

NORTHROP GRUMMAN CORPORATION
HAWTHORNE, CA

Compressed Air Project

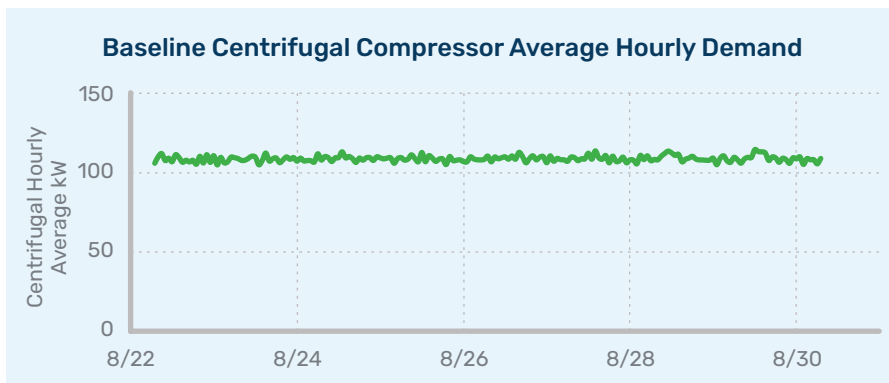
Goals & Challenges

Northrop Grumman Corporation has a 1,000,000-square-foot facility in Hawthorne, California where they run their production cycle 24/7. This facility specializes in numerous unique and custom processes for various technology research and development endeavors. Among these is their distinctive Wind Tunnel Testing system. The existing setup comprises a single Cooper Quad 2000 – a 450 hp three-stage centrifugal compressor that operates continuously to provide significant compressed air flow rates for wind tunnel testing purposes. The wind tunnel operates approximately 500 hours per year. When the wind tunnel was not in operation, the compressor provided general compressed air for other needs at the facility at much lower volumes.

Willdan met with Northrop Grumman in March 2022 to discuss their major operating systems and energy efficiency opportunities to improve performance of their compressed air system.

Solutions & Outcomes

Willdan conducted a comprehensive audit of the compressed air system. Baseline data was collected from the centrifugal compressor from August 22-30 in 2023. Upon data analysis, Willdan engineers concluded that the compressor, due to its size and unloading characteristics, operated inefficiently when the wind tunnel was not in use. Throughout the monitoring period, the wind tunnel remained inactive. The centrifugal compressor exhibited a nearly constant average hourly demand, with no discernible variation based on either the day of the week or the time of day.



Annual Energy Savings

818,096 kWh



Demand Savings Reduction

93.39 kW



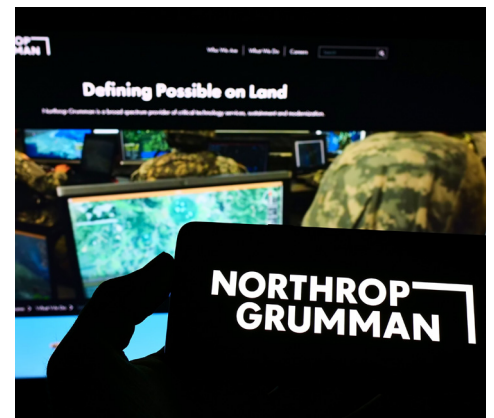
Annual Cost Savings

\$ 171,800



Simple Payback on Project Investment

1.17 years



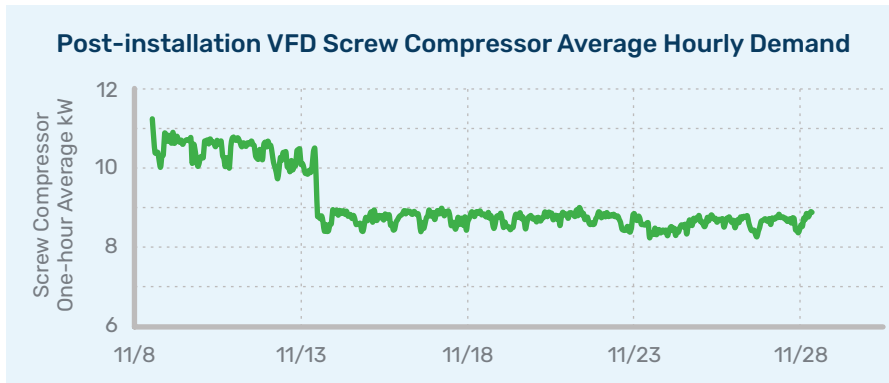
The VFD Upgrade
Exceeded Savings
Estimates by **50%+**

Since the wind tunnel was inactive, to estimate the annual energy consumption, Willdan engineers reviewed the available historical data on the performance of the centrifugal compressor with the customer, and determined that when the wind tunnel is operating, the system delivered about 1,500 SCFM. Using PG&E's compressed air savings calculator, this corresponds to an average demand for the centrifugal compressor of 257.1 kW.

Willdan engineers then developed comprehensive solutions to enhance system efficiency, including a detailed assessment of the project financial metrics. The proposed solution involved installing an additional 75 hp variable frequency drive (VFD) screw compressor for optimal efficiency and cost savings. A Quincy QOFT-75V was selected and successfully installed by Willdan. This VFD screw compressor is specifically designed to operate during wind tunnel downtime, providing compressed air for other facility needs at significantly reduced volumes.

As part of Willdan's comprehensive services, following the system installation and commission, a post measurement and verification (M&V) was conducted for two weeks to validate system operations.

The new 75 hp VFD compressor is conservatively estimated to operate continuously when the wind tunnel is not in operation.



The pre- and post-operating data confirm that this modification improved operating system efficiency and exceeded savings goals by 50%+. In addition to energy savings benefits, the new compressor is expected to enhance and prolong the life cycle of the existing equipment.

The Willdan team continues to work with Northrop Grumman on other energy efficiency projects, including LED lighting projects, at other production facilities throughout the U.S. Their local plant team has introduced Willdan to their corporate sustainability leaders and Willdan is now expanding efforts to support these other production facilities to reduce energy usage and greenhouse gas (GHG) emissions.



About Northrop Grumman Corporation

Northrop Grumman Corporation is an American multinational aerospace and defense technology company headquartered in Falls Church, Virginia. With 95,000 employees and an annual revenue of \$30B, it is one of the world's leading manufacturers of military equipment and suppliers of advanced technology.

