

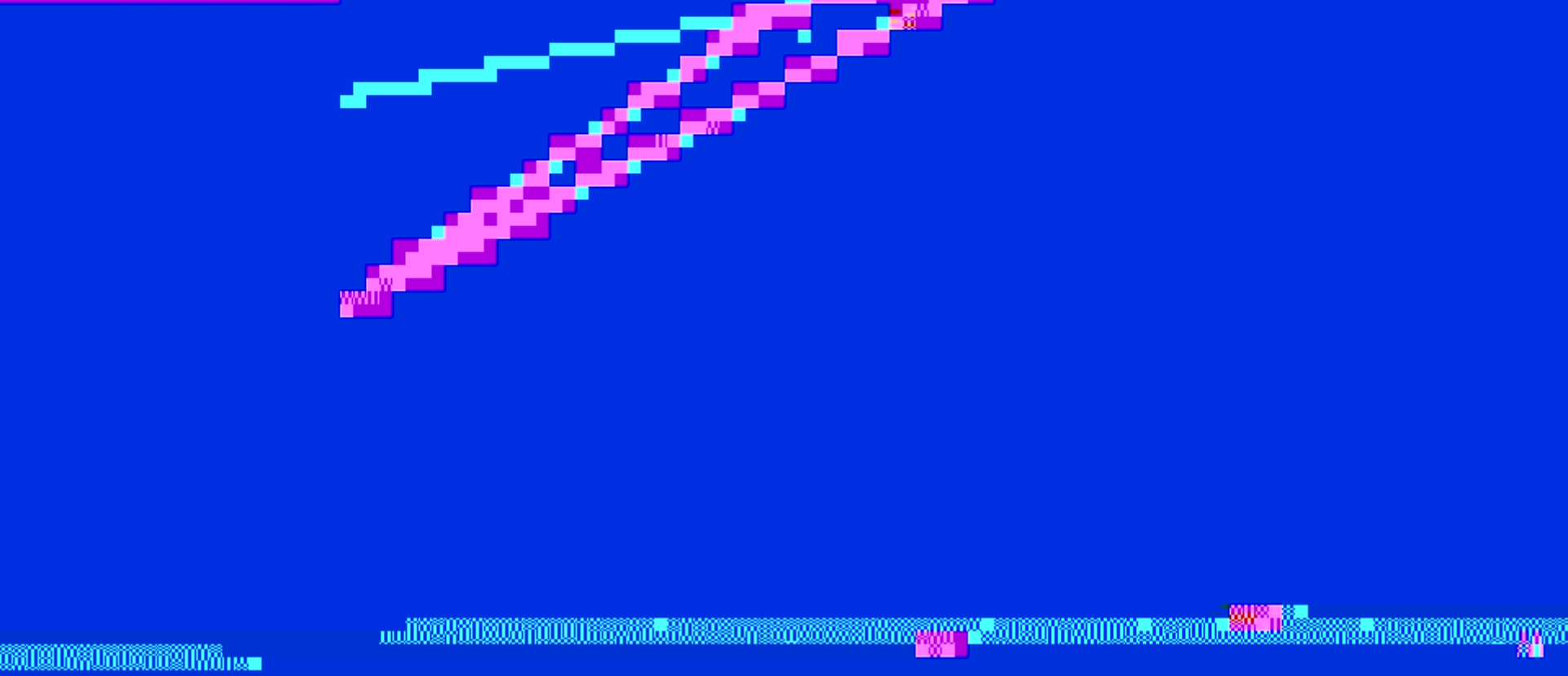


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1977 - 2017



- 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:

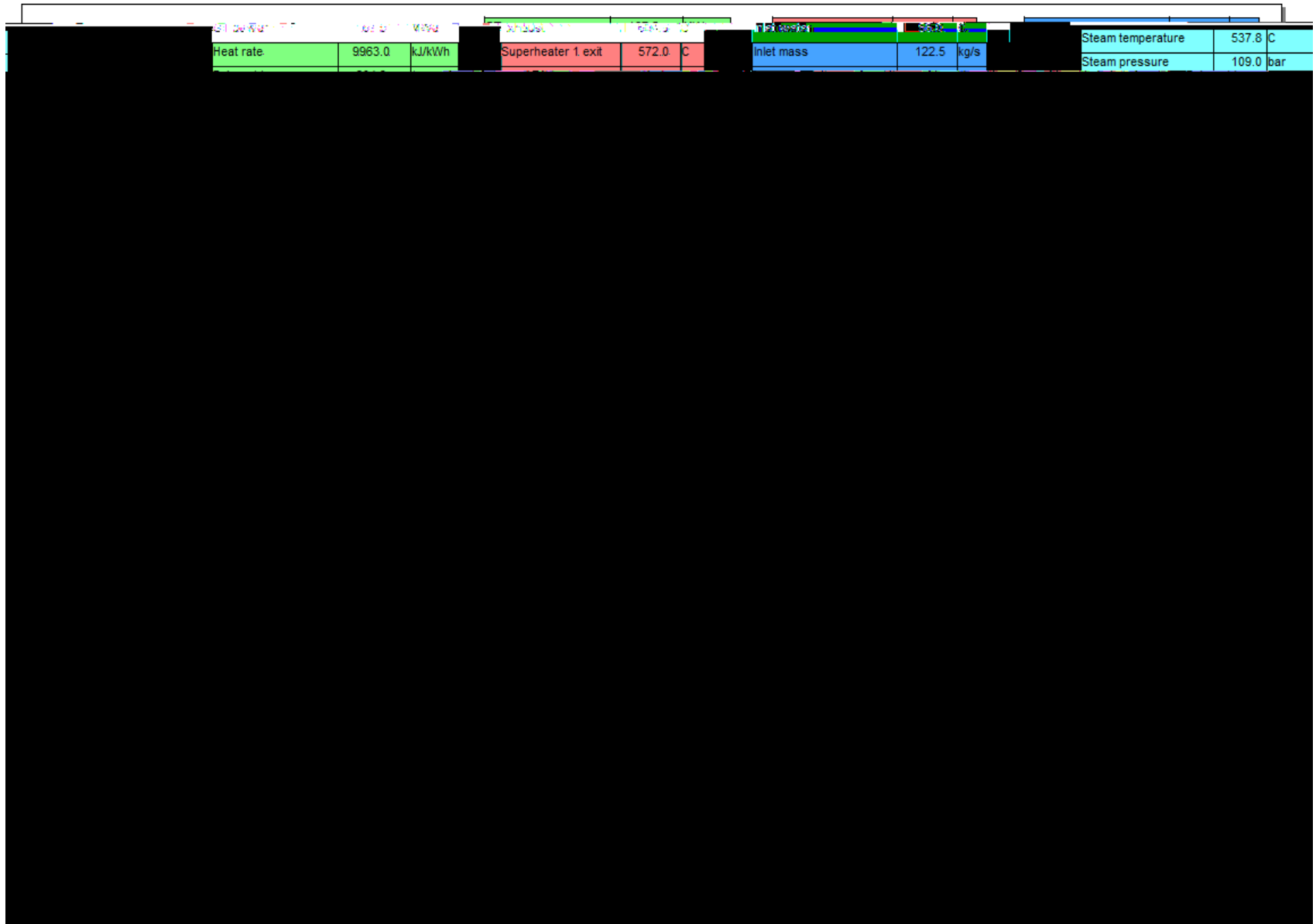
1. Evaluate geothermal resource, local regulations, and other site-specific issues
2. Model integration options to quantify efficiency benefits
3. Assess overall economics by cost and sensitivity to geothermal resource temperature, well depth, and well-to-plant distance



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



Heat rate	9963.0	kJ/kWh	Superheater 1 exit	572.0	C	Inlet mass	122.5	kg/s	Steam temperature	537.8	C
									Steam pressure	109.0	bar

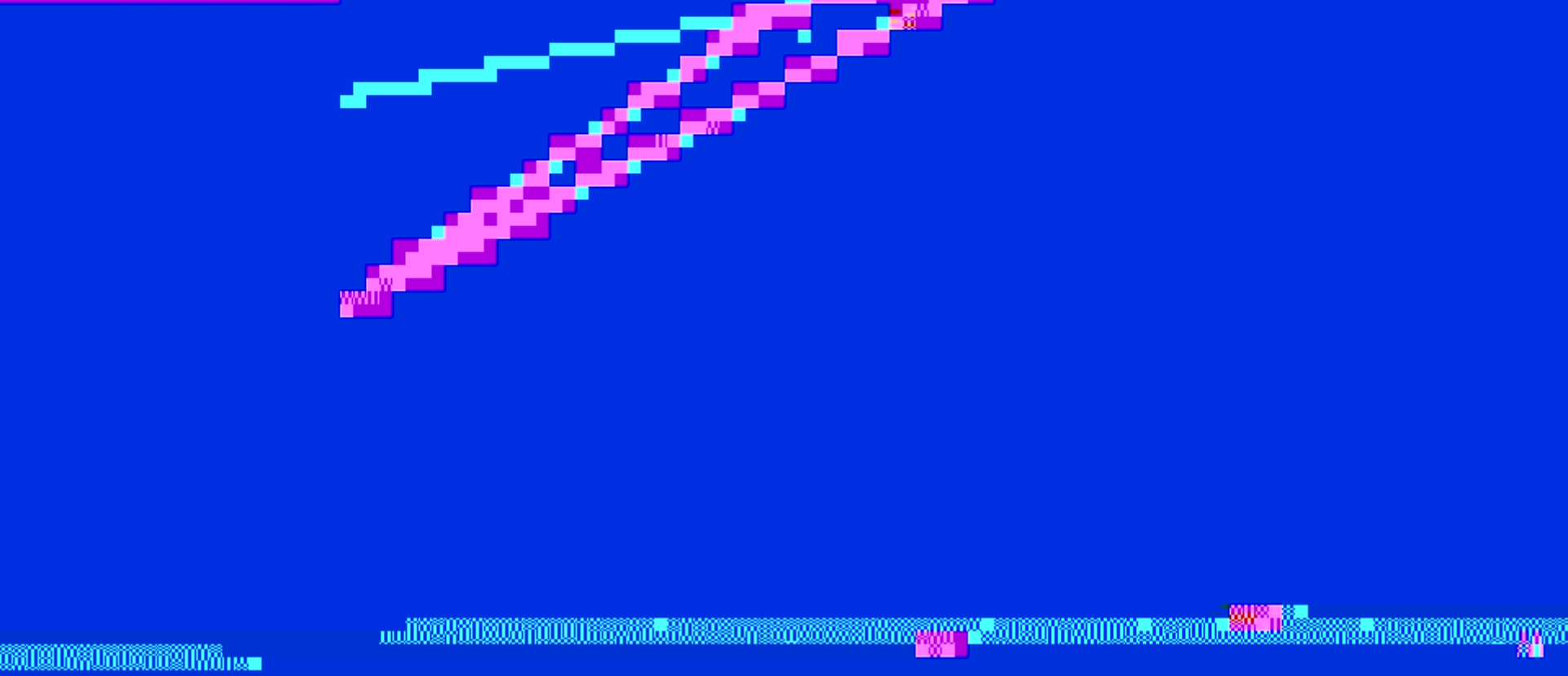


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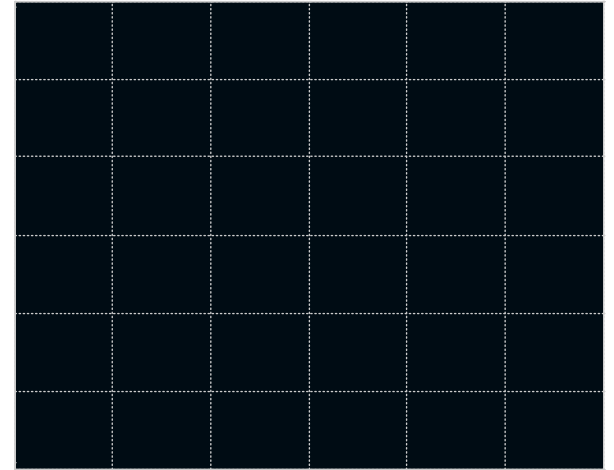
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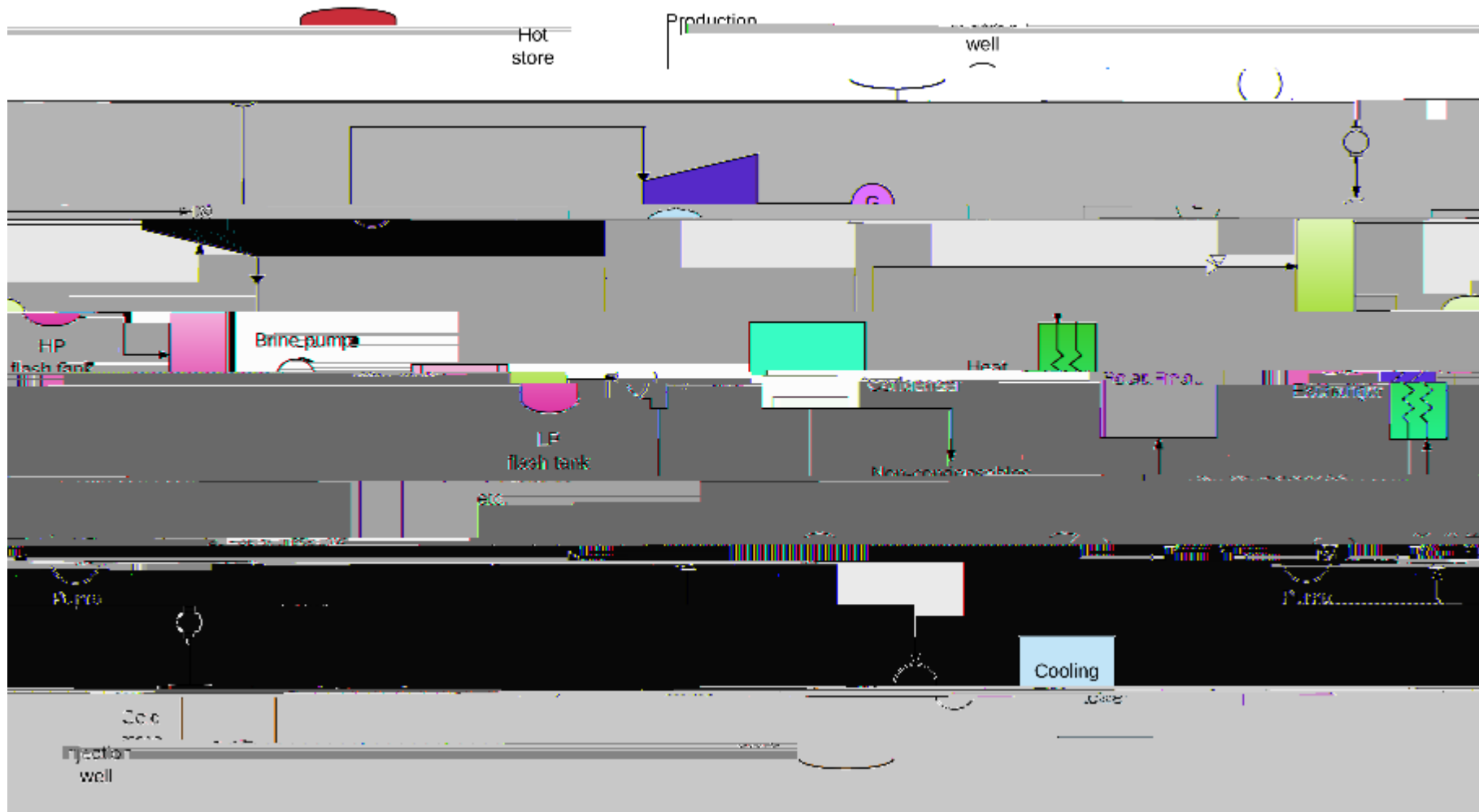
1977 - 2017



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

Acknowledgements to:

Eastman Chemical

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