

Evolving Energy System Flexibility Through Exergoeconomic Optimization

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Energy System Exergoeconomic Optimization

What questions are we trying to answer?

GRID/MARKET



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- What type of services (dynamic performance) can we expect from novel storage assets?
- What market mechanisms will best serve both the system and market participants?

ENERGY STORAGE ASSET



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- What type of services (performance) can we provide the market?
- What are our dynamic efficiencies through each possible operating mode?
- Based on our dynamic efficiencies and market opportunities – how should we run to maximize profit?



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& ENERGY LAB

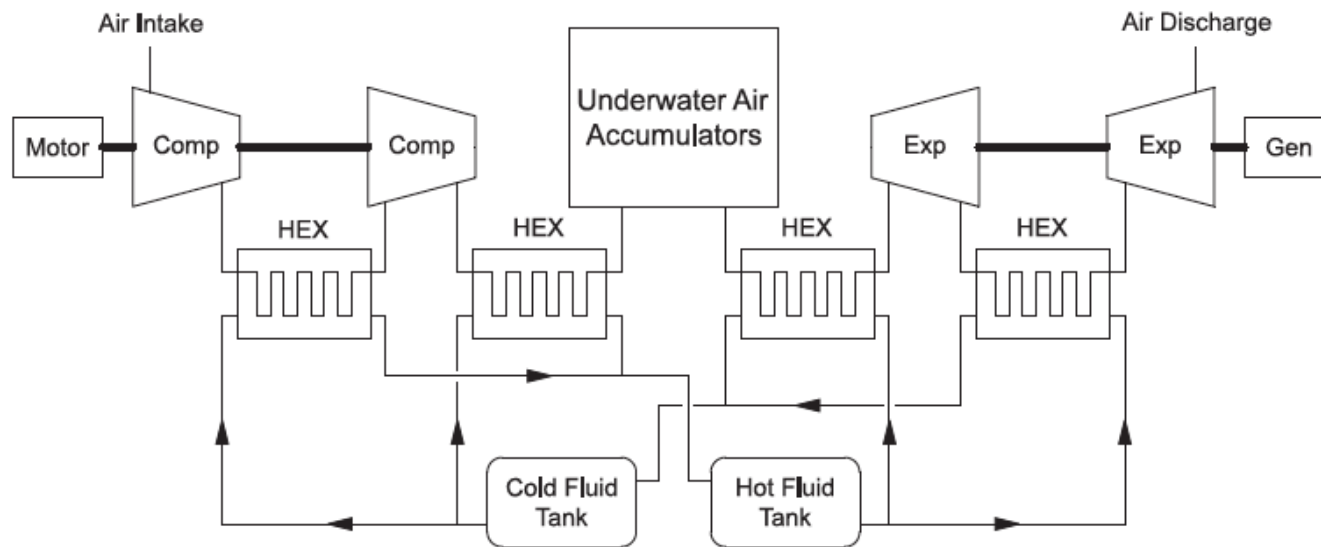


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Energy System Exergoeconomic Optimization

How can we try to answer these questions?

SIMPLIFIED UNDERWATER COMPRESSED AIR ENERGY STORAGE FACILITY SCHEMATIC



- **EXERGO:** A transient advanced exergy analysis considers not just the 1st law efficiencies of individual components, but also the capacity of that component, based on its role in a larger system, to see potential efficiency improvements (can be used at facility design stage as well).
- **ECONOMIC:** Once a dynamic performance map is created it can be coupled with a market analysis to reveal the optimum operation mode for maximum revenue generation.





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