SHOWCASE PROJECT: GENERAL MOTORS: COMPRESSED AIR SYSTEM OPTIMIZATION AT THE ARLINGTON ASSEMBLY PLANT

SOLUTION OVERVIEW
The General Motors Assembly Plant in Arlington, Texas was built in the early 1950s and has operated for more than 60 years. Today, The Arlington Assembly Plant is a facility that spans over 5.3 million square feet and continues to increase productivity and efficiency to keep up with changes in facility and production equipment. GM has noticed that the need for compressed air has increased with production and that the systems have become costly and challenging to manage. Almost every process in the Arlington Assembly uses compressed air, from stamping door panels, fastening machines, to cleaning and painting processes. GM wanted to maximize the overall compressed air system energy performance, so GM executed an Energy Performance Contract (EPC) to optimize controls, reduce leaks and improve system-wide performance. Improving compressed air system performance is critical to GM pursuing their energy reduction goals and the corporate goal to be carbon neutral by 2040.

The Arlington plant’s compressed air system handles a variety of processes, from assembly to painting. The system consisted of two 1,500 standard cubic feet per minute (SCFM) screw-type compressors and five centrifugal machines that range in size from 5,000 SCFM to 11,600 SCFM. None of the compressors were equipped with variable frequency drives (VFDs) and with a total capacity of over 40,000 SCFM and a system horsepower (hp) of over 9,000 hp, GM decided to target the system as an opportunity for significant energy savings.

SECTOR TYPE
Industrial

LOCATION
Arlington, Texas

PROJECT SIZE
5.3 million square feet

FINANCIAL OVERVIEW
$200,000

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SOLUTIONS
Planning for the energy performance contract started after an Energy Treasure Hunt identified the need for improved compressed air controls at the Arlington plant. The compressed air controls Energy Conservation Measure (ECM) was combined with 8 additional ECM’s to form the scope of an energy performance contract. As part of the EPC audit process, GM used infra-red leak detection equipment to isolate leaks on processes that required compressed air. If all projects were implemented, the combined energy savings would lead to a 50% reduction in compressed air generation, equivalent to electrical energy savings for the site of 1.8% per year. The new controls, along with a move away from pneumatic tools on the new body shop, have led to a dramatic reduction in compressed air needs for the plant.

Before the controls system upgrade, a compressor would regularly cycle on when the volume was not needed causing excess compressed air to be vented. Adding the controls and optimizing the systems effectively eliminated compressor blowoff at the Arlington plant. Not only did the Arlington site improve its compressed air energy performance, but other GM sites also improved because of the change to the General Motors Bill of Process. The graph in Figure 1 shows the improvements in green, a reduction of about 6,000 SCFM compared to the existing system’s performance in red. GM sites are sharing this information and Bill of Process to improve efficiency at other sites, using tools like the Fluke II900 Sonic Industrial Imager to identify compressed air leaks with greater accuracy.

OTHER BENEFITS
GM has achieved additional cost savings from the ongoing improvement in Body Shop tooling, by using more electrical devices that do not use compressed air. This change to the General Motors Bill of Process has proven itself in several sites as new models are rolled out and the old tooling is replaced. The work at Arlington exceeded GM’s initial expectations and will continue to yield savings well into the future. As the company moves toward a zero-carbon future, these types of energy reduction projects, as well as changes in fuels and processes, will help it achieve its

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decarbonization goals.
<table>
<thead>
<tr>
<th>Annual Energy Use</th>
<th>Annual Energy Cost</th>
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<tbody>
<tr>
<td><strong>Baseline (2020)</strong></td>
<td>85.79 kWh/unit</td>
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<tr>
<td><strong>Actual (2021)</strong></td>
<td>61.08 kWh/unit</td>
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**Energy Savings**

29%

**Cost Savings**

For more information, visit [https://betterbuildingssolutioncenter.energy.gov](https://betterbuildingssolutioncenter.energy.gov/showcase-projects/general-motors-compressed-air-system-optimization-at-arlington-assembly-plant)