



Energy Demand Reduction for FSU's Central Utility Plant

Group members: Edgardo Cordero, Alec Schoengrund, Steven Decker,
Mira Meyers, Keaton Zargham, and Juan Villalobos

Team Introductions



Keaton Zargham
Data Analyst



Edgardo Cordero
Project Manager



Steven Decker
HVAC Engineer



Mira Meyers
Quality Control Engineer



Juan Villalobos
Energy Auditor



Alec Schoengrund
Mechanical Design Engineer

Keaton Zargham



Sponsor and Advisor



Engineering Mentor
Cameron Griffith
*Solutions Advisor, LEED AP,
CEM, CDSM*



Academic Advisor
Dr. Juan Ordonez, Ph.D.
*Professor of Thermodynamic Optimization
for Advanced Energy Systems*

Keaton Zargham

Objective

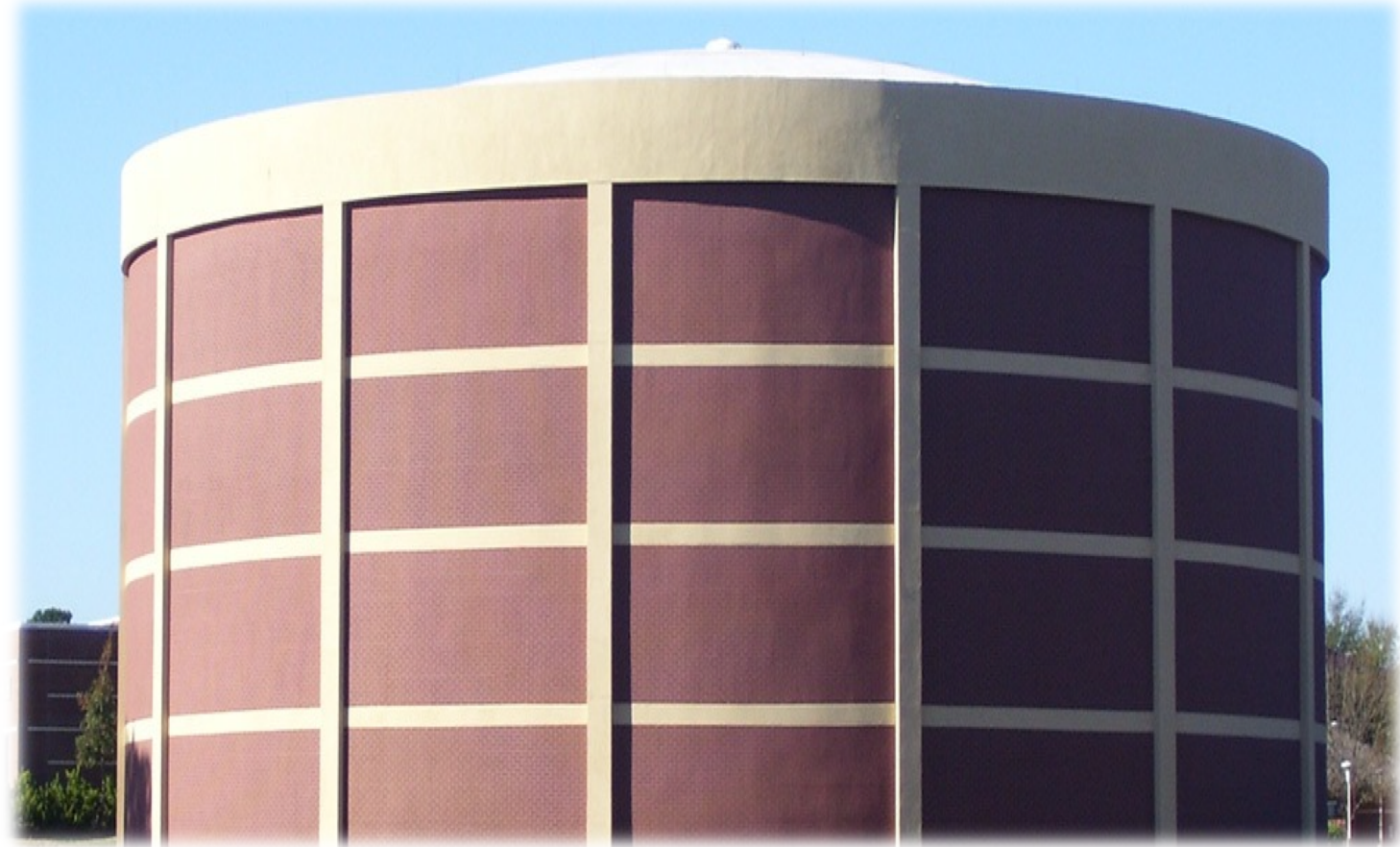
To research, study, evaluate, and propose a project that reduces FSU Facility's Electric Utility bill by reducing peak demand and/or the overall electric consumption to generate a financial payback to FSU.

Keaton Zargham



Fall Recap

- System and utility analysis
 - Evaluation of CUP components
 - Analysis of COT electricity rate structure
 - Analysis of annual major equipment electricity
- Level I Energy Audit
 - Reviewed operating data
 - Identified potential capital improvements
- Hosted meetings
 - Trane, FSU, DN Tanks, and COT Utilities
- Preliminary feasibility study
 - Work scope and financial analysis
 - Concept Selection



Keaton Zargham

Spring Project Plan

- Level 2 Energy Audit
 - Energy demand rate structure
 - Energy usage profile
 - Power factor
 - Load factor
 - Detailed financial analysis
- Level 3 Energy Audit
 - Focus on monetary improvements
 - Illustration of energy conservation opportunity
 - Refined analysis with hourly simulations
- Complete formal report and presentation for high level FSU Executives
- Finalize demonstration for Engineering Design Day

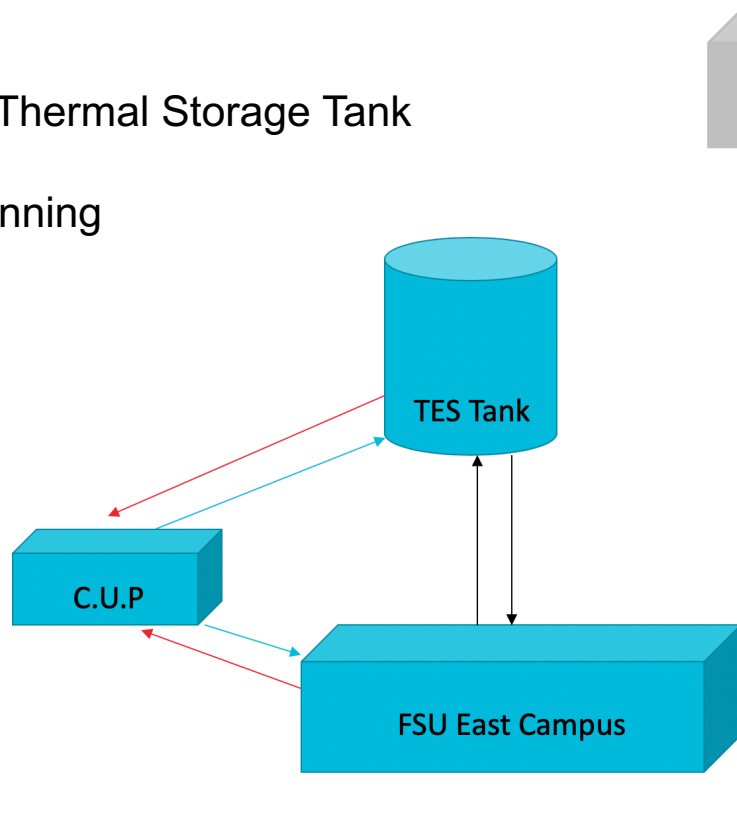


Edgardo Cordero

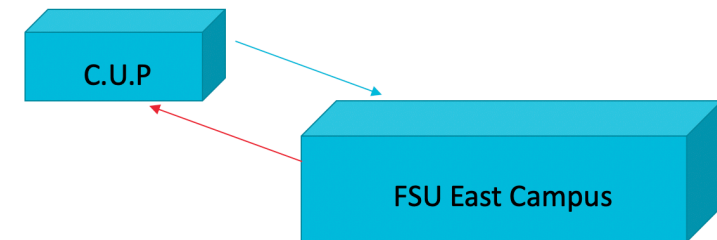
Demonstration

- Small scale real-time comparison between current state vs the adoption of TES Tank
- Arrows will be LEDs representing flow of chilled water supply and return water

- “Charging” of Thermal Storage Tank
- At Night
- 2-3 Chillers running



- 2 chillers running

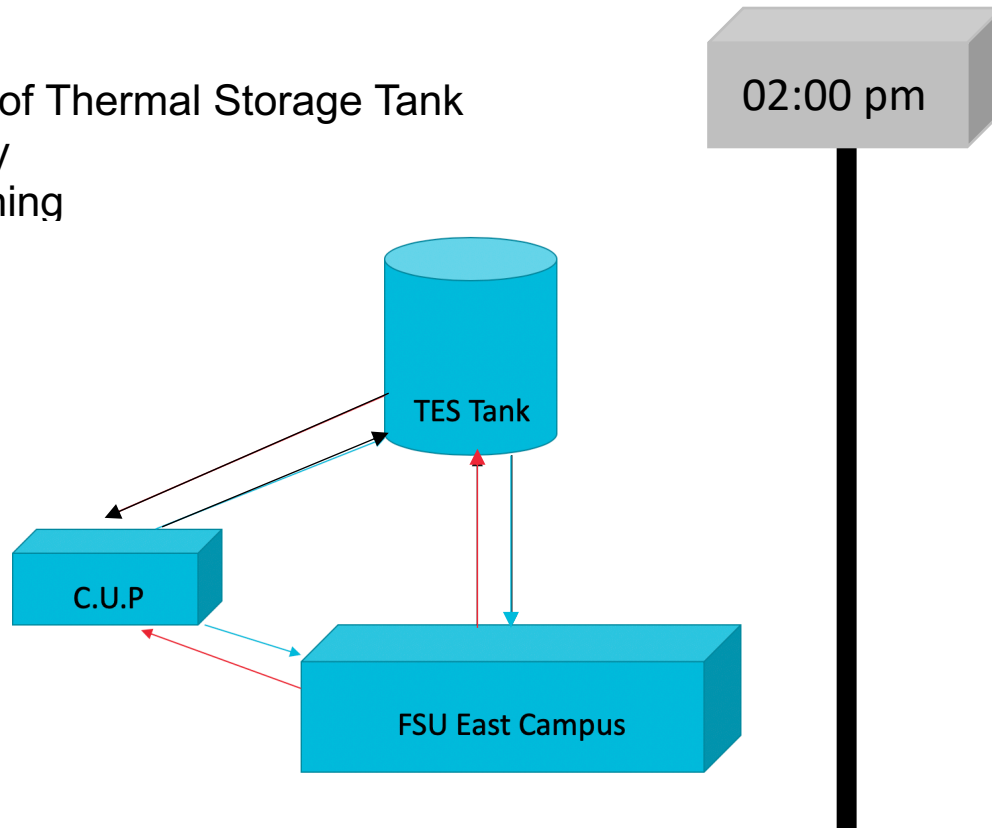


Edgardo Cordero

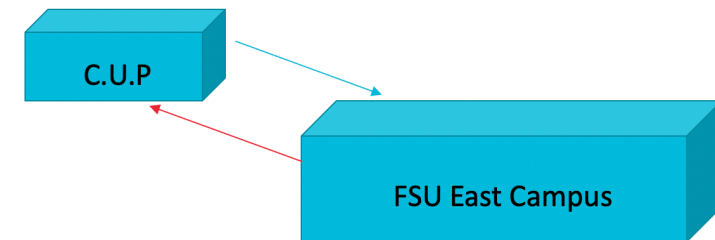
Demonstration

- Small scale real-time comparison between current state vs the adoption of TES Tank
- Arrows will be LEDs representing flow of chilled water supply and return water

- “Discharging” of Thermal Storage Tank
- During the day
- 2 Chillers running

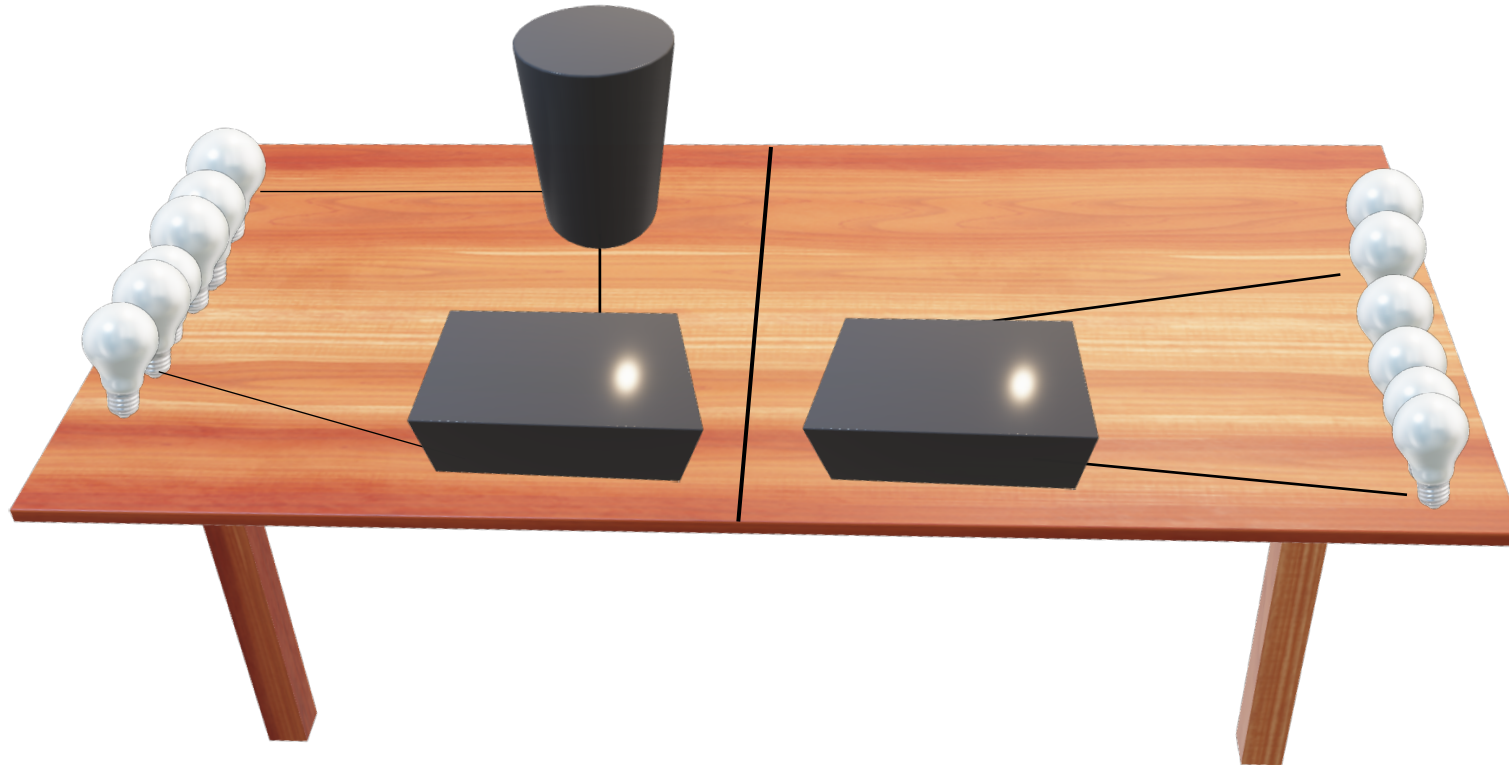


- 4 Chillers running



Edgardo Cordero

Idea for Project Demonstration



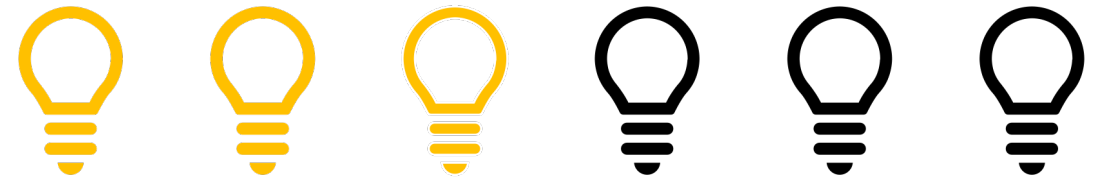
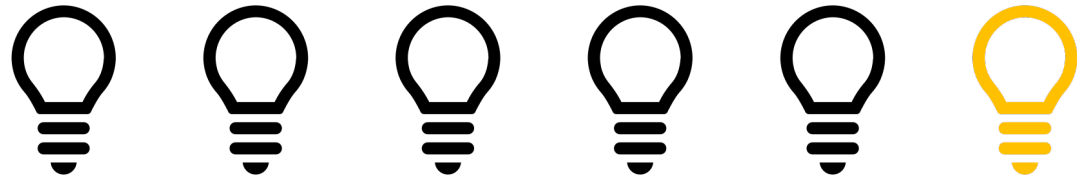
- Divided in two
 - One represents campus current status without the Thermal Energy Storage Tank, the other without it
- Light bulbs represent the six chillers currently at the CUP
- Rectangular boxes represent the FSU East Campus
- Cylinder represents the Thermal Energy Storage Tank

Edgardo Cordero

Light Bulb Demonstration

FSU's Current Energy Demand

FSU's Energy Demand with a Thermal Energy Storage Tank



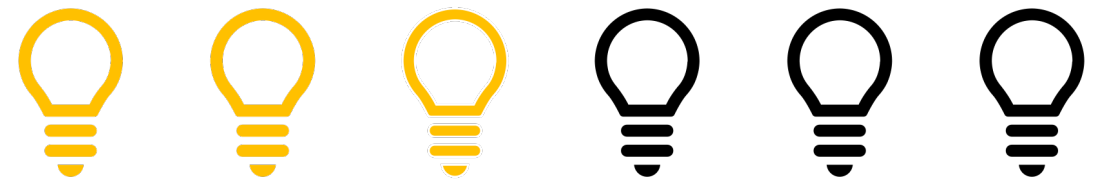
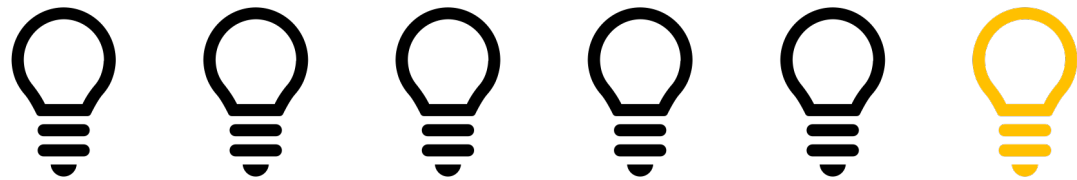
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Steven Decker

Light Bulb Demonstration

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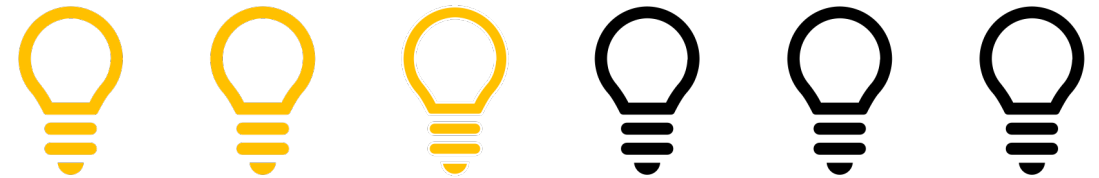
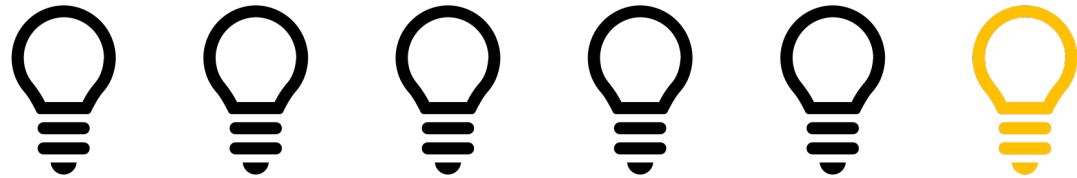
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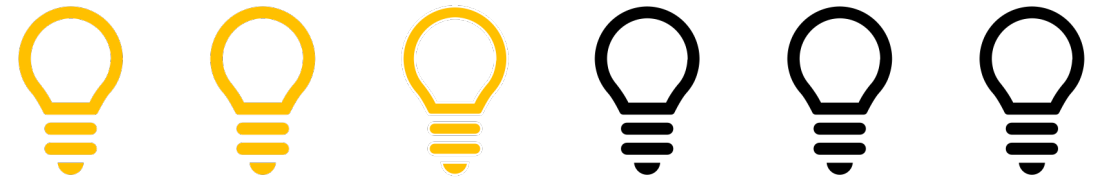
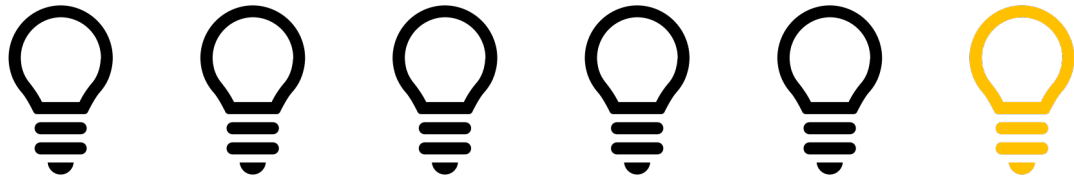
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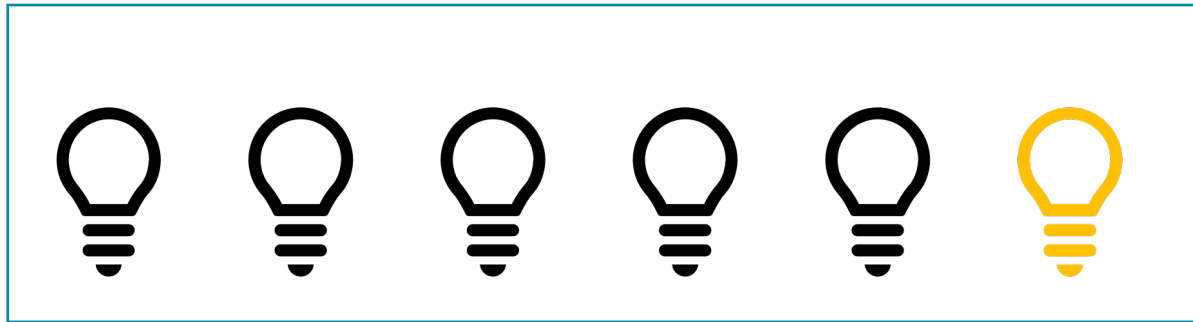


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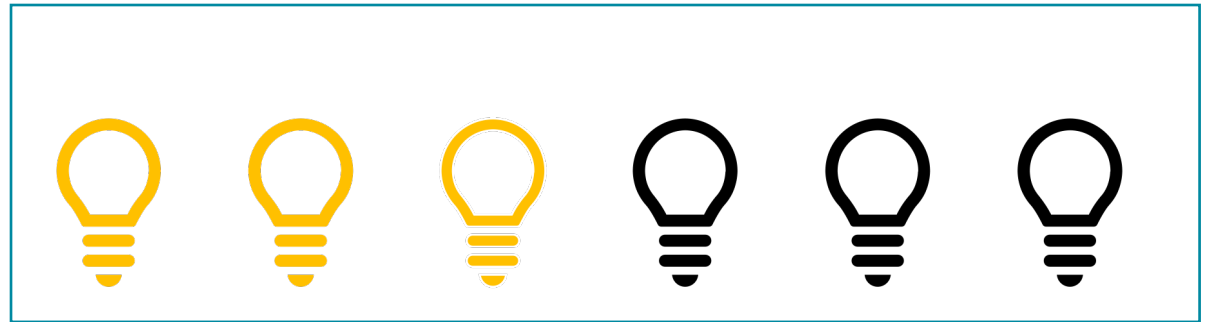
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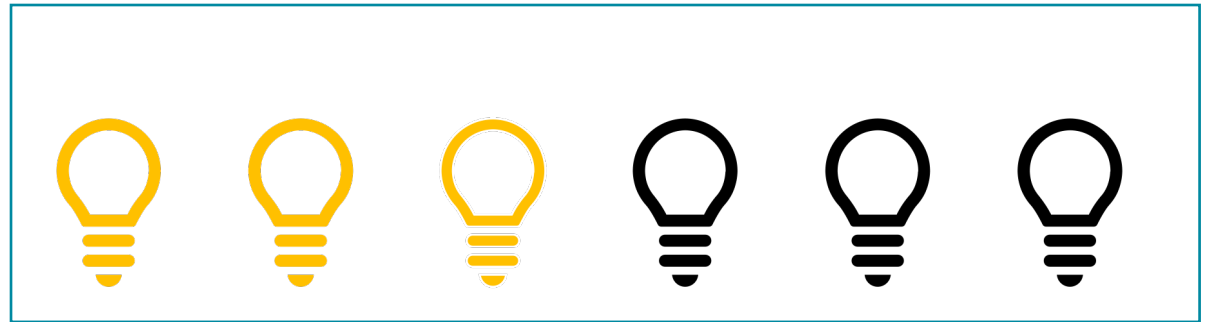
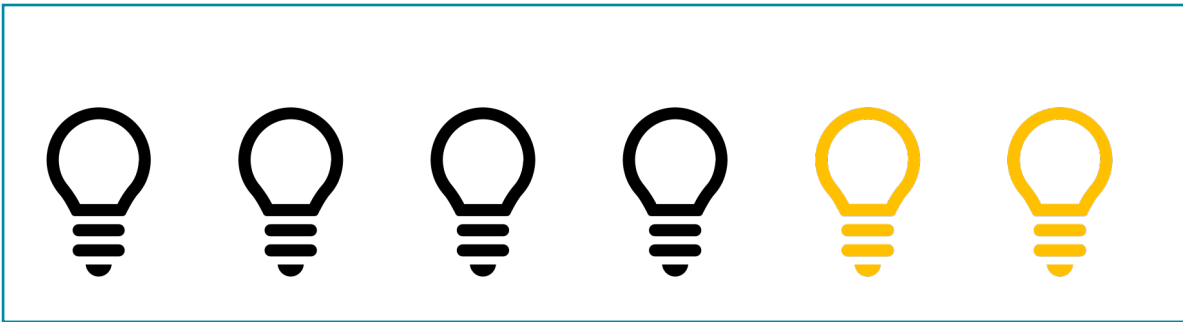
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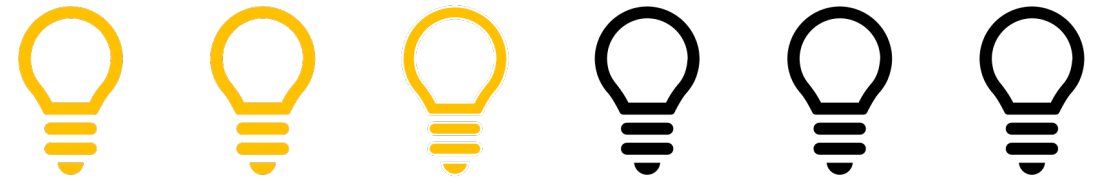
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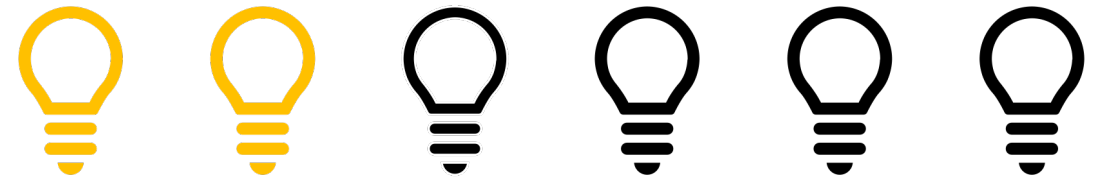
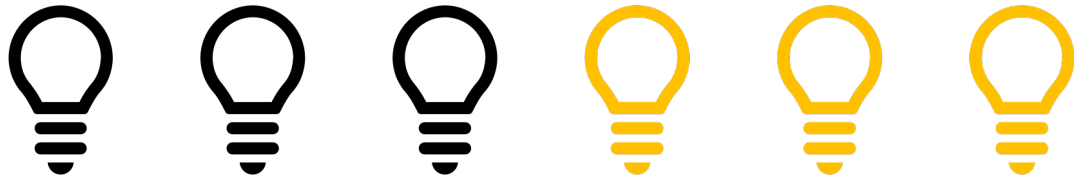
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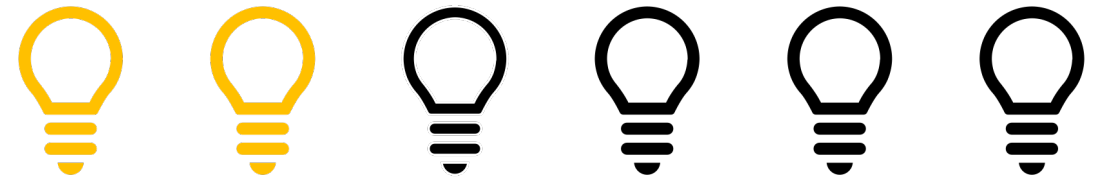
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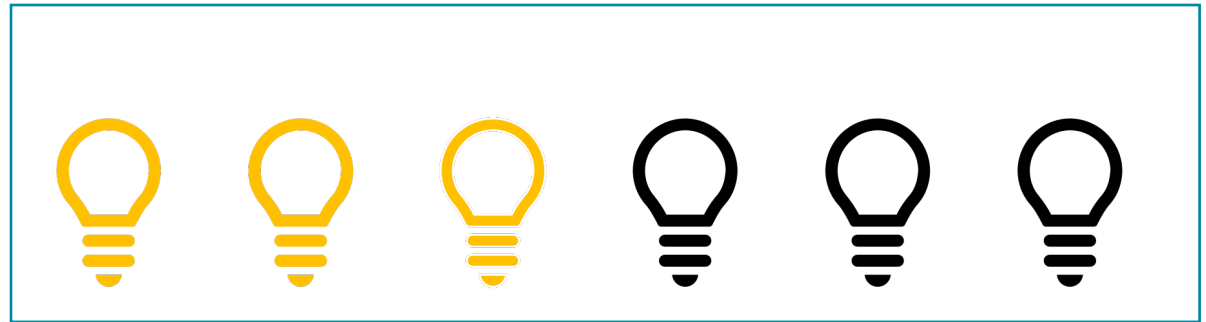
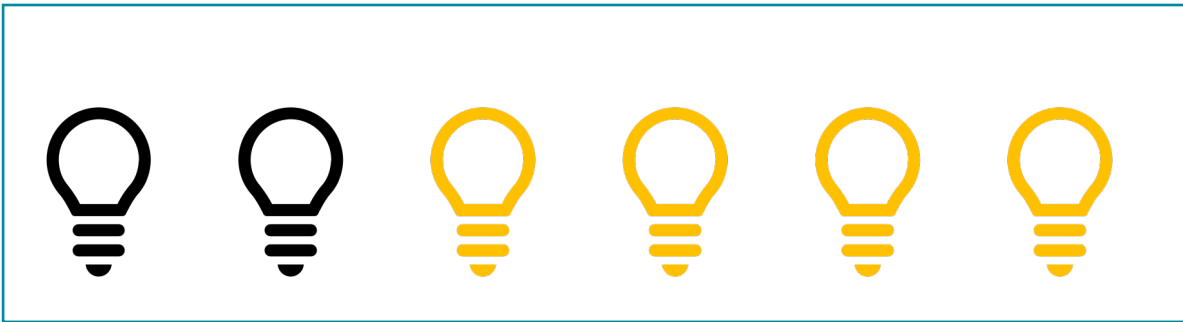
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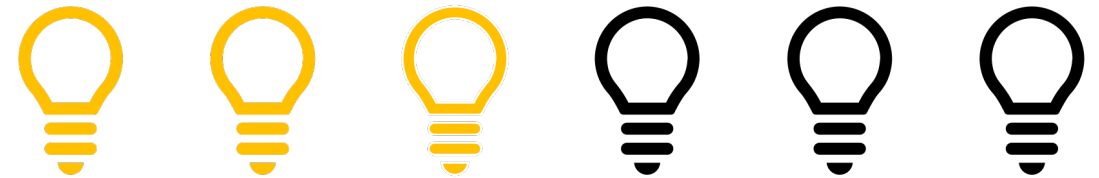
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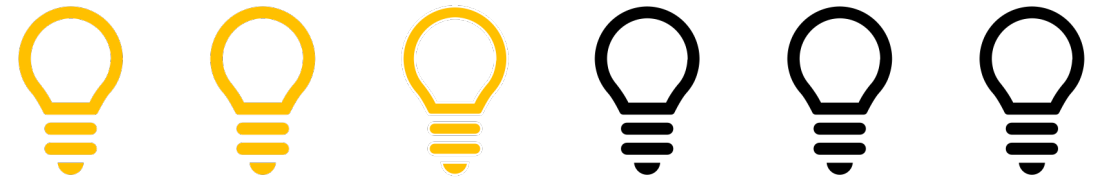
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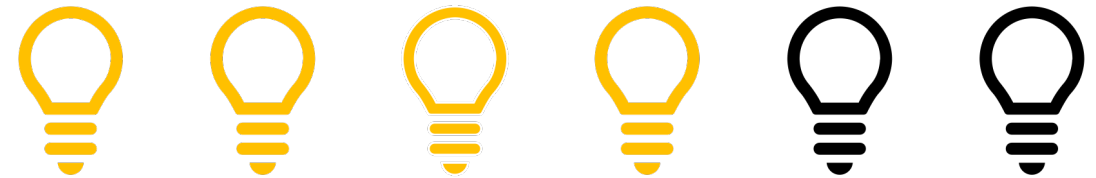
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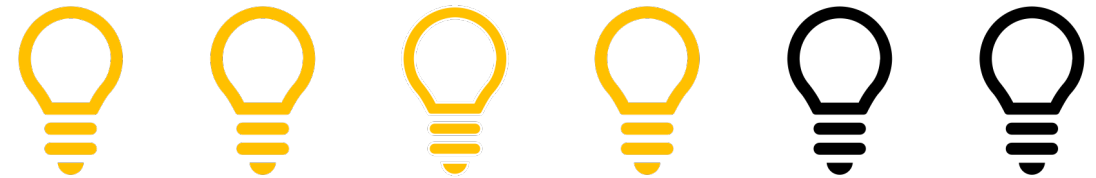
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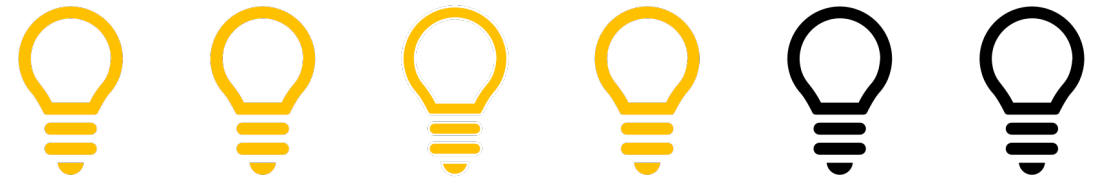
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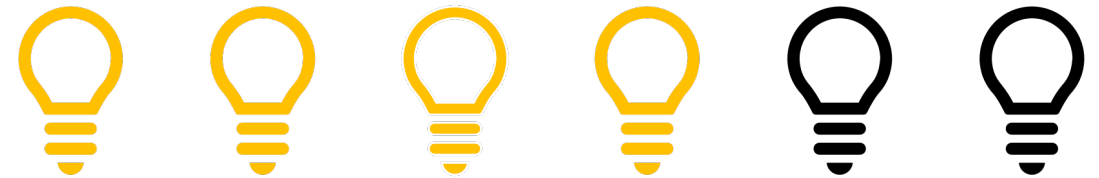
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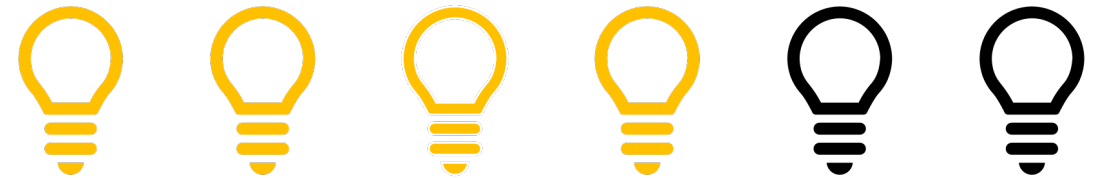
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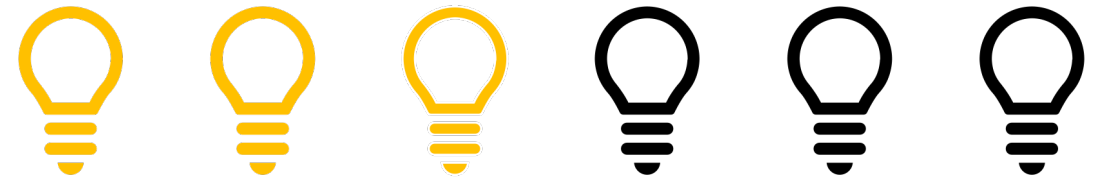
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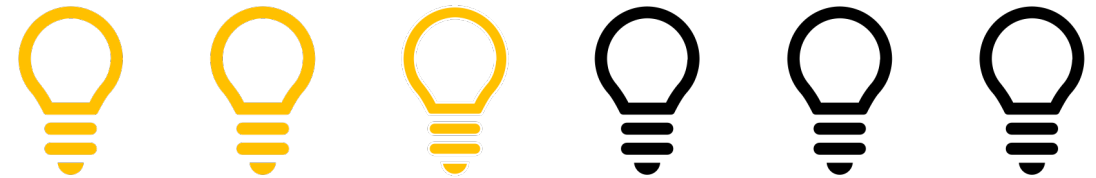
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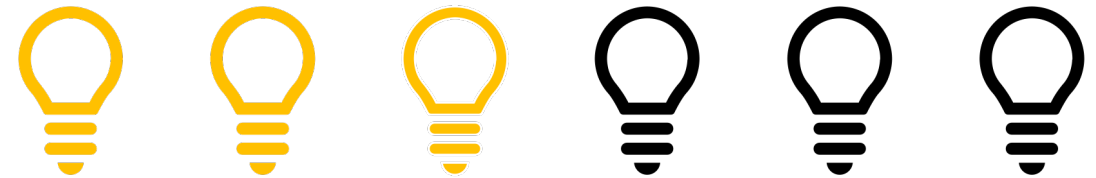
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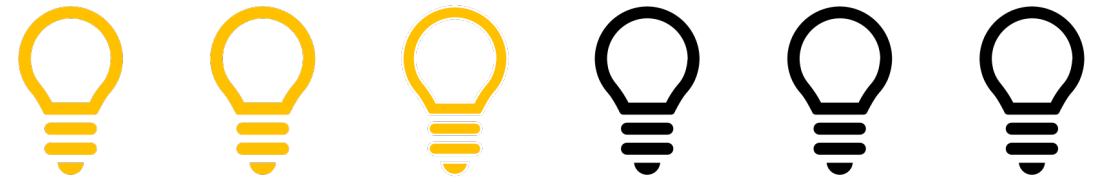
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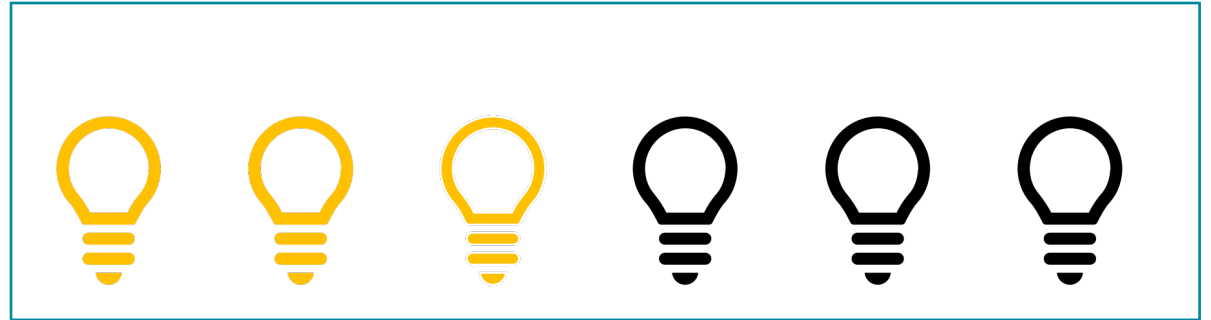
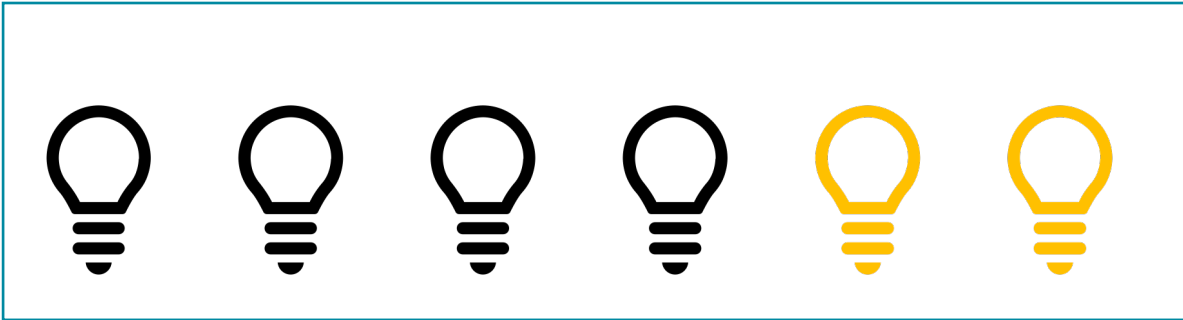
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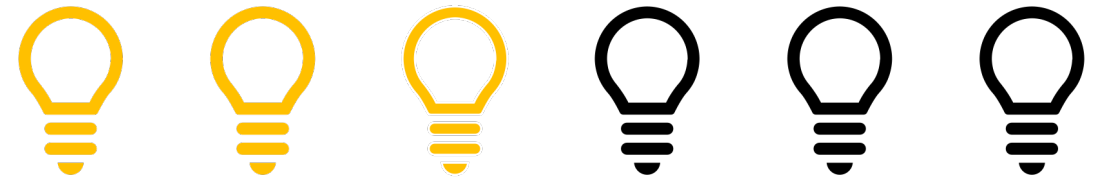
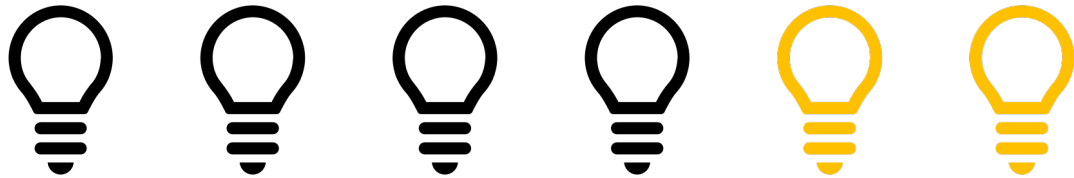
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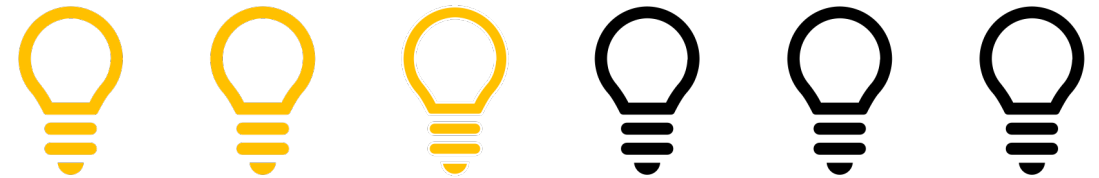
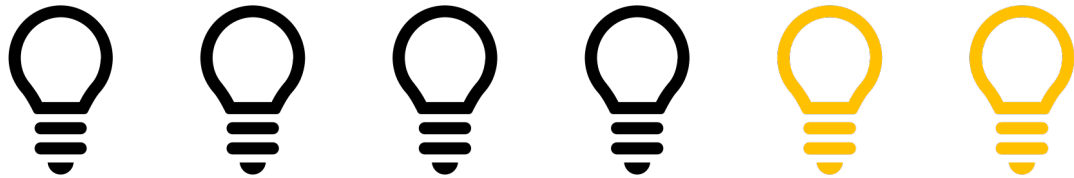
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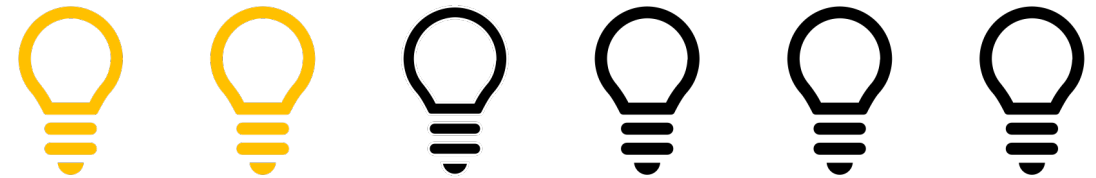
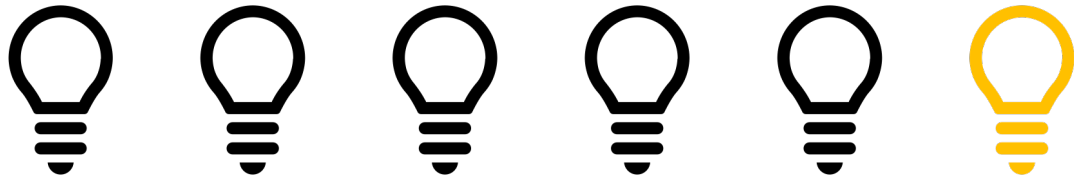
11:00 pm

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12:00 am

Steven Decker

Alternative Demonstration

- Simulation of FSU's operations and costs in a virtual environment
- Physical mockup of FSU campus with a TES tank
 - Including a water-cooling system, controls, etc.
- Interactive game for audience to guess the best way to reduce energy



Steven Decker

Concluding Statements

- All pertinent data has been collected at this time for the sizing of tank, the savings forecast, and the level 3 energy audit
- Team is in final stages of project with DN Tanks, Trane, FSU Facilities and Tallahassee Utilities
- We are currently developing our demonstration/interactive presentation for design day as we progress with negotiations with stakeholders

Steven Decker



Questions?

Team Members:

Edgardo Cordero

Steven Decker

Alec Schoengrund

Mira Meyers

Keaton Zargham

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