CSP, PV and Wind: which Technology is the most competitive?

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Methodology for the Comparison of Renewable Energies for Seawater Desalination

**Annual energy balance between RE and DES:**

- **Assumptions:**
  - Unlimited electricity export to the grid
  - Stable electricity grid
  - No influence on existing power plants
  - No backup power plant
  - No fossil fuel consumption

- **Disadvantages:**
  - Focus on single technologies, no consideration of overall system
  - Cost externalization

**Direct cover DES-plant load:**

- **Assumptions:**
  - Export with feed-in tariffs (different cases are possible)
  - Part-load and start-up behavior of existing power plants
  - Backup with fossil power plants

- **Advantages:**
  - Focus on load cover
  - Comparison of power with equal quality
  - Simplified consideration of external costs
Comparison Methodologies

Specific Cost of Supply and LEC (Scenario 2020)

- Cost externalization
  - Fossil backup
  - Grid management cost
→ Cheap, fluctuating RE
Results

- Fossil fuel prices are prone to high volatility and a clear upward trend.
Conclusions (1/2)

- Fossil fuel prices are prone to high volatility and a clear upward trend

- On the contrary, Renewable Energies (RE) represent a key element for an environmentally friendly, cost stable and low-risk energy supply

- When comparing different supply options, the right question to ask is:
  - Which is the most effective technology **mix** to secure the supply? Rather than
  - Which is the cheapest technology?
Conclusions (2/2)

- A fair comparison between options should consider configurations which guarantee equal quality of supply (consideration of externalities):

  they do not compare!

- The optimal energy supply for desalination plants will probably consist of a combination of low cost variable power (PV, Wind) and slightly more expensive balancing power (CSP with thermal energy storage)
Thank you for your attention!

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