



Cummins Energy Saving

Group Number 2

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Group 2

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Marvin Fonseca

Cummins Energy Saving



Background

- Cummins increased efforts to reduce energy consumption in 2009
- Energy audits used to reduce and reuse energy in industry
- Their initial audit provided a 14% energy savings



Figure 1 – Energy Audit Process

Fall 2014 Energy Saving Ideas

- **Chillers**
- **Insulation**
- **Dynamometers**
- **Exhaust Gases**
- **Solar Panels**
- Better appliances
- Solar light posts
- HVAC
- Wind Turbines
- Elevators



Fall 2014 Results

- Cumulative savings
~\$250,000 /year
- Exhaust gases provide significant savings
- Analysis and implementation of exhaust energy system is lucrative

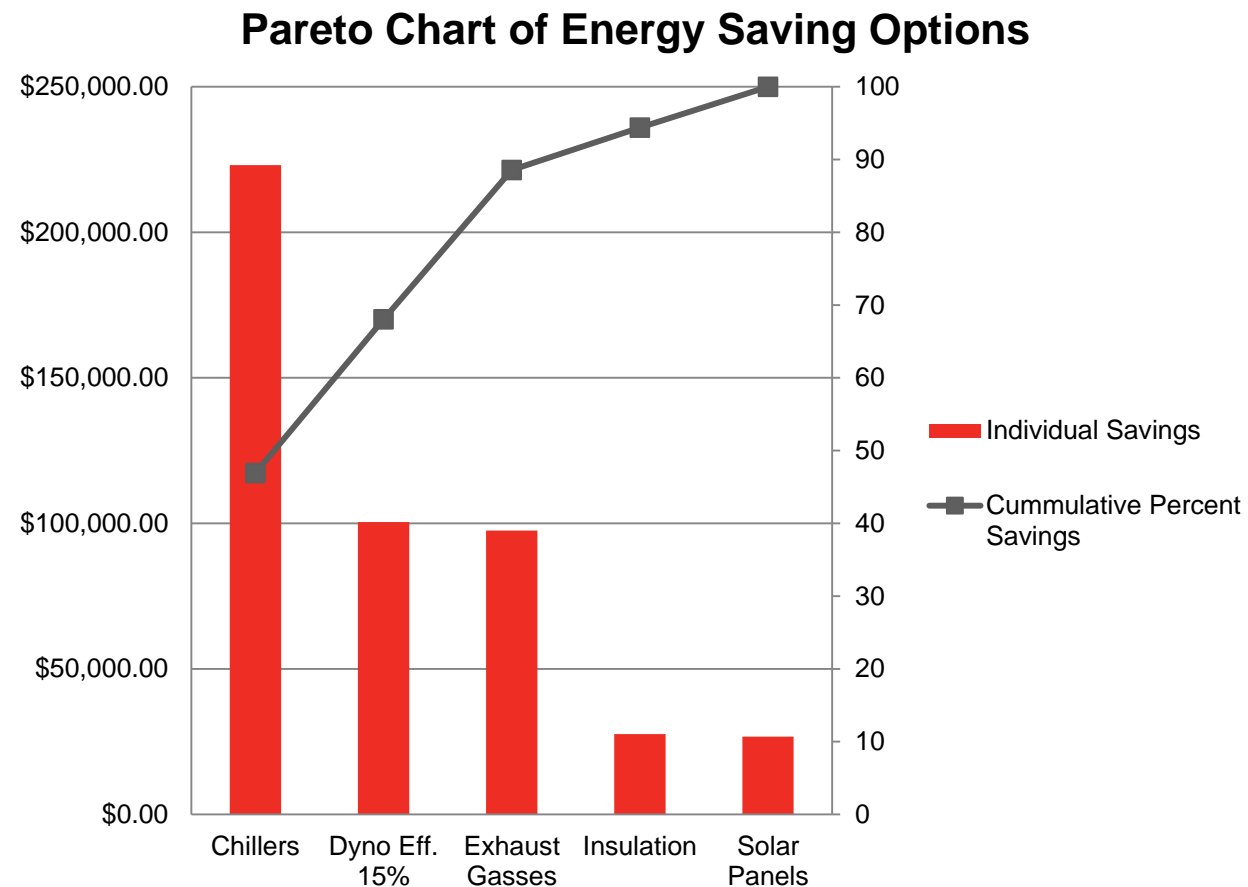


Figure 2 – Pareto Chart



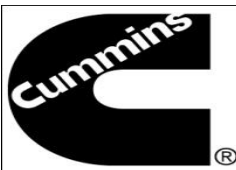
Fall 2014 Takeaways

- More Focused Goal
- Main Sources of Energy Consumption
- Improve Communication with Advisor and Professors
- Some Ideas Developed Already Implemented



Revised Project Scope

“Provide an engine exhaust capture system design supplemented with other energy saving ideas that will assist in decreasing the overall energy usage at the Cummins Technical Center.”



Projected Work

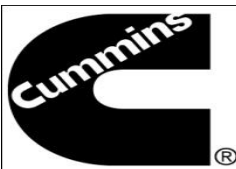
- Exhaust System Design
 - CTC
 - Prototype Design
- Power Generation Cycle
- Simulation
- Wind Turbine Feasibility



Figure 3 – CTC Exhaust Vents

Simulation

- Simulate Industrial Prototype
- Generate Live Measurement Feed
- Create experiment for CTC's engine testing



Prototype

- Fabricated Product
- Develop Measuring Tool
 - Mass Flow Rate
 - Temperature
- Prove Feasibility of Power Generation from Exhaust



Figure 4 – ISX

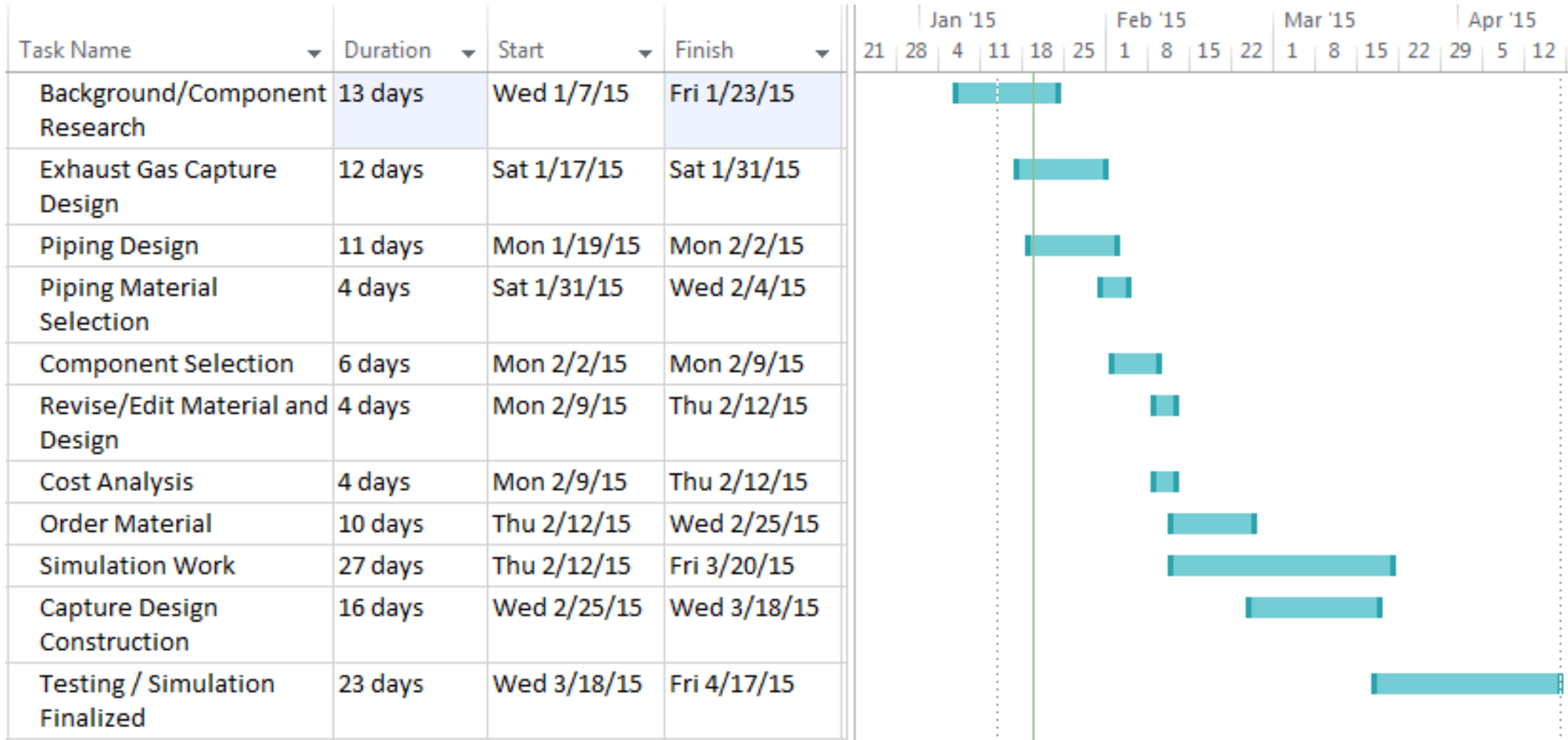
Expected Results

- Exhaust System Design / Simulation for the CTC
 - Electrical Energy Measurement
 - Mass Flow Rate Measurement
- Innovate New Energy Saving Methods



Figure 5 – Accomplishing Goals

Project Breakdown



Summary

- Ideas Generated
- \$250,000 of Energy Saving Costs
- Exhaust Capturing System Design
- CTC 88 Test Cells and 8 Auxiliary Cells For Simulation
- Engine Prototype Measurement Tool



References

- <http://energy.gov/public-services/homes/home-weatherization/home-energy-audits>



Questions

