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
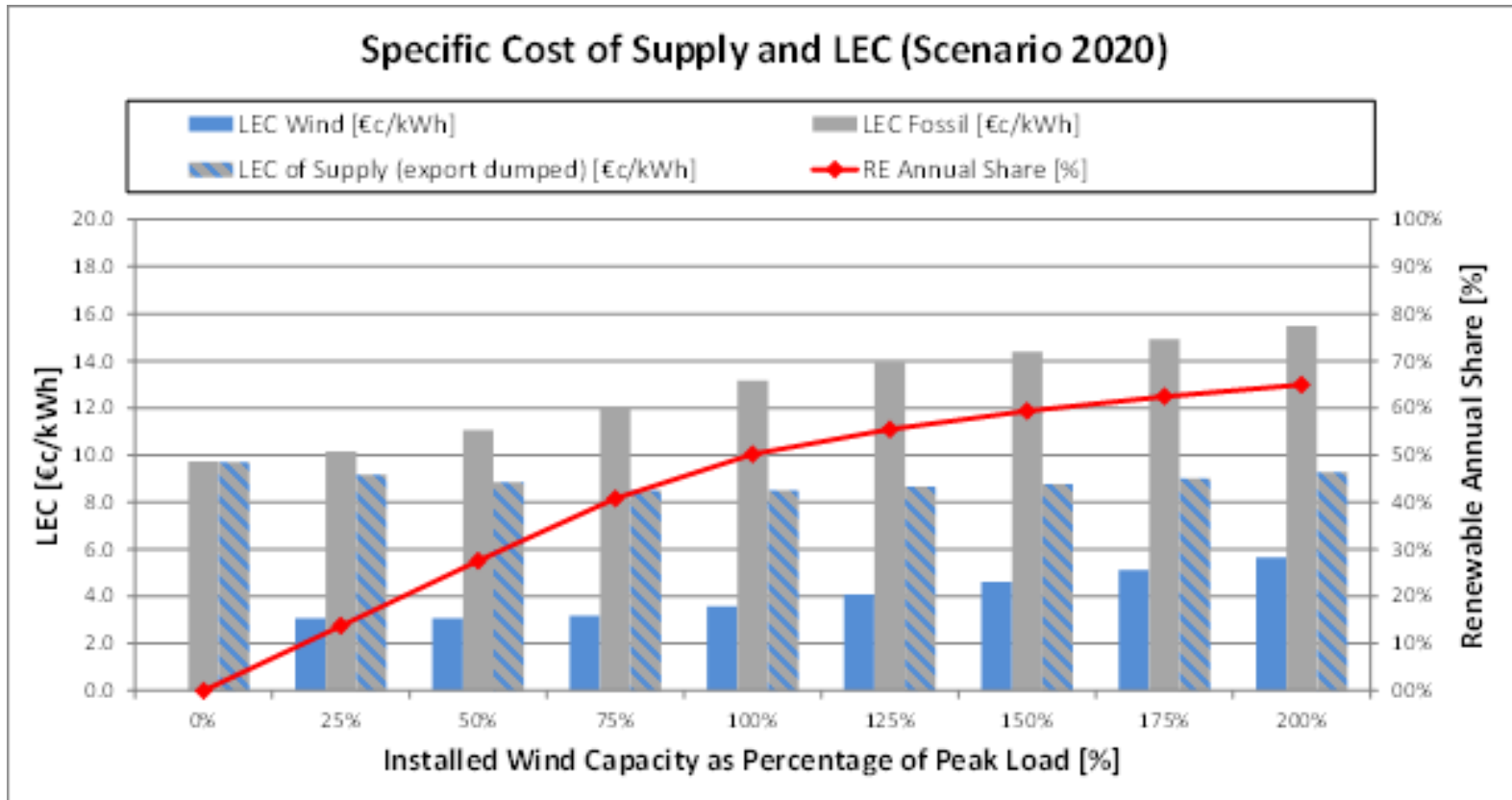   - Cost externalization
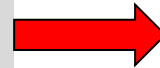
Direct cover DES-plant load:

- 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
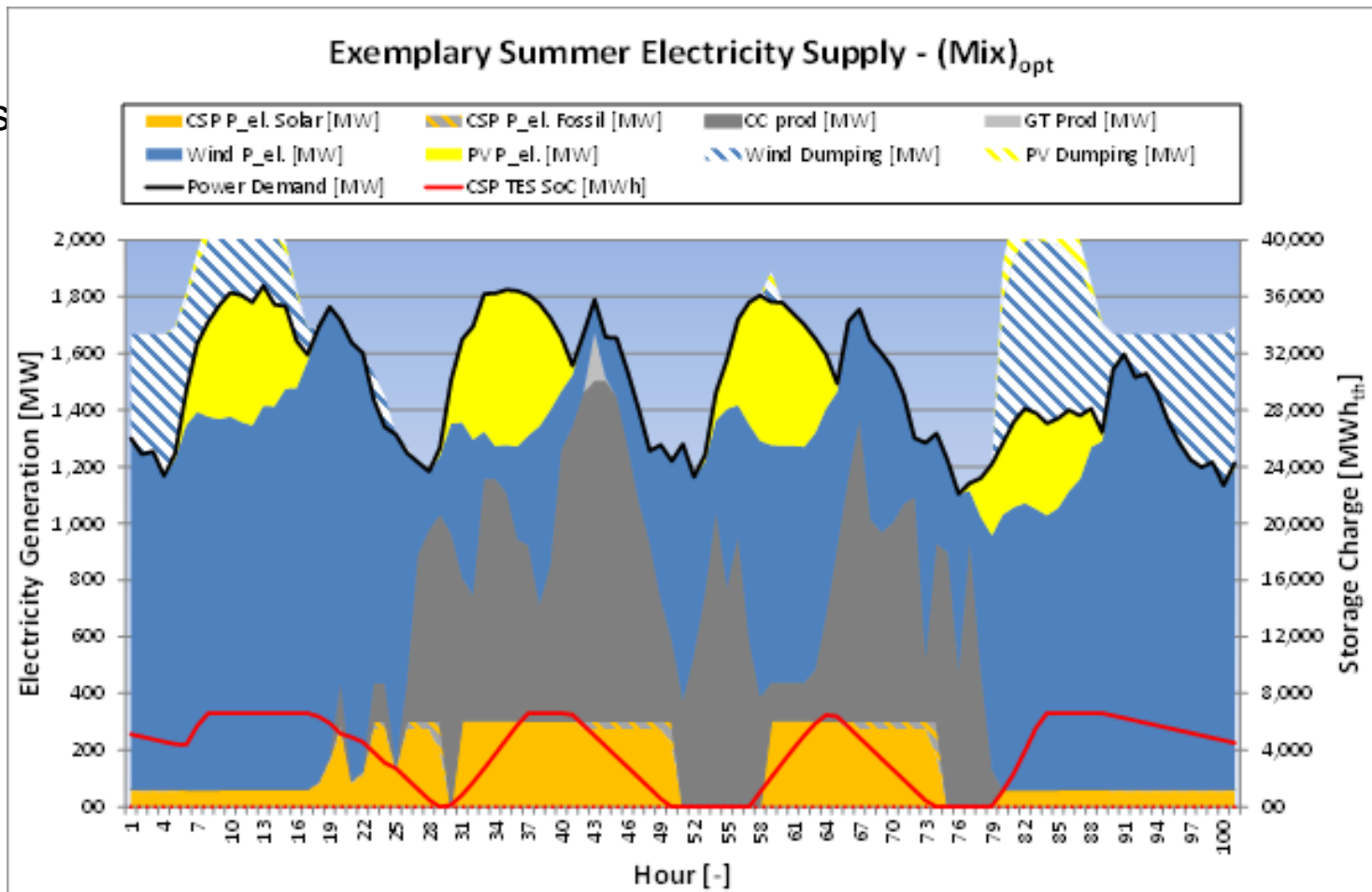   - Simplified consideration of external costs

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Comparison Methodologies

Specific Cost of Supply and LEC (Scenario 2020)

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

Results

- Fos

Exemplary Summer Electricity Supply - (Mix)opt

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):
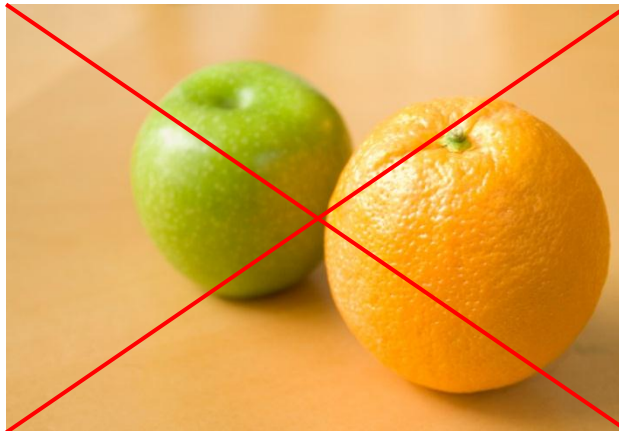
they do not compare!

- 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)

Source: wikipedia

Thank you
for your attention!

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