Renewable Energy Desalination:
A list of R&D priorities

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Research Priorities

- R&D of **components and control systems** for a smooth and efficient coupling of existing desalination and renewable energy technologies
  
  → robust for long **stand-alone operation in harsh environments**
  
  → able to deal better with **variable energy input**
Research Priorities

- R&D of **components and control systems**
  - Adaptation of pumps and energy recovery systems for efficient operation in small-scale plants
  - Development of components (e.g. pumps and heat exchangers) using seawater-resistant materials
  - Development of **control systems** that optimise performance and minimise maintenance requirements, like "Model-Predictive Control" to anticipate source variability
  - Development of **intelligent energy management** and control systems for alternating energy supply
Research Priorities

- R&D of **components and control systems**
  - Development of **new measurement and diagnosis systems** for robust operation
  - R&D on **energy storage**
  - R&D on **combinations** of RE and desalination systems
  - **Influence of transient operation** on:
    - biofouling and scaling
    - lifetime of membranes beyond manufacturer specifications
    - boundary layer phenomena, for instance temperature- and concentration-polarization
Research Priorities

- Applied Research for **up-scaling RE-Desalination** systems and reach **serial production** to get technologies in the field

- Applied Research for **cost optimization and/or cost reduction** of RE-Desalination water

- Applied research for the **integration** of RE desalination in **agricultural production**
Renewable Energy Desalination

Research Priorities

- Development of **systems to increase RE-desalination penetration**:
  - Co-generation systems to produce water and power
  - *(Near) Zero Liquid Brine Discharge* for small-scale combinations of RO and thermal plants
  - Automated and environmental friendly pre- and post-treatment technologies
  - Integration of small-scale RE-Desalination in building energy supply
  - Development of RO systems as “flexible load” in RE dominated grids
Research Priorities

- Development of **market strategies / business concepts**