ADU-RES

A coordination action developed with seven Mediterranean Partner Countries

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Presentation Structure

- Introduction
- The ADU-RES project
- Status of the technology
- Conclusions

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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
- Usually water is combined with energy scarcity
- Adequate water supply is a main development goal

Autonomous Desalination

Desalination is possible in two ways:

- Membrane processes (RO, ED)
- Thermal – distillation (MSF, MED, MVC)

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

- Offers autonomous operation suitable for rural, isolated communities

PV-Wind RO unit installed by CRES in Greece

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Autonomous Desalination Units based on Renewable Energy Systems

- Partners from 5 EU and 7 Mediterranean Countries
- Funded by the European Commission

ADU-RES partners

AUA, Agricultural University of Athens, Greece	**FM21**, Fondation Marrakech 21, Morocco
CDER, Centre de Développement des Energies Renouvelables, Algeria	**IAV,** Institut Agronomique et Vétérinaire Hassan II, Morocco
CRES, Centre for Renewable Energy Sources, Greece	**INRGREF,** Institut National de Recherche en Génie Rural, Eaux et Forets, Tunisia
CREST, Centre for Renewable Energy Systems Technology, Loughborough University, UK	**ISE,** Fraunhofer Institute for Solar Energy Systems, Germany
E.C. DG-JRC, Institute for Environment and Sustainability, Renewable Energies Unit, EU	**ITC,** Instituto Tecnológico de Canarias, Spain
ELARD, Earth Link and Advanced Resources Development, Lebanon	**PHG,** Palestinian Hydrology Group, Palestinian Authority
ETA–Renewable Energies, Italy	**RSS,** Royal Scientific Society, Environment Monitoring & Research Central Unit (EMARCU), Jordan
EWE, Egyptian Association for Water and Energy, Egypt	**WIP**–Renewable Energies, Germany

ADU-RES Objectives

- ADU-RES supports technical improvement and market strategies to boost desalination
- ADU-RES brings scientists, decision makers and industrial players together

ADU-RES Activities

- Analysis of the technical status and recommendations for future research
- Analysis of the users
- Study of the market conditions and funding options

ADU-RES Events

- **26 September 2005**: Seminar on small-scale desalination in Hammamet, Tunisia
- **September 2006**: Seminar in Jordan
- More info under: **www.adu-res.org**

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RO against Solar Distillation

RO

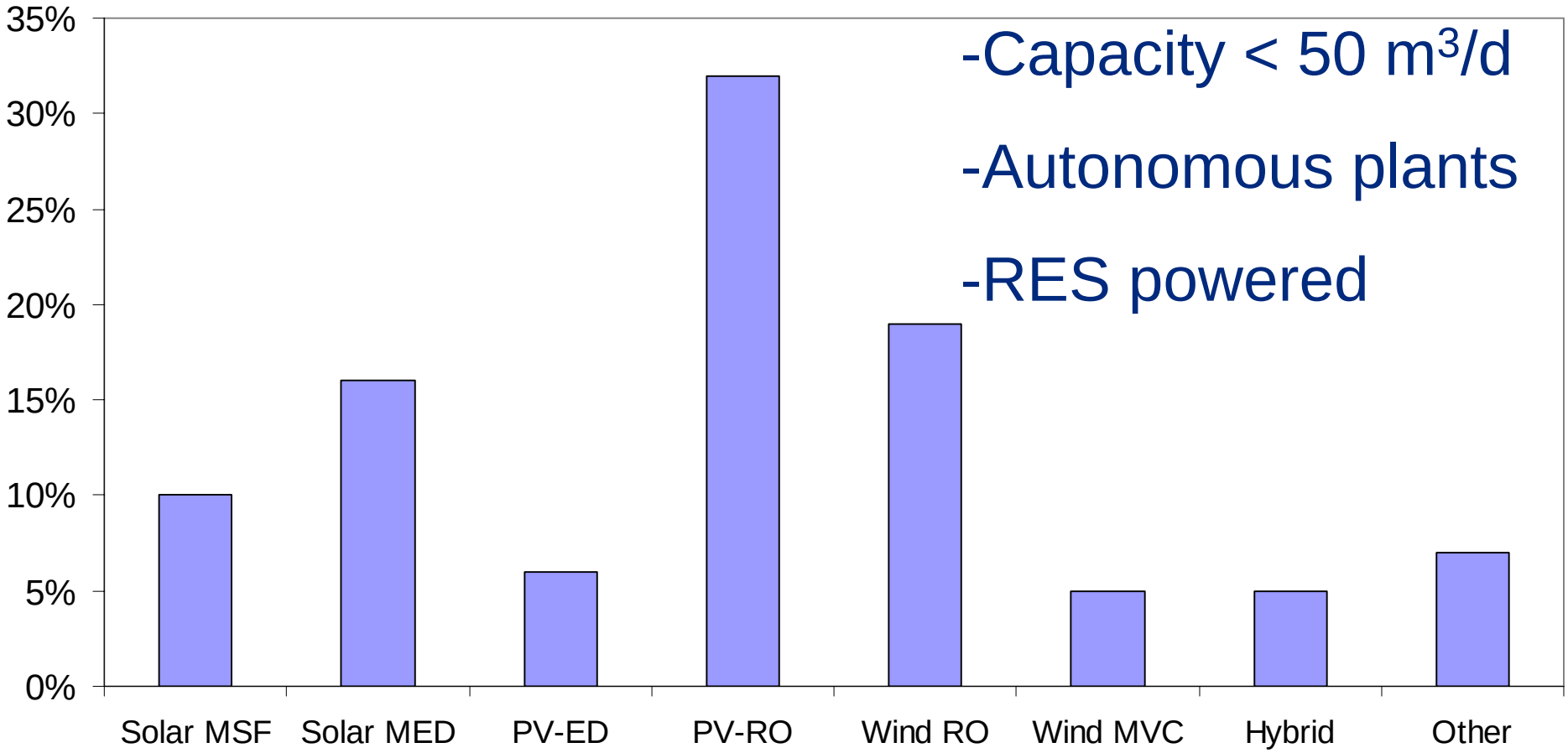
- Cheapest option
- Less space demand
- Established PV, wind and RO industries
- Even cheaper with brackish water

Solar Distillation

- Less maintenance and easier operation
- No membranes and less chemicals required
- No moving parts
- Almost pure water

51 % of installed applications are PV or wind RO

Technologies of Pilot Plants



-Capacity < 50 m^3/d

-Autonomous plants

-RES powered

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 – 10 Euro / m³
- Ship transport: 5 - 10 Euro / m³

→ Renewable desalination is least cost option in many rural areas and provides reliable and high quality supply

Fields of R&D Focus in PV- RO

Installation of energy recovery in small systems

→Cuts energy consumption by 50%

Design of systems without energy storage

→Reduces capital cost and environmental impact

Improved system operation

→Remote monitoring and automated operation

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Conclusions

- ADU-RES supports technical and policy developments in the small-scale desalination field
- First results show that PV-RO has the greatest potential
- Additional research is required - but first technologies are already on the market
- Marketing strategies are required

Thank you for you attention

www.adu-res.org