University of Windsor

Evolving Energy System Flexibility Through Exergoeconomic Optimization

2017 IESO Stakeholder Summit

Monday, June 12, 2017, Toronto

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Energy System Exergoeconomic Optimization

What questions are we trying to answer?

GRID/MARKET

www.candianmanufacturing.com

- 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

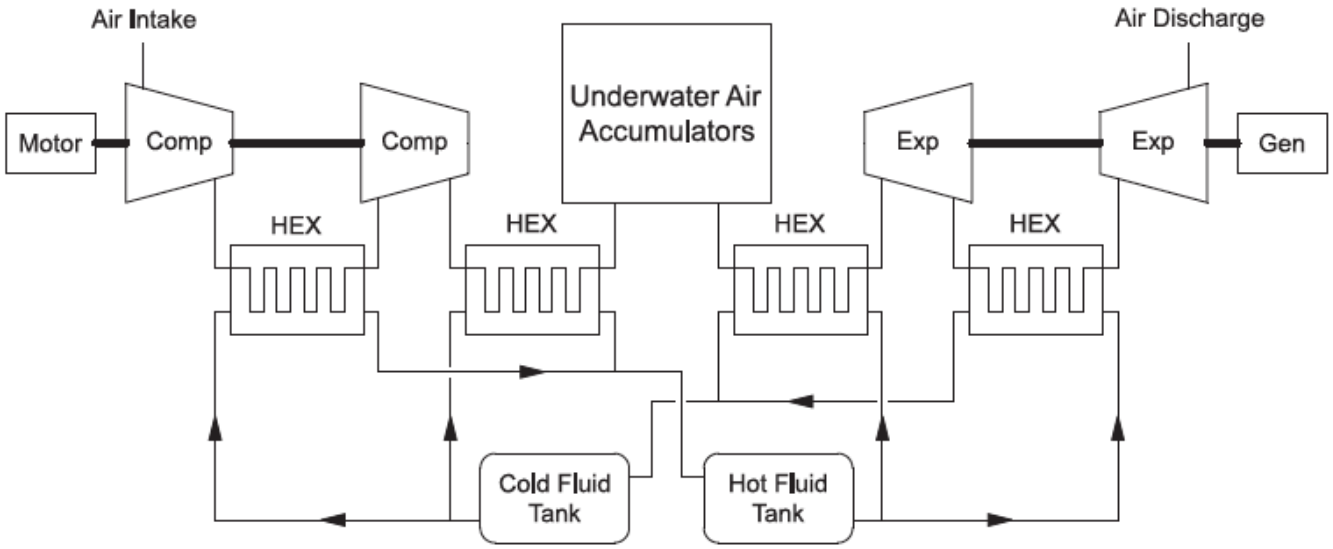
www.pbsimg.com

- 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?

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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