PRELIMINARY TECHNOLOGY ASSESSMENT – OCTOBER 2017

Drop-In Smart Switched Reluctance Motor

Technology Overview

This "smart motor" combines an innovative electric motor design with a programmable variable speed drive and a controller that provides real time monitoring and cloud-based connectivity. Unlike induction or permanent-magnet motor designs, which have barely changed in more than a century, this motor uses a switched reluctance (SR) design that purports to be simpler to manufacture and more reliable and efficient to operate.

Why is GSA Interested?

HVAC represents more than 40% of GSA's electrical energy spend, with electric motors (fans, pumps, etc.) representing more than 60% of that. With standardized sizes providing "drop in" replacement, and efficiencies up to 10% greater than current state of the art electric motors at their rated (full) speeds—and up to 30% greater at part loads/speeds—smart SR motor technology has the potential to provide GSA with significant energy cost savings. Integrated sensing and reporting, "out of the box" variable speed capability, and easy configuration promise additional O&M savings.

How Will Success Be Measured?

Two key claims will be evaluated: (1) this technology will save 10% of energy costs in a pumping application when compared to a state of the art incumbent motor with the same shaft horsepower; and (2) this technology will achieve payback in less than three years and a Savings to Investment Ratio > 1 based upon operating conditions and utility costs at the test-bed location. Additional criteria to be evaluated: O&M impact (no added work required), value of built-in reporting and monitoring; ease of installation.

Deployment Potential

This technology is currently available for motors between one-half and five horsepower in size. In 2018, motor sizes of up to 10 HP will become available; by 2019, motor sizes of up to 25 HP will become available. If this technology proves out, it promises to be a cost-effective retrofit for the majority of GSA HVAC plants, with an opportunity to save up to $8 million annually, if fully deployed.

GSA'S Proving Ground (GPG) program, in association with Oak Ridge National laboratory, is evaluating the real-world performance of Smart Switched Reluctance electric motors in a pumping application at a San Diego Test Bed location. Equipment will be provided by Software Motor Corporation and coordinated with other ongoing evaluations of this technology.