

# ENERGY PROJECT CASE STUDY

## INDUSTRIAL REFRIGERATION SYSTEM

### Financials

- ◆ **Pre-Project Annual Energy Costs: \$947,000**
- ◆ **Annual Energy Savings: \$253,000**
- ◆ **Total Turnkey Installed Cost: \$466,000**
- ◆ **Simple Capital Payback: 1.8 years**
- ◆ **Project IRR: 54%**

### Description of Facility

- ◆ High Volume Ice Cream & Frozen Novelty Plant
- ◆ Approximately 5,000 hp of on-line compressors
- ◆ Multiple blast freezer operations
- ◆ Sweet water and pasteurizing systems
- ◆ Ammonia system divided amongst two separate engine rooms



### System Description

- ◆ Ammonia refrigeration system running 4 distinct suction levels; - 65 °F, - 50 °F, -30°F, and + 5°F.
- ◆ System has 30 reciprocating and rotary screw compressors varying in size from 50 to 500 horsepower and 8 evaporative condensers.

### System Opportunities/Issues

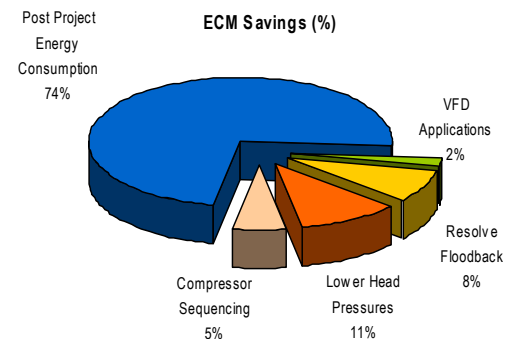
- ◆ Compressor and condenser sequencing preformed manually in old engine room.
- ◆ Condensing head pressures maintained at 150 psig minimum to avoid compressor trip outs.
- ◆ Problematic and inefficient blast freezer operations.
- ◆ Excessive flood back of liquid refrigerant

### Project Description

- ◆ Install a master sequencing control system to enable optimal control of compressors and condenser staging and to allow tighter control over suction pressures.
- ◆ Retrofit several existing condensers with variable speed drives.
- ◆ Convert existing blast freezer fans to variable speed driven control with premium efficiency motors enabling increased production and reduced heat load within the blast freezer.

### Project Benefits

- ◆ \$88,000 in annual energy saving by implementing low cost modifications to allow head pressures to safely operate below 120 #.
- ◆ Rerouted suction line to second intercooler where excessive liquid can be used effectively thereby eliminating a continuous false load on the system and savings approximately \$96,500 per year.
- ◆ Developed comprehensive Measurement and Verification (M&V) plan to document savings.
- ◆ Energy savings from implementing developed measures at over 25% with the added benefit of enhancements to plant productivity.





## **Company Overview**

Solution Dynamics is focused on providing our clients with high value services to assist them with the evaluation, development, and implementation of utility related cost reduction strategies and measures. These strategies include taking into account issues such as energy cost savings, sustainability, Green House Gas (GHG) impacts/carbon footprint, and reliability. Solution Dynamics looks at facilities as a whole to evaluate both demand side and supply side strategies and solutions. The principals of the company bring over 60 years of experience in the energy industry to our clients. This depth of experience allows Solution Dynamics to operate efficiently and effectively to derive value.

Solution Dynamics works closely with our clients to look at all aspects of their energy related costs. This includes; how production processes utilize energy and other utilities, the operation and maintenance costs, which fuel is being utilized, what utility rate structures are being used, is there equipment in need of replacement, what opportunities are there for low cost and capital based improvements, and what are financial and environmental benefits. Solution Dynamics develops and implements cost reduction strategies and measures that are specifically tailored to meet the individual needs of each facility. Energy supply opportunities provide reduced costs, while demand side opportunities include both technology and operational improvements to reduce energy use and cost. This also translates into benefits that go beyond simple energy cost reduction that include newer equipment, increased reliability, improved process control, reduction in GHG impacts and the potential generation of carbon credits.

Solution Dynamics has several established programs and as a company we take on the risk of successful performance to achieve results. Solution Dynamics has unique, high value, programs that have been developed to meet our client's requirements. These programs combine the ability to identify and implement both Low Cost High Value operational types of savings along with more traditional capital based savings. We also have supply side programs that guarantee performance to eliminate the risk of our clients.

## **Services Provided**

Solution Dynamics specializes in the development and delivery of utility and energy consuming equipment related cost reduction opportunities and can deliver them in an efficient manner. Services provided by Solution Dynamics include:

1. Identification of high value cost reduction opportunities
2. Evaluation & development of energy strategies
3. Utility rate analysis
4. Project scope development
5. Project financing assistance
6. Detailed cost and savings analysis for professional quantification of project value
7. Development of measurement and verification plans
8. Project development for Construction
9. Turnkey project management, implementation, and commissioning of cost savings opportunities

## **Results**

Solution Dynamics has a very strong and sustained track record of being able to successfully develop and implement cost reduction opportunities for our clients. We excel in identifying opportunities, many of them high value, which other companies typically miss. When reasonable economic criteria are utilized energy cost reductions that range between 5% to 25% of a facilities energy cost.

## **Energy Systems Experience**

Solution Dynamics is experienced in a wide range of commercial and industrial facilities and energy consuming systems. Typical systems include: Boiler & Steam systems, Chilled water systems, Cooling towers, Compressed air, Lighting, HVAC for plants and offices, Building automation controls, Ammonia refrigeration systems, Variable speed drives, Efficient motors, Co-generation & Combined Heat & Power Systems, Heat recovery, Metering systems, Measurement and Verification protocol, and other types of energy, water, wastewater, industrial gasses and related utility systems.