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Company profile

The Challenge >

The Challenge

At present, data centers (**DCs**) are one of the major energy consumers and source of CO₂ emissions globally.

The **GREENDC** project addresses this growing challenge by developing and exploiting a novel approach to forecasting energy demands.



The Collaboration >

The Collaboration

The project will bring together five leading **academic** and **industrial** partners with the overall aim of reducing energy consumption and CO2 emissions in specific national **DCs**.



The project Partners are:



[The Solution >](#)

The Solution model

Mathematical and simulation modelling of **DC** operations and developing an efficient and scalable optimization techniques.



The Deliverable >

The Main project deliverable

Software development of a decision support tool (**GREENDC DSS**) for industrial applications by industrial partners and other companies operating **DCs**.

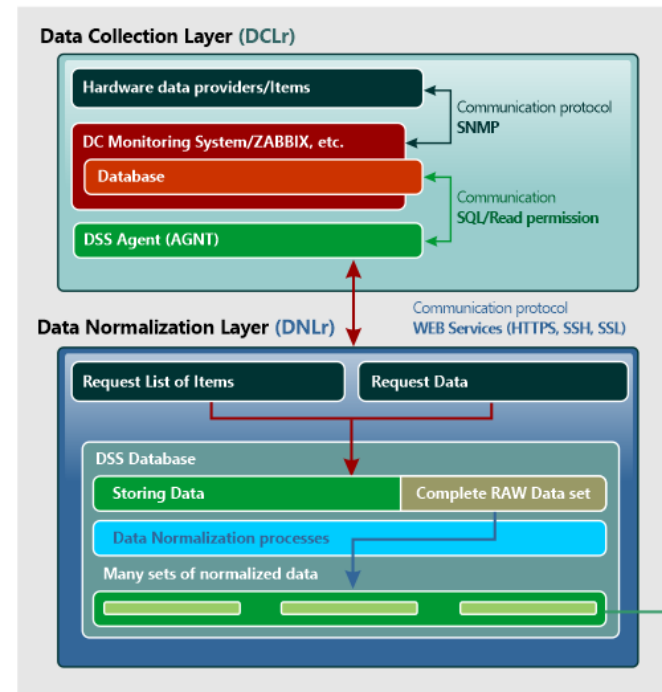


[DSS architecture >](#)

DSS Architecture

The **GREENDC DSS** has three-tier architecture including **data**, **business logic**, and **user interface** layers.

Each layer will provide Interfaces for upper layer to make them independent from each other.



DSS (Decision Support System)

Components List and Processes Workflow

Components

- Data Collection Layer (DCLr)
- Data Normalization Layer (DNLr)
- Math Model Layer (DOLr)
- Business Logic Layer (BLLr)
- DSS Dashboard - UI (DBLr)



DSS Dashboard - UI (DBLr)

User Interface, Data visualization and Use Case Scenarios interaction

Business Logic Layer (BLLr)

Uses optimization models to simulate pre-defined use case scenarios

Math Model Layer (DOLr)

Consumes normalized data sets to use them, according to built-in mathematical optimization "greening" models

[DSS User Interface \(UI\) >](#)

DSS User Interface (overall)

The **main intention** of the UI designers are to keep its simplicity and consistency, delivering maximum possible results to end-user, with minimum interface interactions.

Usability standards and Device Independency

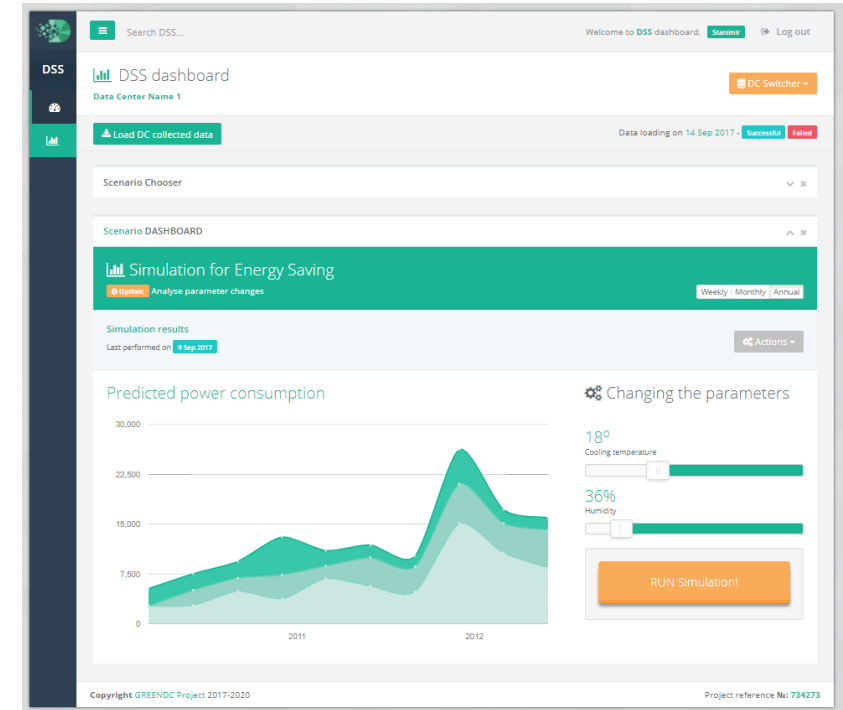
- Powered by Bootstrap 3.0 web interface library
- Standardized User web controls
- Fully customizable additional User web controls
- Responsive (screen resolution independent) User views layout
- Dynamical Interaction Panels
- Maximum Browser compatibility

Lightweight Programming Approach

The technology used, consists of three main web standards:

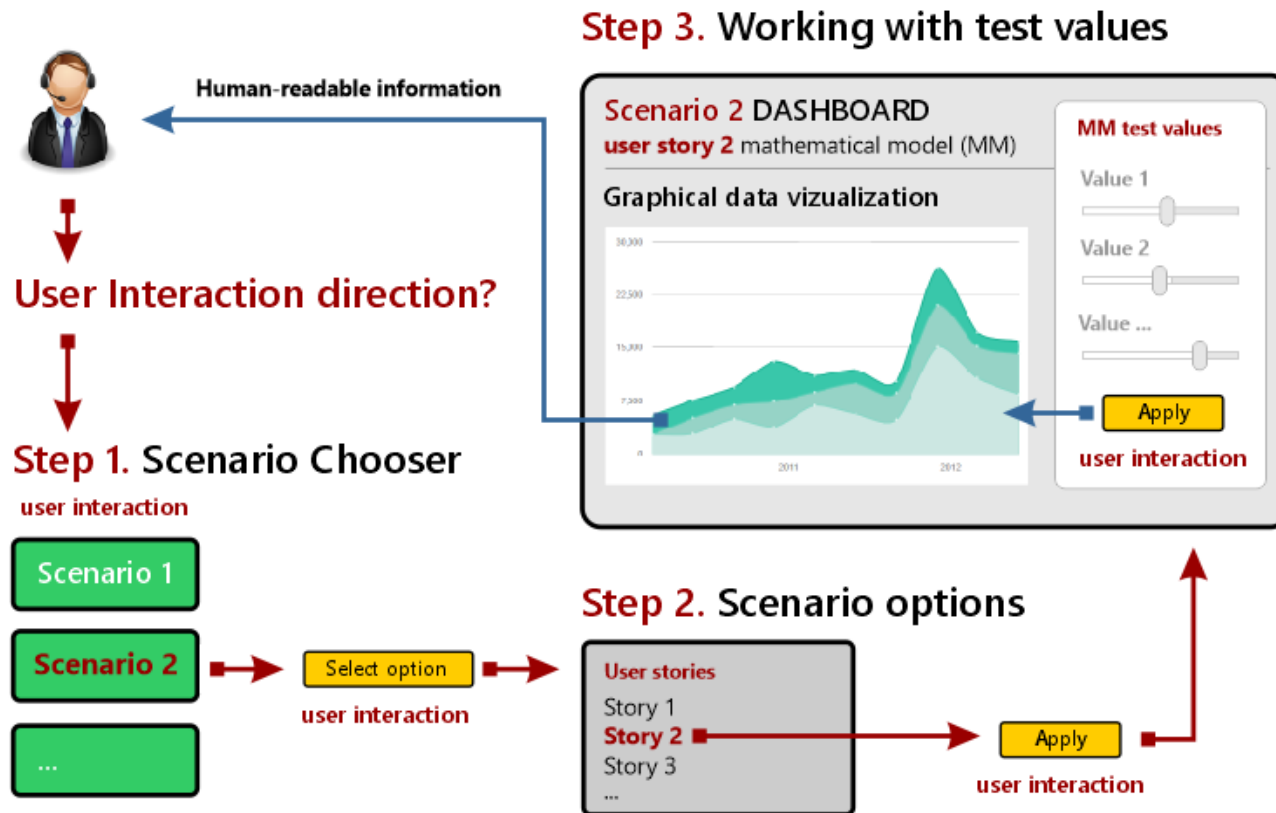
- HTML5
- CSS 3
- Java script

These standards allowing the interface developers to deploy any needed additional interactivity quickly and independently to main business logic.



Simplified UI interpretation >

Serving User Stories and Scenarios



In terms of “User interface - UI”, the following schema represents the logical interaction workflow of the **DSS UI**, concerning **User Scenarios** and **Scenario stories**.

Getting results >

Getting Useful Results in **3 easy steps** (user interactions)

Step 1. Scenario Chooser

After successful **DC data loading** from **DC Data Warehouse (DC DW)**, user should perform his first interaction with **DSS**, using simple web control to choose the **scenario/direction** of future **steps/interactions**.

See it online

HTML Prototype

Step 2. Option/story selection

The User can make himself familiar with each option details, using **More details** button on the right of each **option/story**. After selecting chosen option the **Apply Scenario** button became enabled, instead of disabled

See it online

HTML Prototype

Step 3. Working with test values

Using standard **Web controls** (sliders, switches, include/exclude controls, etc.), user can interact with these tools to change available test values and to perform unlimited number of simulations, based on **(MM)** for the chosen **Scenario** + selected **User Story**.

See it online

HTML Prototype

Thanks!

Thanks for your kind attention!