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Geothermal energy and thermal storage - summary

- Why storage?
- “Deep Direct Use” project
  - The direct use of geothermal heat
  - Use heat to run absorption chiller (cooling) applications
  - Benefit of ‘turbine inlet cooling’ in a power plant
  - Case study
- Solar-geothermal hybrid

Project Scope

Focus on geothermal-driven absorption chillers for turbine inlet cooling at Eastman Chemical's combined-cycle cogen plant.

Tasks:

1. Evaluate geothermal resource, local regulations, and other site-specific issues
2. Model integration options to quantify efficiency benefits
3. Assess overall economics by cost and sensitivity to geothermal resource temperature, well depth, and well-to-plant distance

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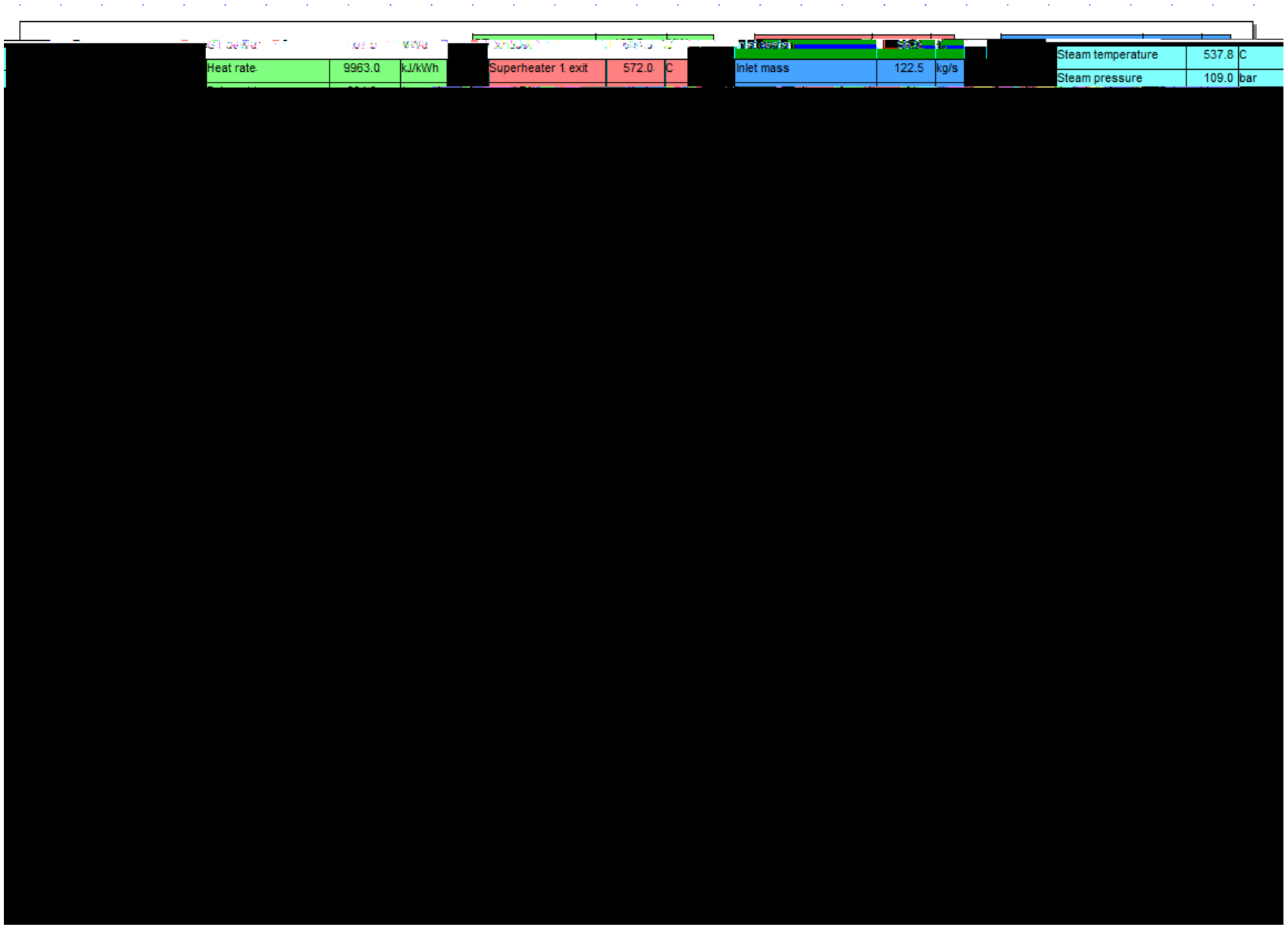
Why Turbine Inlet Cooling?

Standard gas turbine rating is estimated at 15°C (59°F). Turbine performance drops with increasing air

Modelling of the co-gen plant - IPSEpro



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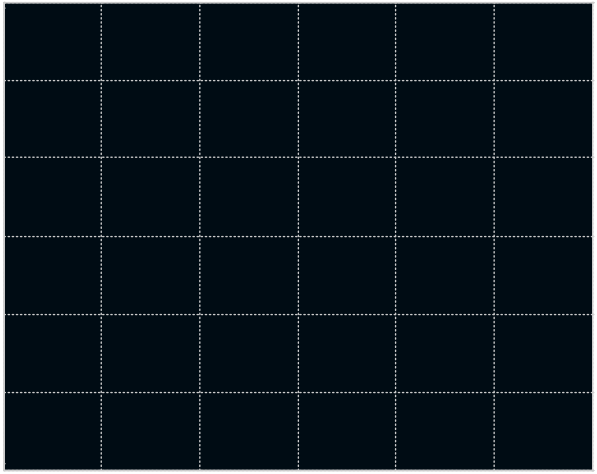
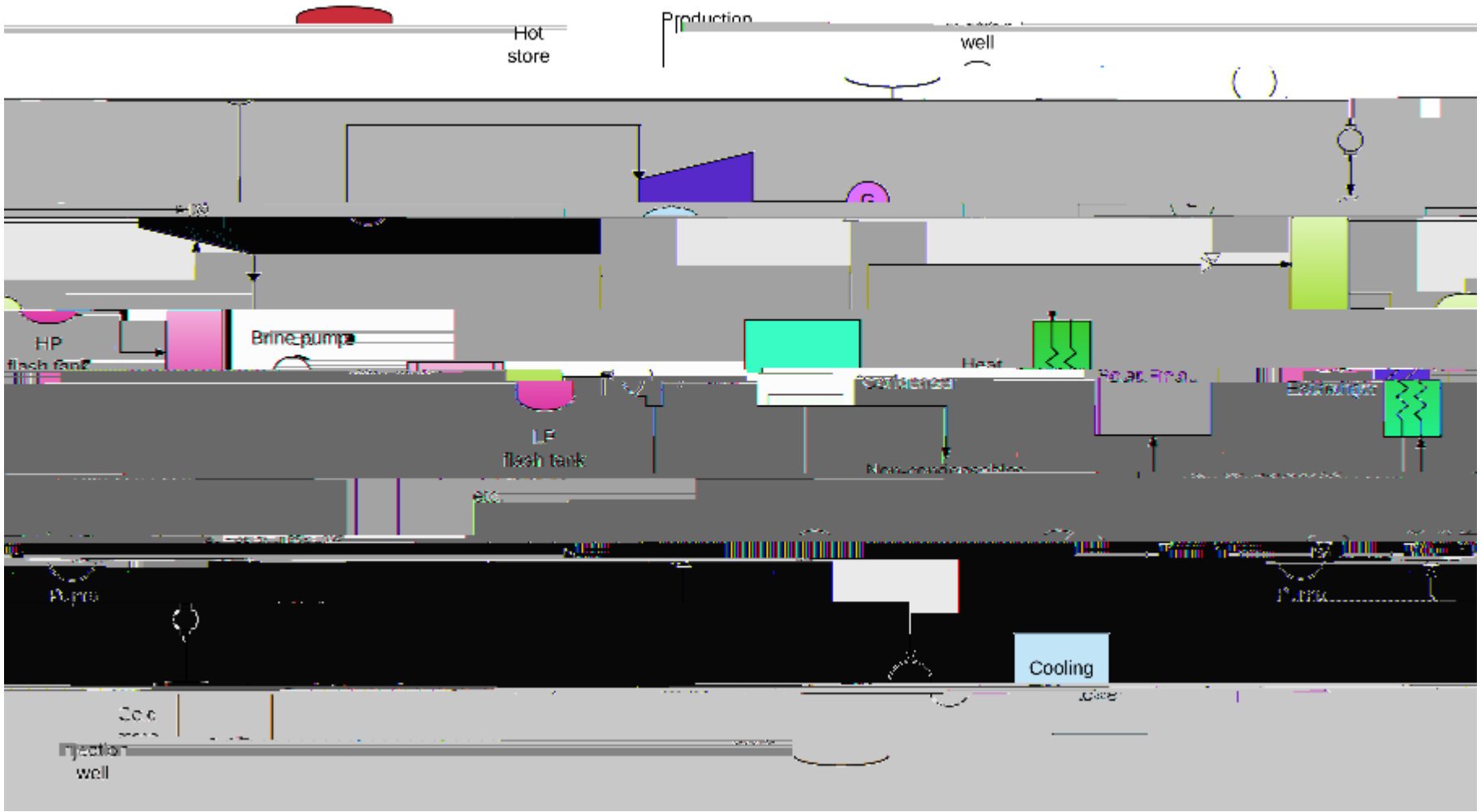
- Motivation: off-design geothermal power plants
- Hybrid geothermal-CSP plants
-

Off-design geothermal plant behavior



Hybrid geothermal-CSP power plants



McTigue et al. “Retrofitting a geothermal plant with solar and storage to enhance power production”, GRC Transactions, 41, 2017

Yearly calculations – storage and economics

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