

# Climax Molybdenum Company

## COMPANY BACKGROUND



Climax Molybdenum Company is a subsidiary of Freeport McMoRan Copper and Gold, Inc. It is one of the world’s leading molybdenum producers. The Climax Molybdenum plant in Fort Madison, Iowa, which has been operating since 1974, produces molybdenum oxide, which is widely used as an alloying element in strengthening and improving corrosion and wear resistance of iron and steel. The molybdenum is mined as molybdenum disulfide and sent to Climax Molybdenum in Fort Madison where the main process is roasting the sulfur off to make molybdenum trioxide. The roasting process generates sulfur dioxide which is then turned into commercial-grade sulfuric acid.



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### PROJECT BACKGROUND

Climax Molybdenum’s manufacturing process requires a significant demand for energy. Climax decided to use the Pollution Prevention program to conduct an energy audit of the plant to identify opportunities to save energy and money.

### INCENTIVES TO CHANGE

Climax’s major use of electricity is electrical motors. However, the facility was lacking information to guide the decision-making process when replacing an existing motor, or buying a new one.

Metal halide lighting is the primary fixture used in the plant. While metal halide lighting is fairly efficient, a more efficient lighting system could save money.

Further evaluations are needed of the remaining energy consumers to complete this audit.

### RESULTS

#### Motor Inventory

The motors at Climax Molybdenum were inventoried into MotorMaster 4.0., a free software program from the U.S. Department of Energy. Now that the inventory is complete, it can be accessed by anyone in the plant. With the program, the stock code for the equipment can be entered and the motor information on that piece of equipment will be pulled.

#### Motor Replacement

Different scenarios for each motor over 5 HP were explored. If a third of the motors are replaced with more efficient recommended models, in the next three years there will be a yearly savings of \$26,000 and 465,000 kWh.

#### Lighting in Roaster Area

The lighting in the roaster area was suggested to change from a 175 W metal halide to a 175 W metal halide with more lumens per watt. This would lead to fewer lights having to be placed in these areas giving an annual savings of \$12,300 and 245,000 kWh.

#### Lighting in Moly sulfide Plant

The lighting in the moly sulfide plant was suggested to be changed from a 250 W metal halide to a 250 W metal halide to give more lumens per watt. This would yield an annual savings of \$3,850 and 77,000 kWh.



### Compressed Air Leaks

Forty-five compressed air leaks were found. These leaks should be easy to repair and will lead to a savings of \$16,000 and 85,000 kWh per year. It is recommended that Climax implement a compressed air maintenance plan to yield additional savings.

### Air Pollutants Diverted in Tons

|     | Total for all sectors |
|-----|-----------------------|
| SO2 | 4.42                  |
| CO  | 0.45                  |
| NOX | 2.10                  |
| VOC | 0.07                  |
| PM  | 0.11                  |

### Green House Gases Diverted in Tons (CO2 Equivalent)

|      | Total for all sectors |
|------|-----------------------|
| CO2  | 817.54                |
| CH4  | 30.74                 |
| N2O  | 0.41                  |
| CFCS | 10.06                 |



| Project                       | Annual Cost Savings | Environmental Results | Status      |
|-------------------------------|---------------------|-----------------------|-------------|
| MOTOR INVENTORY               | N/A                 | N/A                   | IMPLEMENTED |
| MOTOR REPLACEMENT             | \$26,000            | 465,000 kWh           | RECOMMENDED |
| LIGHTING IN ROASTER AREA      | \$12,300            | 245,000 kWh           | RECOMMENDED |
| LIGHTING IN MOLYSULFIDE PLANT | \$3,850             | 77,000 kWh            | RECOMMENDED |
| COMPRESSED AIR LEAK           | \$16,000            | 85,000 kWh            | RECOMMENDED |