Autonomous Desalination System Concepts for Sea Water and Brackish Water in Rural Areas with Renewable Energies - ADIRA

Potentials, Technologies, Field Experience, Socio-technical and Socio-economic Impacts

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Context of the Project

- Financed by the European Commission under the Euro-Mediterranean Partnership and Regional Programme for Local Water Management
- Contract N° ME8/AIDCO/2001/0515/59610
- Additional Consulting Support as a contribution in kind from MEDREC (Middle East Desalination Research Centre)
- Duration: 4 years (2003-2007)

Presentation Structure

- Introduction
- The ADIRA project
- ADS Installations
- Expected results & achievements

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Water demand in rural areas

- Mediterranean is the most water scarce region in the world
- Water crisis hits primarily the rural populations
- Adequate water supply is a main development goal

Autonomous Desalination

Desalination is possible in two ways:

- Membrane processes (RO, ED)
- Thermal – distillation

Small units can be powered from PV, wind or solar collectors

- Offers autonomous operation suitable for rural, isolated communities

Typical Plant Design PV - RO

5 m³ freshwater per day: Sufficient for 100 people→ Covering food and sanitation

Site parameters:

- Water production capacity of 1 m³ / hour
- Energy consumption: 4 kWh / m³
- PV capacity: 8 kWp

→ Capital cost: 70.000 Euro

→ Cost of water: 3 – 6 Euro / m³

Water supply alternatives

- Large scale desalination: 0,4 – 0,7 Euro / m³
- Treated waste water: 0,1 – 0,5 Euro / m³
- Truck transport: 2 – 20 Euro / m³
- Ship transport: 5 - 10 Euro / m³

→ PV RO is least cost option in many rural areas and provides reliable and high quality supply

→ Limiting factor is cheap electricity from the grid

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The ADIRA objective:

- To supply rural areas with safe fresh water
- To investigate the on-site performance of various ADS
- To analyse the acceptance of ADS from different user groups

The ADIRA approach

Aims to help ADS implementation:

i. Identification of suitable areas

ii. Technical analysis

iii. Installation of pilot units

iv. Actors analysis

v. Training tools and dissemination

ADIRA target countries and partners

Agriculture University of Athens (**AUA**) - Greece

Egyptian Energy & Water Association (**EWE**) -Egypt

FONDATION MARRAKECH 21 (**FM21**) - Morocco

Fraunhofer Institute for Solar Energy Systems (**ISE**) -Germany

Technological Institute of the Canary Islands (**ITC**) - Spain

Istanbul Technical University (**ITU**)- Turkey

The Middle East Desalination Research Center (**MEDRC**) - Oman

National Center for Scientific Research (**NCSR**), DEMOKRITOS - Greece

Jordan University of Science and Technology (**JUST**) - Jordan

(**WIP**), Germany

DAN

EGYPT

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ADS Installations

Country	System design	Use
Cyprus	Humidification/Dehumidification	Eco-tourism
Cyprus	PV-RO	Agriculture
Turkey	PV-RO	Eco-tourism
Turkey	PV-NF	Primary school
Jordan	Solar stills	Education center
Egypt	Greenhouse integrated solar still	Agriculture
Morocco	PV-RO	Rural village
Morocco	Wind-RO	Rural village
Morocco	PV-Wind-RO	Rural village
Morocco	**Not decided yet**	Rural village
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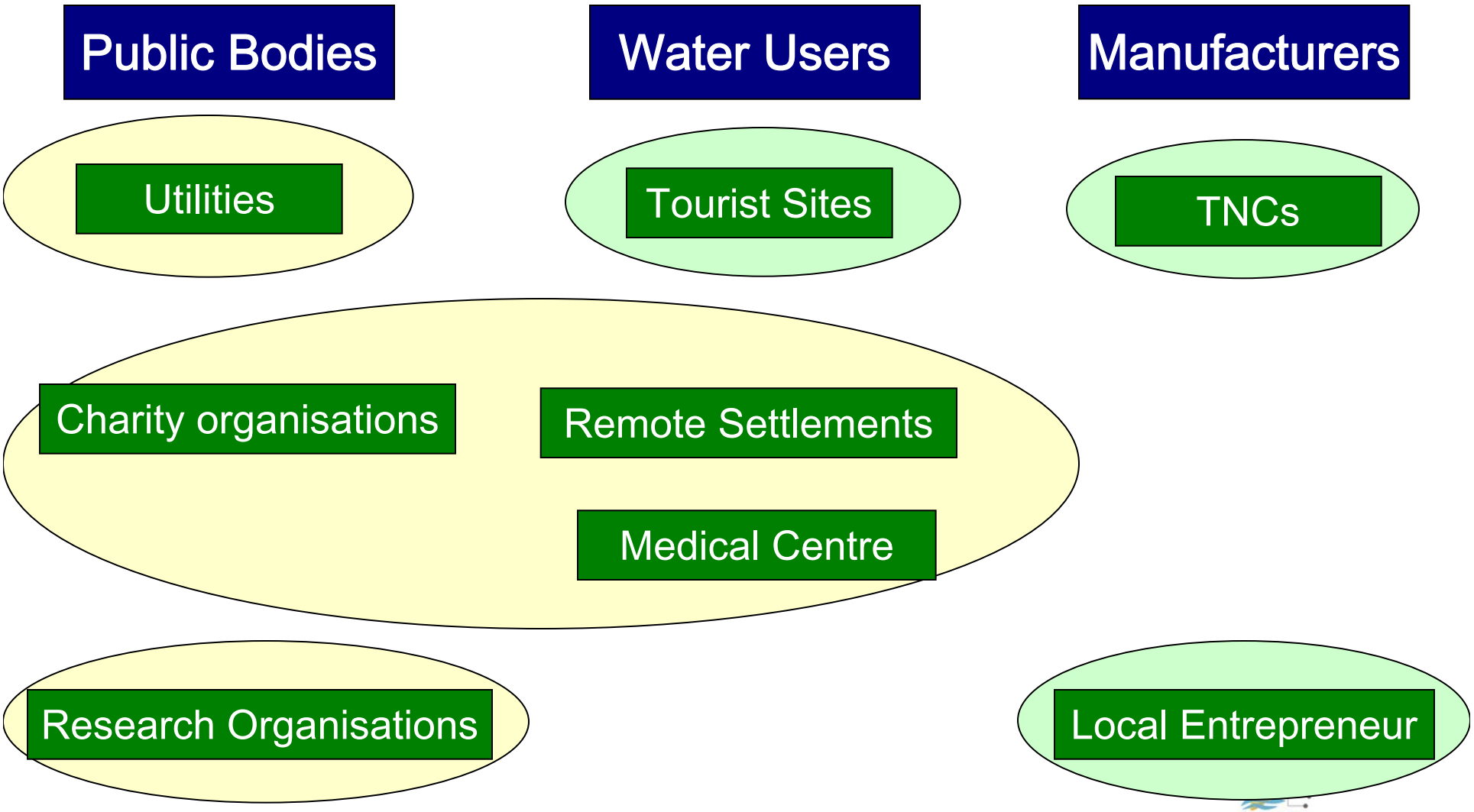
ADS Operators



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Expected Results (1/2)

1. Full description of the various small-scale desalination installations
2. Detailed business plans for each installation to guarantee the sustainability
3. Installation / operation / maintenance guidelines
4. Monitoring guidelines
5. Decision support tool

Expected Results (2/2)

6. Data base with market related data
7. Proposal to the national and regional government on how to support the development of rural water supply infrastructure
8. Workshop in each participating country
9. Training of the users
10. Handbook for users, decision makers and installers

Thank you for you attention

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