Rancor Hybrid Energy System Microworld
(How to design and evaluate HMIs for Nuclear Power)

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Acronyms (In order of appearance)
|	
NPP	Nuclear Power Plant
ConOps	Concept of Operations
HMI	Human Machine Interface
UofI	University of Idaho
INL	Idaho National Laboratory
HSSL	Human Systems Simulation Laboratory
HFE	Human Factors Engineer

1. **Understand the Problem**
   Proliferation of renewables results in too much electricity being generated during the day. Nuclear Power Plants (NPPs) can't load follow and need alternative revenue streams to remain competitive.
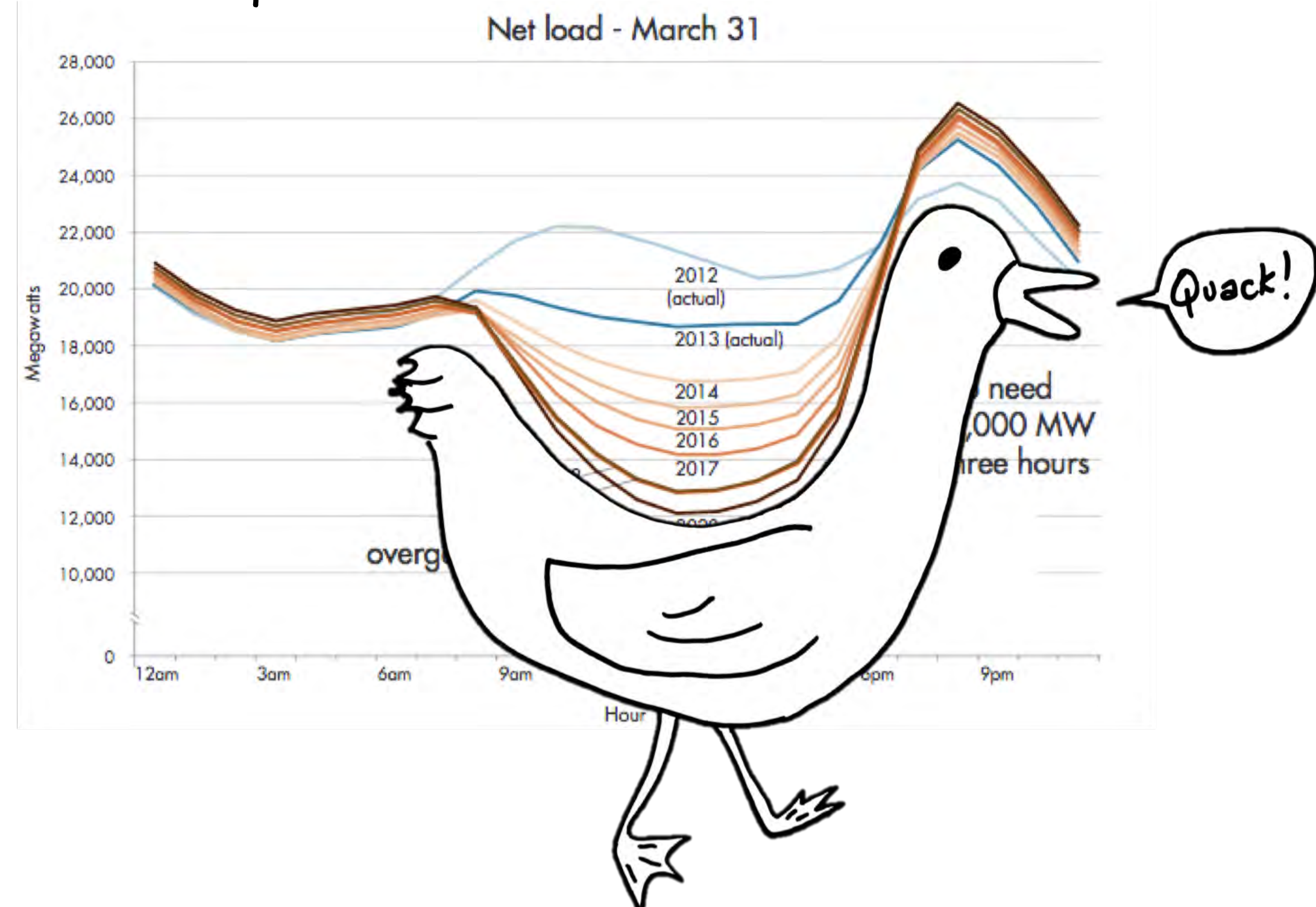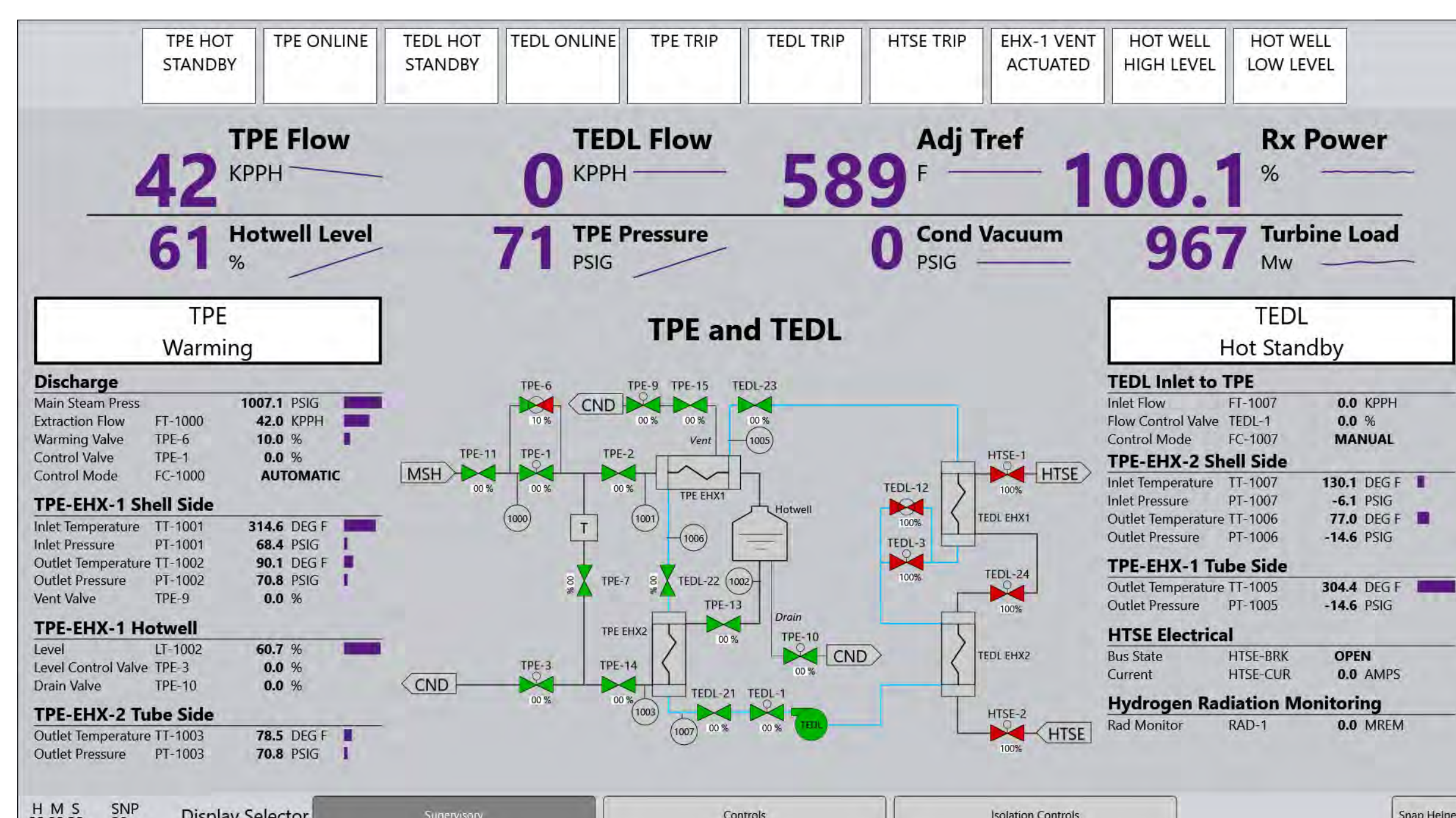

2. **Design Hybrid Energy System for NPP.**
   Easy, just hire some nuclear engineers.
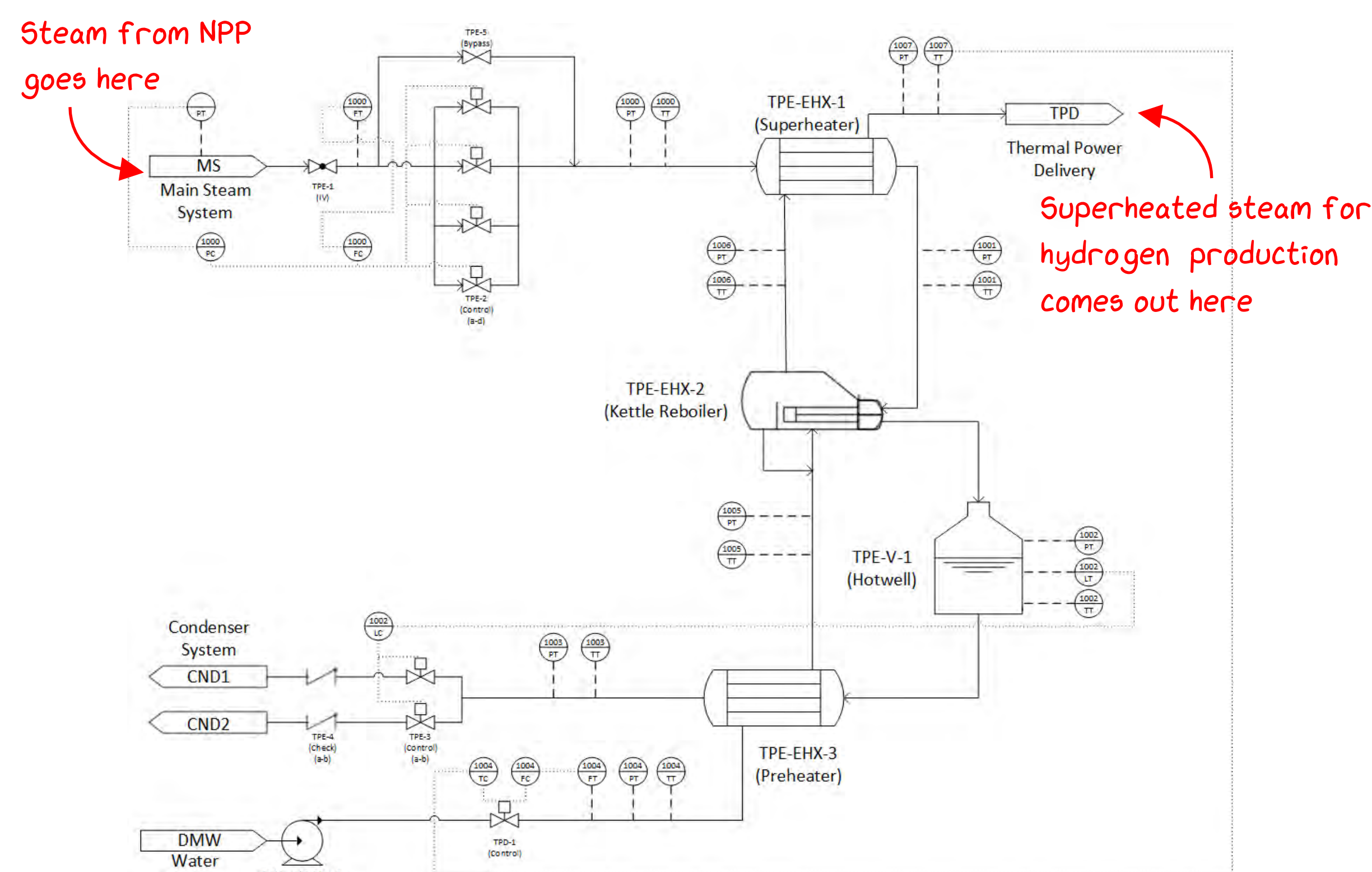
3. **Specify ConOps and HMI requirements.**

4. **Survive Pandemic.**

5. **Design Quasi-Dynamic Prototype HMI and Procedures**

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6. **Remote User Evaluation w/ Operators**
   Operators walked through scenarios with a quasi-dynamic HMI over teleconferencing. We validated the basic ConOps and received lots of feedback regarding the interface and engineering design.

7. **Utilize Rancor Microworld for Iterative Interface Design and Evaluation with Student Operators**
   The Rancor Microworld is a dynamic simplified nuclear reactor simulator developed by the UofI and INL. We implemented a simplified model of the hybrid energy system allowing us to iterate the design with students.
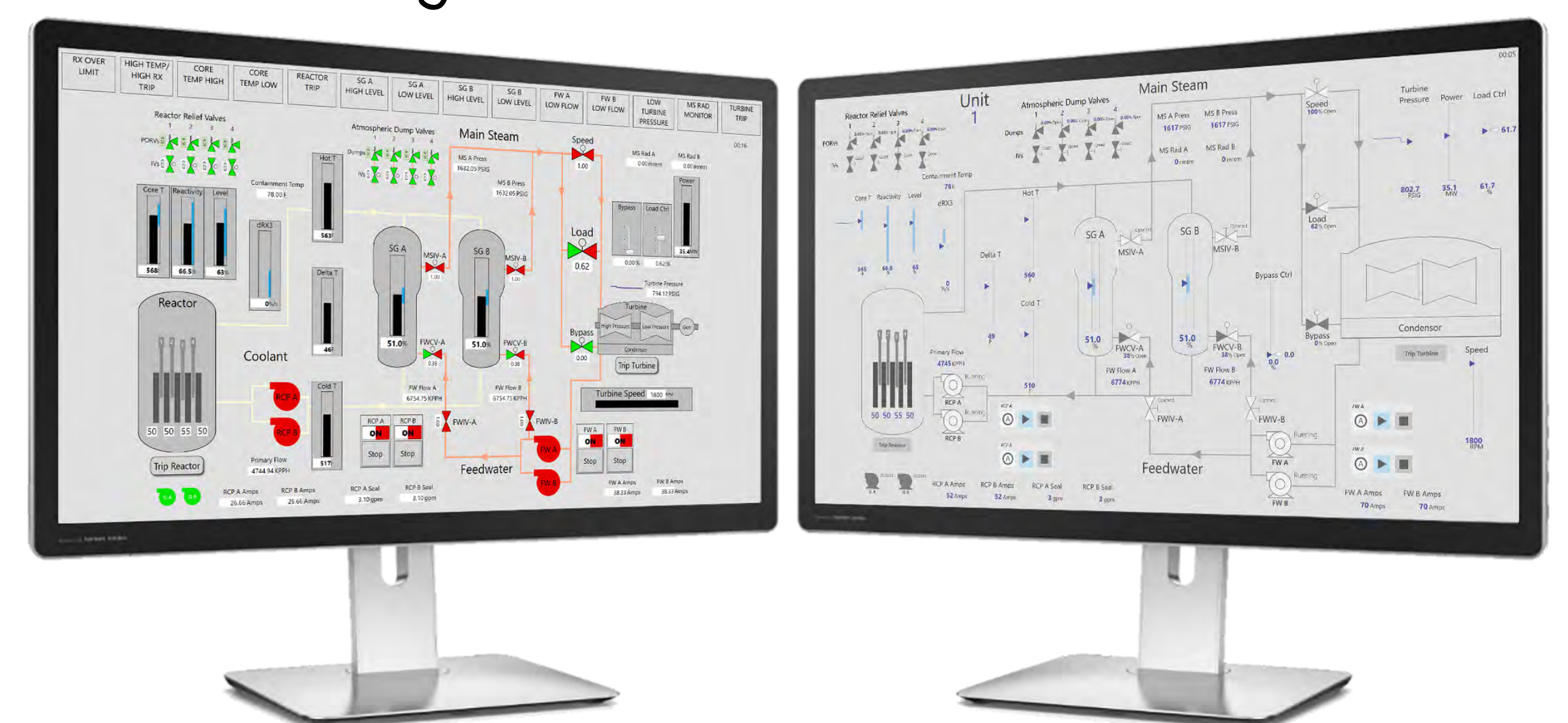
8. **Implement Refined HMI in INL's HSSL's Full-scope, Full-scale, Reconfigurable Simulator.**

HFEs (yours truly) pretending to discuss something important during a photoshoot in the HSSL circa 2013.

9. **Conduct Dynamic Scenario Testing w/ Operators**
   Operators were able to complete normal and abnormal operating procedures but desired increased automation for starting up and shutting down the hybrid energy system.

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