



DESIGN of DESalination systems based on optimal usage of multiple Renewable Energy Sources

Acronym: **DES²iRES**

PIs: **Technical University of Crete (Greece), Space Geomatica Ltd. (Greece), Université de Rennes 1, Université de Bretagne Occidentale, Université de Bretagne Sud, INRA & IFREMER (France), University of Tunis El Manar (Tunisia), Ibn Tofail University (Morocco)**

Topic: **ERANETMED Energy-Water nexus, Total Budget: 559.471,91 €**

Start and End of the Project: **01/06/2016 - 31/5/2018 (not for all partners)**





Challenges

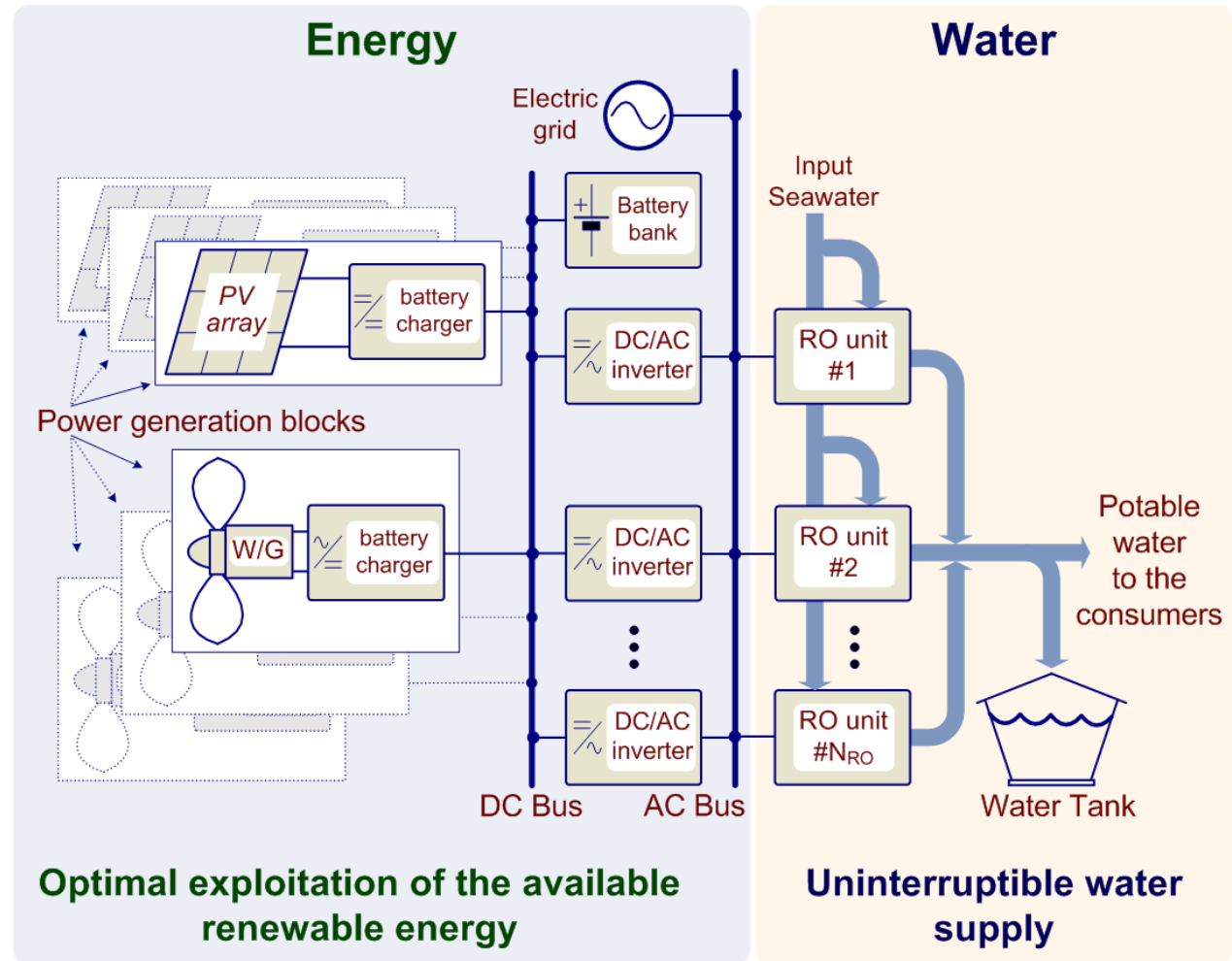
- **Mediterranean region:**
 - among the most water-scarce regions in the world **BUT**
 - rich in Renewable Energy potential (e.g. solar irradiation)
- **Climate change:** expected to **exacerbate water scarcity**

DES²iRES:

- Freely accessible, Internet-based **design tool** for engineers and decision-makers → **will facilitate the use of RES-based (i.e. solar, wind & wave) desalination systems in the Euro-Med region**



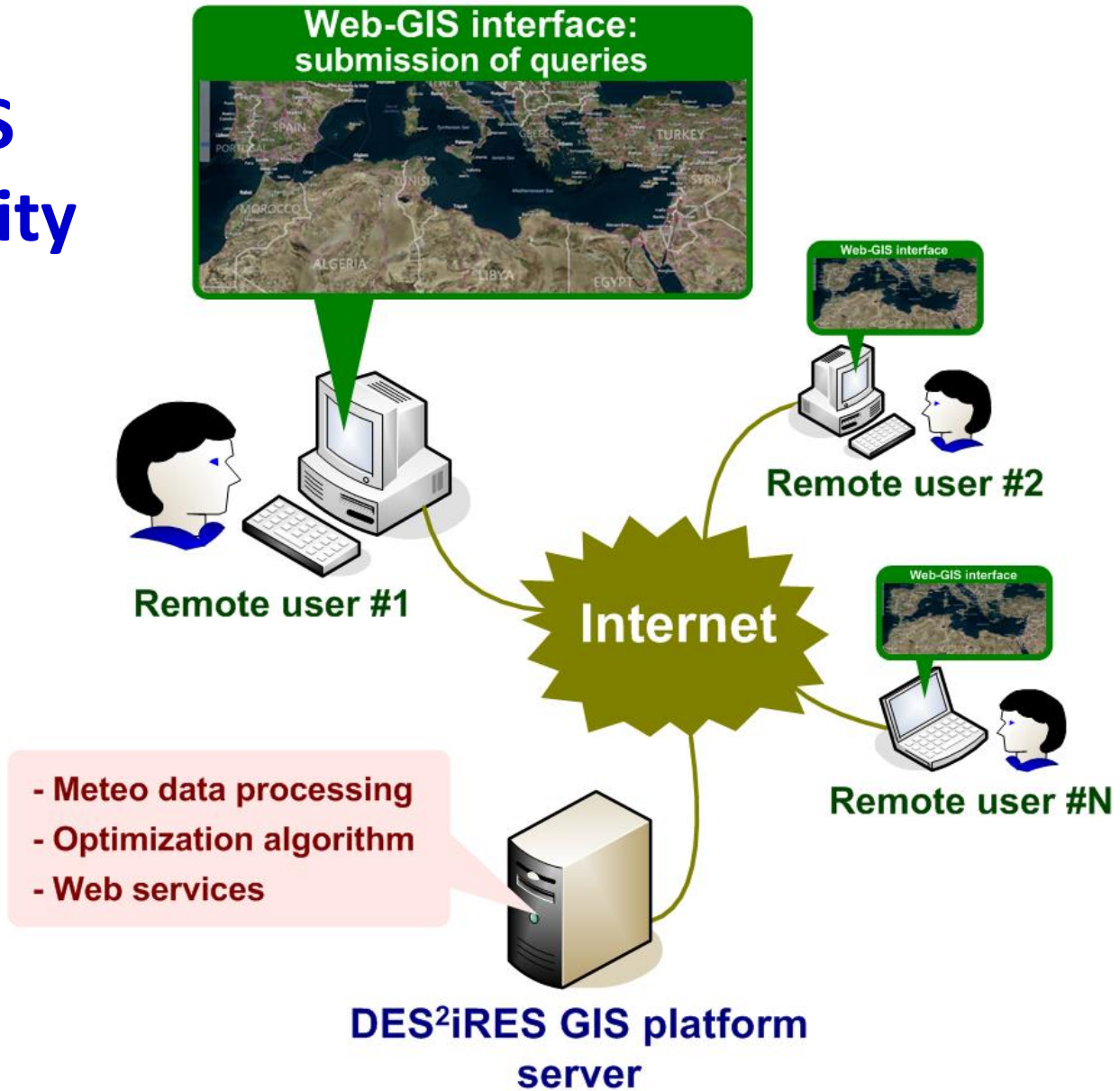
The systems designed by **DES²iRES**



Targets: ✓ **Reliable water supply**
✓ **Minimum cost**



DES²iRES functionality





Challenges

DES²iRES will provide

technical answers to critical policy-driven questions:

- Is it feasible to construct a RES-powered desalination plant? If yes, which is the optimal location? If not, why?
- Can existing desalination plants be upgraded to be powered by RES? What kind of technology should be used?



Goals (I)

1. Develop a **freely-accessible design platform:**

Web-based Geographic Information System (GIS)

2. **Optimize the location & configuration (devices number/types) of desalination plants → novel optimization algorithm for minimum lifetime cost of the system**
3. Estimate the **distribution of the RES energy potential** over a given area selected by the user → **novel techniques**



Goals (II)

4. Investigate the use of **measurements obtained by satellite altimetry missions** to complement in-situ **wave height data**
5. Demonstrate the DES²iRES platform for its **immediate usage and validation** by the respective end-users
6. **Dissemination** through training courses for scientists, participation in conferences etc.



Possible business interest (I)

Participating SME → **Space Geomatica Ltd.** (processing of satellite measurements for deriving environmental information) will:

- develop know-how in the Energy/Water sectors
- expand its services portfolio



Possible business interest (II)

Exploitation of results:

- a similar platform is **not currently available on a worldwide scale**
- it will be capable of **immediate utilization (free of charge)** by Euro-Med stakeholders for specific sites of Greece and Tunisia
- can easily be extended for **additional regions of the World**, if environmental data are provided
- can be extended for the **optimal design of generic RES systems** (e.g. building-integrated Photovoltaics, wind parks etc.)



Methodology

A. Workplan:

Action 1: Data collection: specs. of devices & meteo data

Action 2: Implementation of geostatistical analysis methods

Action 3: Design and development of the GIS & GUI

Action 4: Implementation of the design optimization algorithm

& Demo

Action 5: Dissemination activities

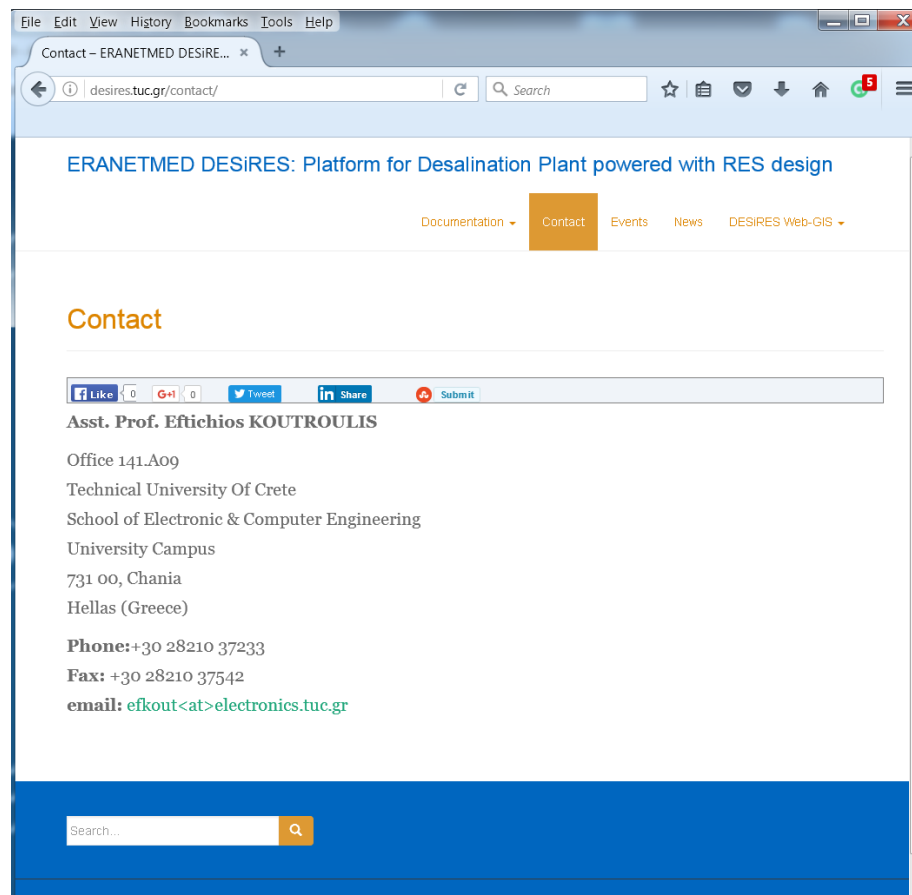
B. Risks:

- Funding delays (for some partners)



Methodology

<http://desires.tuc.gr>





Thank you !

Questions ?

