

Fortissimo Success Story



FORTISSIMO

Cloud-based Simulation of Desalination Systems Powered by Renewables

Fortissimo Experiment Facts:

- Industry Sector: **Renewable Energy**
- Country: **Greece**
- Software Used: **TRNSYS, GenOPT**

ORGANISATIONS INVOLVED

PHOTOVOLTAIC (End User) is a Greek SME, recognized for providing innovative solutions in water desalination coupled with renewable energy.

THE AGRICULTURAL UNIVERSITY ATHENS (Domain Expert) is the third oldest university in Greece. Its main research focus is agro-nutrition, environmental ecology and agricultural economics.

ARCTUR (HPC Provider), the Slovenian HPC centre, was the HPC Provider.

VERTOYO (ISV) from Greece, an expert for implementation of integration of advanced technology services.



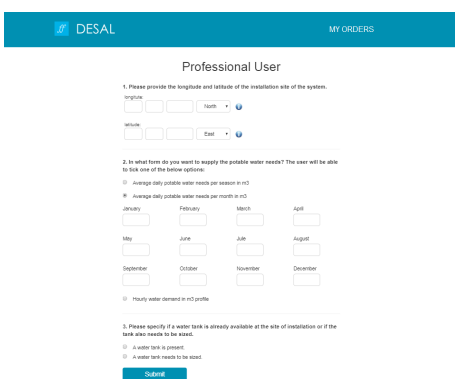
THE CHALLENGE

Based on the current industrial state of the art, the design process of RE-powered desalination systems takes place in two distinct steps. Step 1 includes the design of the reverse osmosis desalination system and Step 2 includes the design of the renewables system based on the desalination unit designed in Step 1. This approach using two distinct steps leads to non-optimized systems.



THE SOLUTION

The major innovation introduced by the experiment is the simultaneous optimization of both the desalination system and the renewable energy system, along with the tuning of the control system. Currently, the companies operating in the design and implementation of RE-Desalination facilities need to address requirements of both the desalination process and the RE supply. This is a very broad spectrum of required skills and results in installations that operate in a highly unoptimized way. The main contribution of the experiment to the engineering and manufacturing actors, is the development of a design and sizing platform based on optimizations through simulations for RE-Desalination systems leading to systems providing lower cost of water and improved efficiency.



BUSINESS IMPACT

The solution (named DESAL) is expected to tap into the growing desalination market and manage to get an important share as far as design and sizing software is concerned. PHOTOVOLTAIC will be using DESAL in order to provide cost-effective turn-key solutions to customers worldwide and also through the network of the PHAESUN associated companies, to which PHOTOVOLTAIC belongs and which has presence worldwide across four continents). Moreover, the expected collaborations with 3rd party desalination and renewables SMEs, as well as private end-users and public sector users will further increase DESAL's utilization and market share.

Fortissimo Experiment Partners:

- **Photovoltaic** (End User)
- **The Agricultural University of Athens** (Domain Expert)
- **Arctur** (HPC Provider)
- **Vertoyo** (ISV)

More Information:

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BENEFITS

- Depending on the individual case the new approach leads Photovoltaic to the design of systems featuring a decrease in the water production cost ranging from 5% to over 40%,
- The new approach can increase production of water by more than 40% without changing core properties of the system.

THE FORTISSIMO PROJECT

Fortissimo is a collaborative project that enables European SMEs to be more competitive globally through the use of simulation services running on a High Performance Computing cloud infrastructure. The project is coordinated by the University of Edinburgh and involves more than 100 partners including Manufacturing Companies, Application Developers, Domain Experts, IT Solution Providers and HPC Cloud Service Providers from 14 countries. These partners are engaged in over 90 experiments (case studies) where business relevant simulations of industrial processes are implemented and evaluated. The project is funded by the European Commission within the 7th Framework Programme and Horizon 2020 and is part of the I4MS Initiative.



I4MS Fortissimo is part of I4MS ICT Innovation for Manufacturing SMEs: www.i4ms.eu



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