ESA PILOT FEEDBACK

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Chroma Technology

Chroma Technology

- Design and manufacture high quality optical filters for a worldwide market
- Employee owned company located in Bellows Falls, VT (Windham County)
- We provide 150 quality jobs with great compensation and benefits for **all** employees
- Continuing to grow
- Committed to our community and a sustainable future

Proud to have provided optical filters to enable over
1 million PCR tests and over 200,000 PCR diagnostic machines!

Cleanroom Manufacturing Environment

Thin Film Deposition Chamber

Electric Bill at approximately $520,000 year

Energy Efficiency charges $35,000 year

Energy Project – Pump Replacements

Project

- Replace cryogenic pumps with Turbo Molecular Pumps (TMP) which are used for achieving high vacuum in four deposition chambers
- Retrofit requires the chamber to be out of production for the pump change and to reestablish the manufacturing process.
- Out of pocket cost $50,000 per chamber

Status

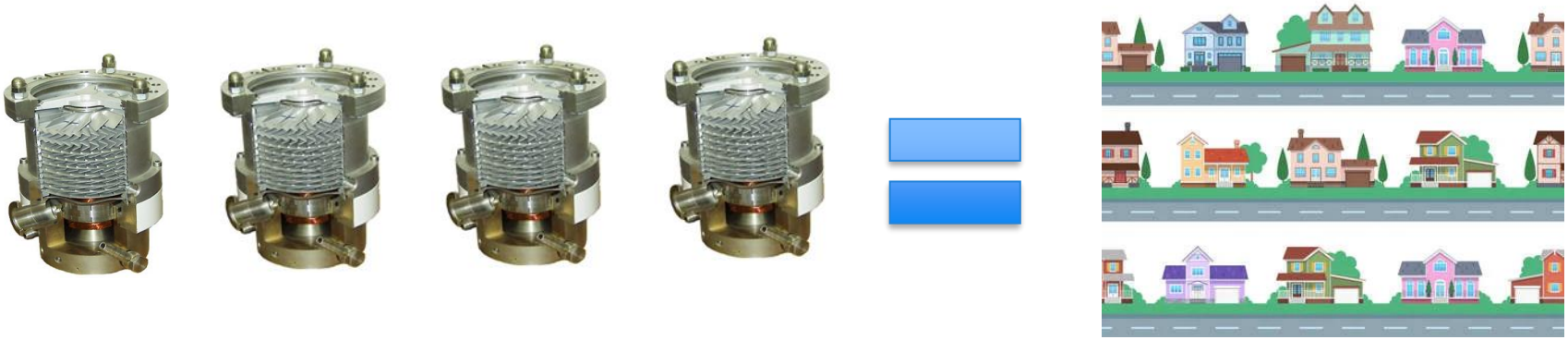
- Total downtime per chamber has been 4 months, one chamber at a time
- Two chambers are complete
- Key parts for the next two chambers are back ordered due to supply chain issues
- Project required significant internal technical resources from Chroma for equipment work and process development (500 labor hours)
  - No EVT resources applicable or used

Results

- Energy Savings: 47, 245 kWh per year per chamber
- Energy productivity: 50% less kilowatts per deposition hour
- Additional energy savings in reduced load on the Chilled Water System
  - TMP pumps do not require chilled water

Understanding the Scale of Industrial Energy Projects

1 Pump replacement = Energy used by 4.4 Homes



4 pump replacements = Energy used 17.6 homes = Neighborhood

Note: Average home uses 10,715 kWh / year

Program Timeline of Events

May 2019

Pilot program established

September 11, 2020

Participated in an Associated Industries of Vermont (AIV) sponsored meeting with Efficiency Vermont and PSD staff and other ESA participants

First time participants were provided key content in the ESA Participant MOU (EVT rates and required services) and steps related to development, review, and submission of Energy Management Plans (EMPs).

February 3, 2021

Chroma Technology filed an Energy Management Plan with the Public Utilities Commission.

This included meetings over a two month period with the State of Vermont PSD and EVT for them to define and provide feedback on exactly what was required for submission.

February 25, 2021

First reimbursement requested

Reimbursement received April 13, 2021 after significant intervention

October 18, 2021

Second reimbursement received

February 7, 2022

Participated in feedback session with PSD and EVT to provide program feedback

Eligible funding for pilot period clarified

Summary

Project and Program Success and Impact

- The access to our efficiency charges was material in initiating a complex and high cost energy reduction project
- Significant innovation and engineering is required to develop and complete projects in manufacturing
- Due to the high cost, complexity and scope these projects take significant time to plan, ensure total funding and execute.
- Projects like these are critical to meeting State of Vermont energy goals
- Many participants in the program are key to the economies of rural Vermont and their energy costs are large

ESA Pilot Feedback

- Extend pilot
  - 1 ½ years of the pilot period was used for program definition
  - Minimum of 6 months impact for pandemic and supply chain delays
- Ensure "no gap" for participants to accumulate efficiency charges for additional projects
  - All report writing and program redesign (simplification) can occur in parallel while participants use the existing program design
- Ensure the participants have an equal voice in any program redesign
  - Program needs to continue to allow for full access to a company's efficiency charge with causal charging for assessment