

IEE Solar Combi+

WP3 – Virtual Case Studies

Actual project stage

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Content

1. Changes since last meeting
2. Data processing (Excel-Macros)
3. Performance figures / evaluation
4. Overview of results of Sortech simulations



1. Changes since last meeting

- Cold distribution - fan coil: 12°C return temperature (formerly 15°C)
- Heat rejection – hybrid cooler instead of dry cooler
 - reference chilling capacity calculated with 32°C return temperature (formerly 35°C)
 - >30°C ambient temperature adiabatic cooling ($t_{amb} - 2K$)
- Modified load file: cooling load is accumulated to min. 15% of maximum load.

1. Changes since last meeting

- Water consumption: loss factor
 - wet cooling tower: 30...50% ??
 - hybrid cooler: 50...100% ??

3. Performance figures

- Energetic results and related:
 - thermal (solar system, chiller, system)
 - electric
 - combined (electric efficiency)
 - stagnation time, water consumption
- Economic and environmental results; compared to reference system, require user input:
 - PE
 - CO₂
 - combined with costs

3. Evaluation

- Proposal at side meeting at ISE (Dec. 08)

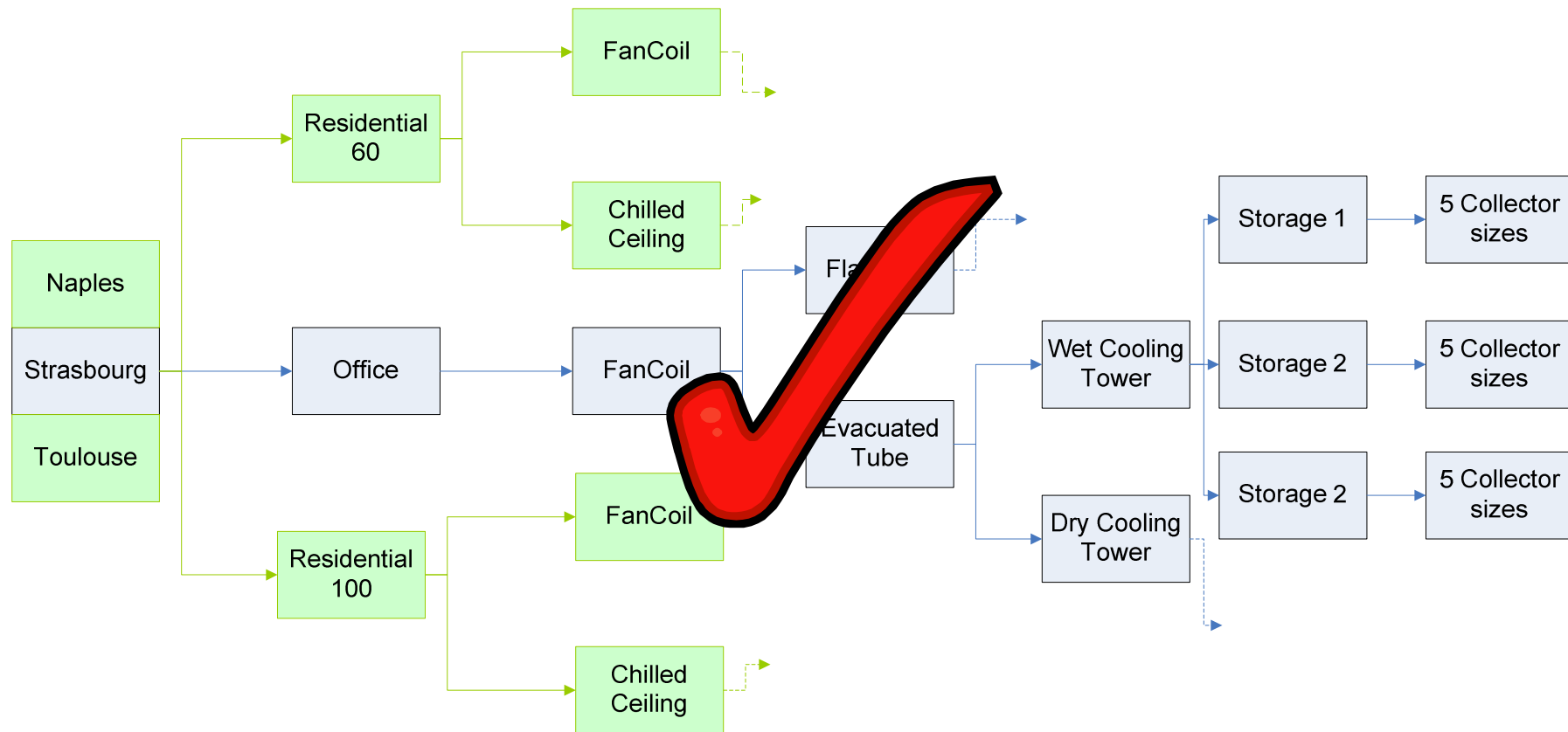
Preselection:

- total electric efficiency > 5

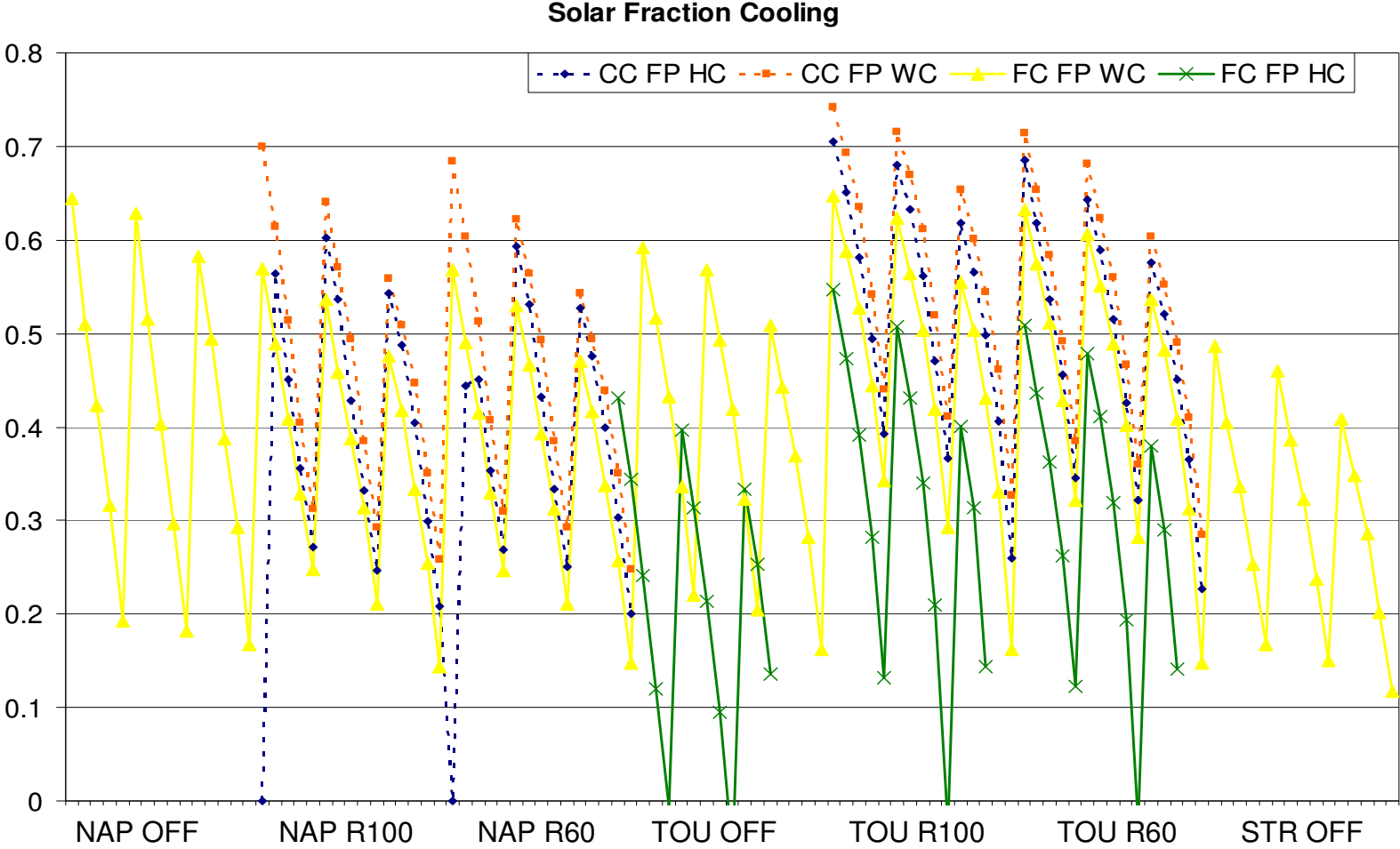
$$\eta_{el,tot} = \frac{Q_{cold,demand} + Q_{heat,demand} + Q_{DHW,demand}}{\sum P_{el}}$$

- stagnation time < 50

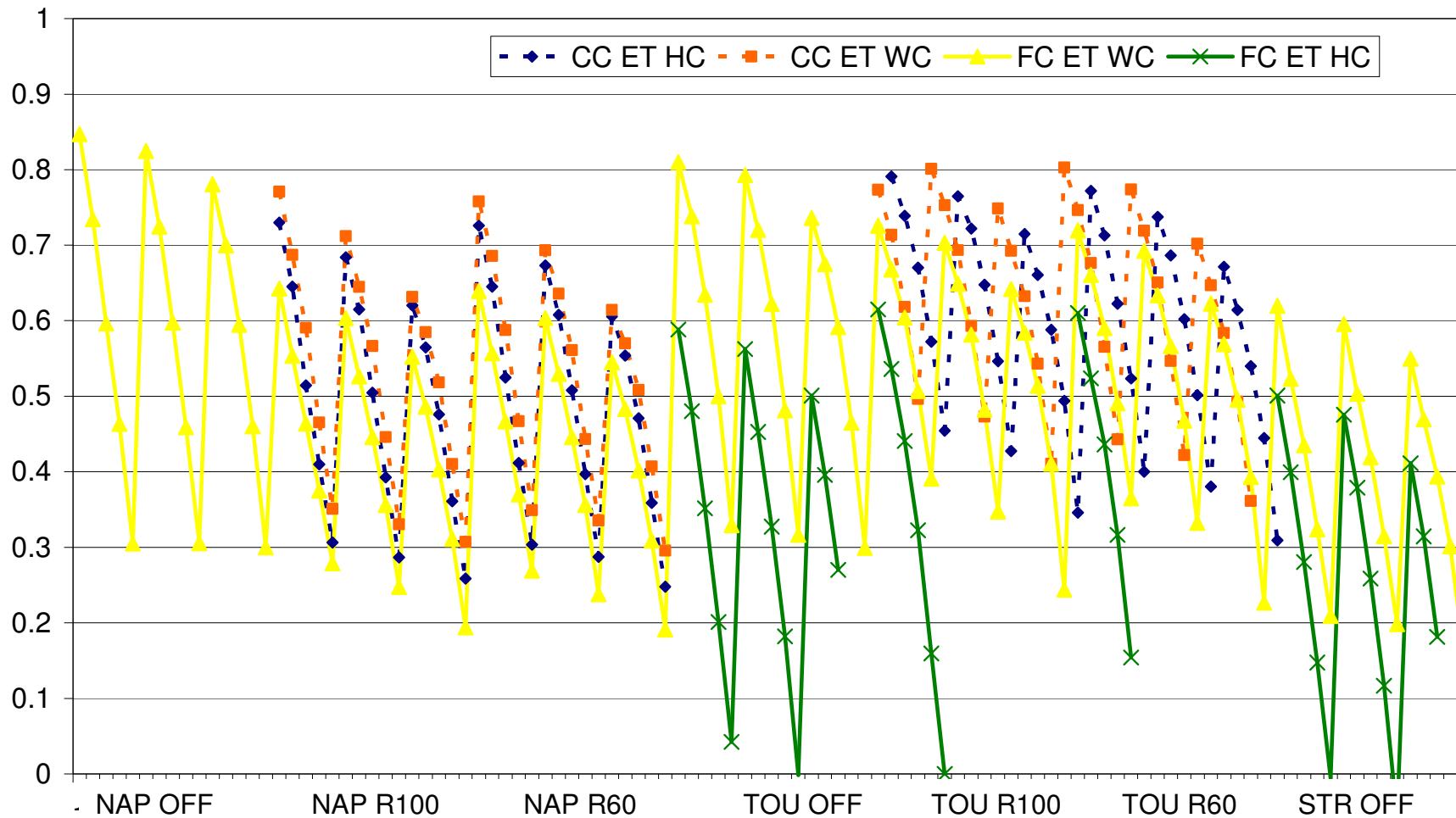
4. Simulation results



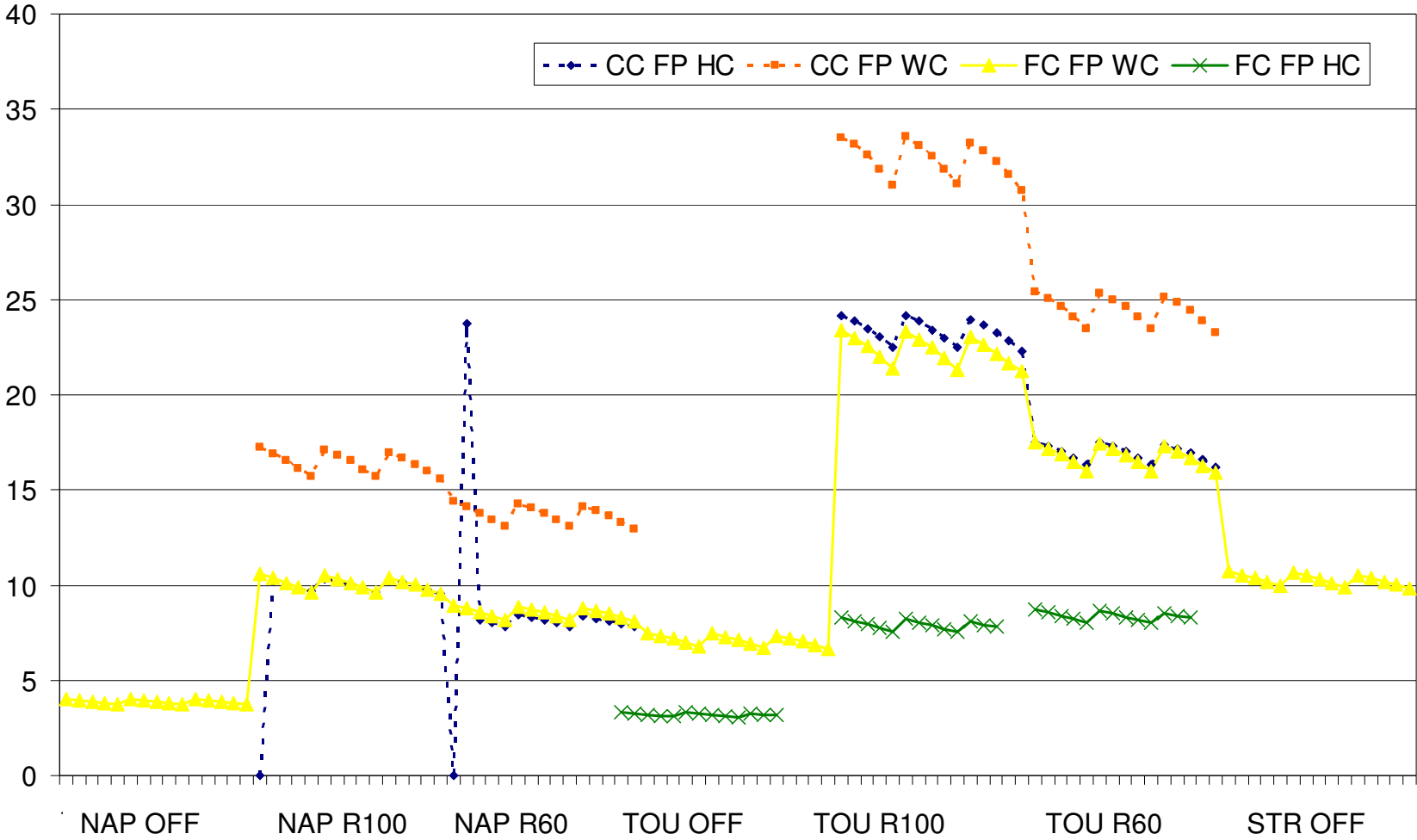
4. Simulation results



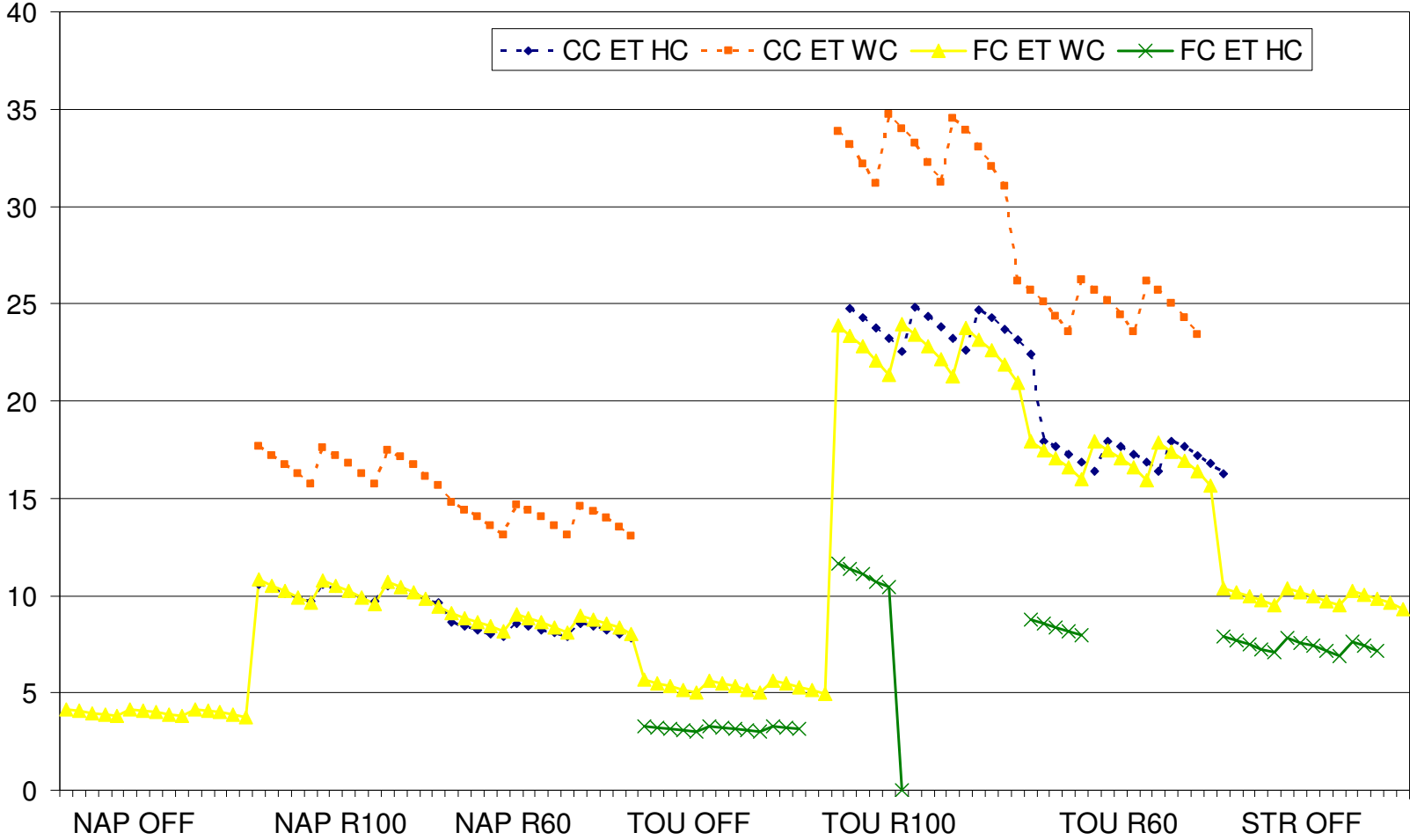
Solar fraction cooling [-]

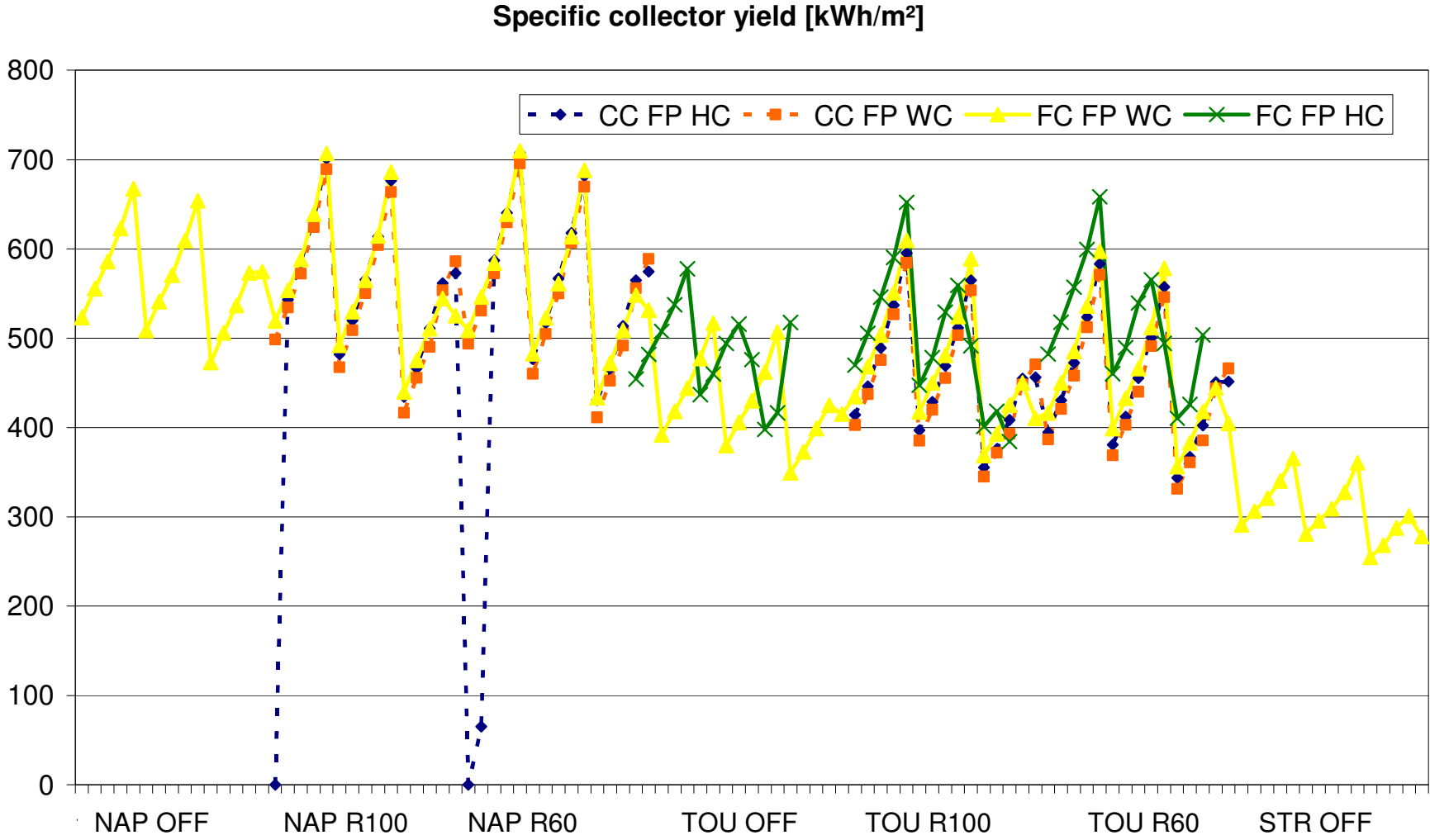


Total Electric Efficiency

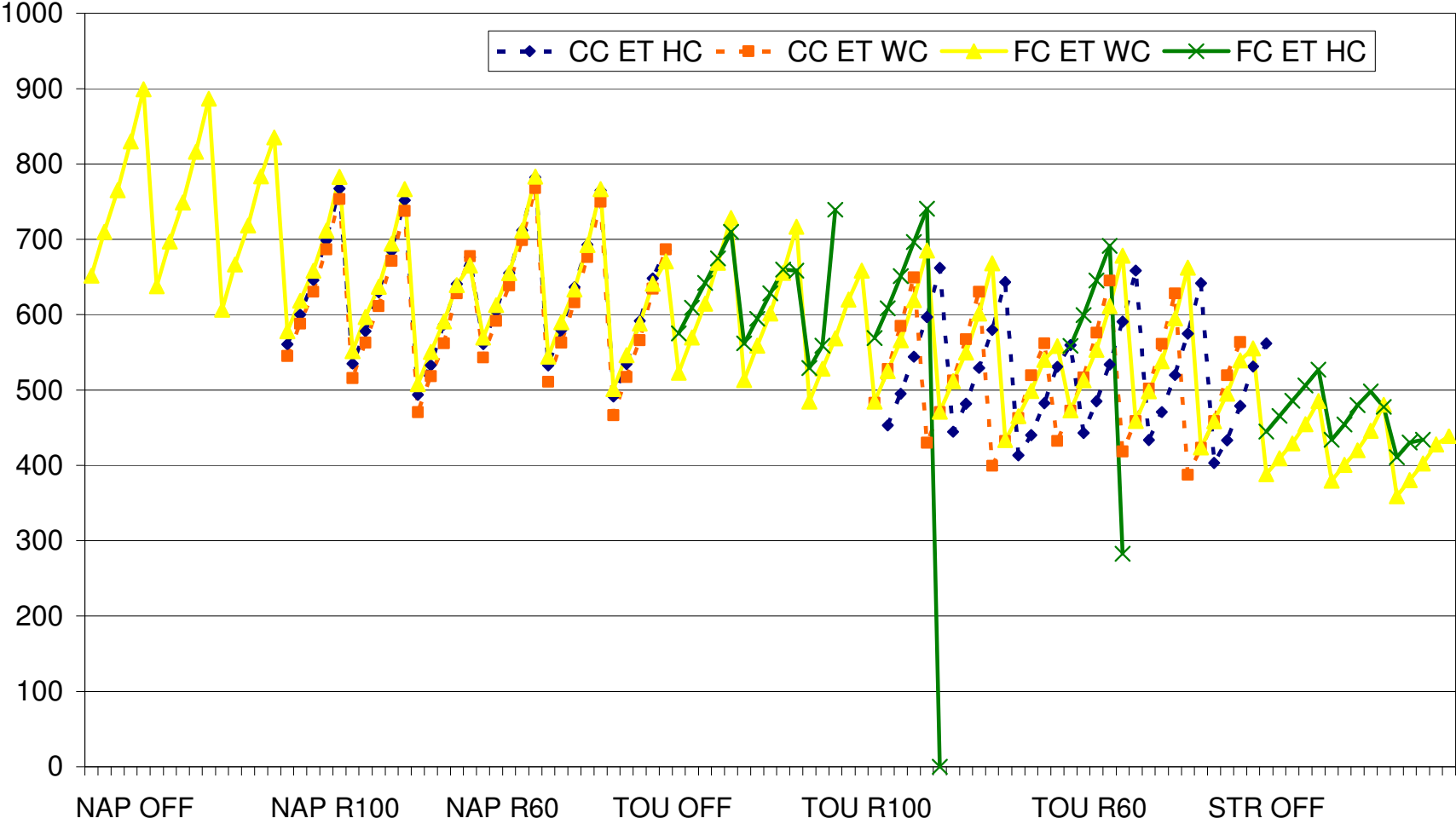


Total Electric Efficiency





Specific collector yield [kWh/m²]



ToDos

- Finalization of simulations (Sonnenklima, ?)
- Final validation of results
- Report
- Sensitivity analysis (control strategy, configuration, ...)

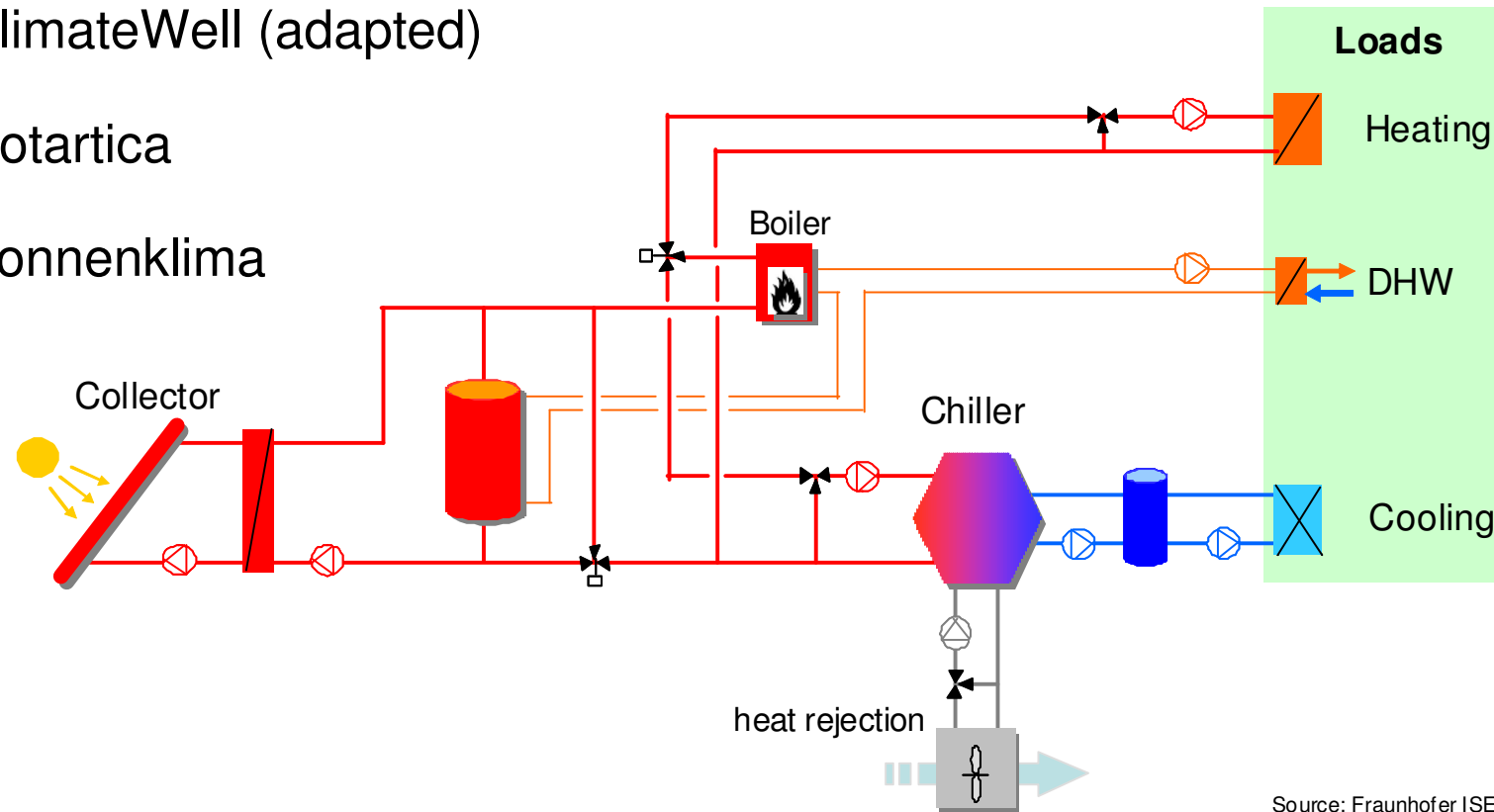
→ WP4



3.4: System configuration C1

Simulated for:

- ClimateWell (adapted)
- Rotartica
- Sonnenklima



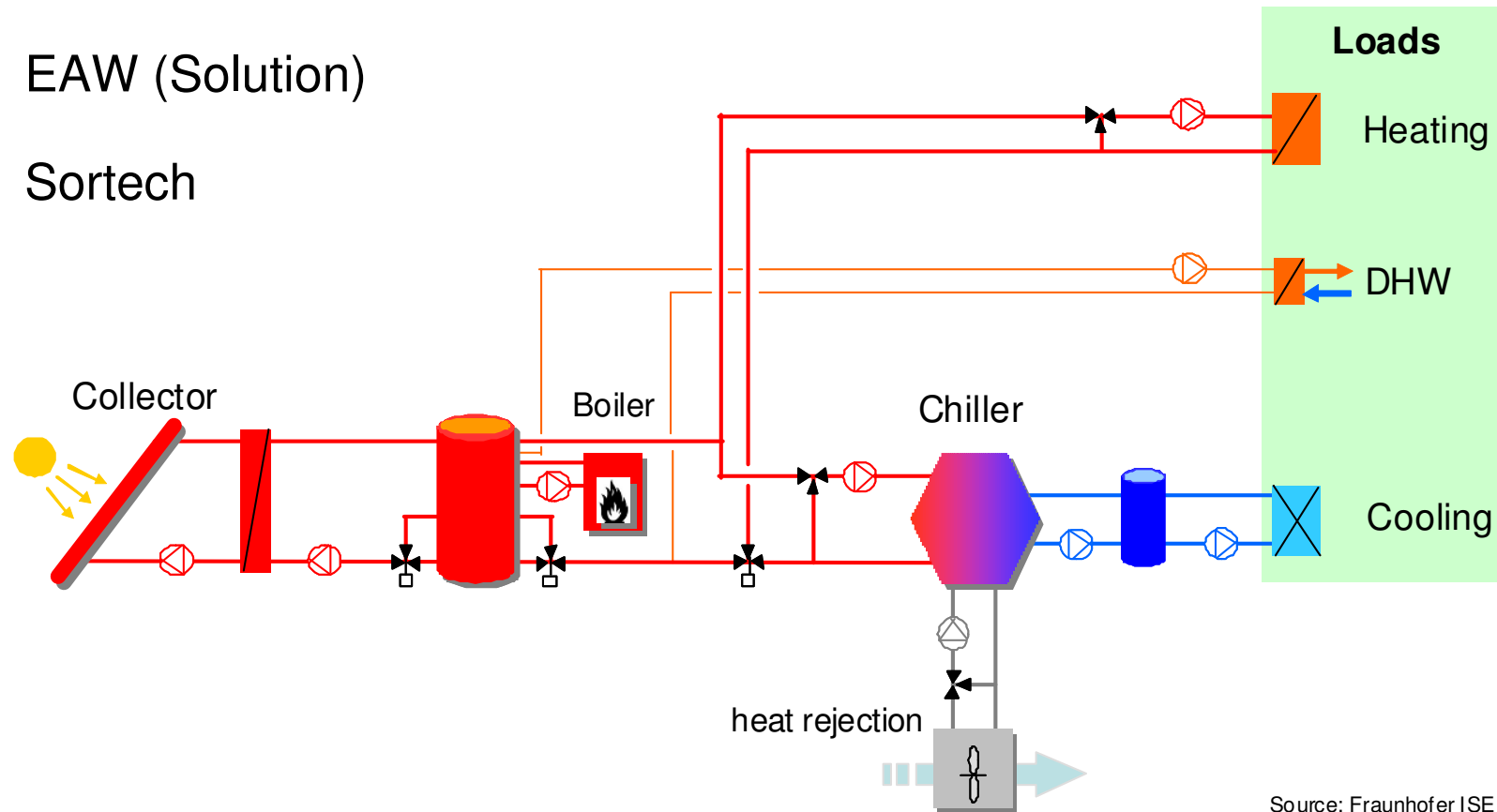
Source: Fraunhofer ISE

Slide 16

3.4: System configuration E1

Simulated for:

- EAW (Solution)
- Sortech



Source: Fraunhofer ISE

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3.6, 3.7: energetic and economic evaluation

- **Performance figures of the system:** Collector efficiency, collector yield, solar fractions, COP, ...
- **Environmental performance figures:** PE-savings, PE-COP, CO₂-savings, PER, ...
- **Economical figures:** Investment costs, annual costs, costs per saved kWh PE, ...

