NREL documents Smart Motor System energy savings up to 71% in refrigerator condenser fans

Results from independent testing by the National Renewable Energy Laboratory (NREL) to evaluate the SMC Smart Motor System for use as a condenser fan motor for commercial refrigeration systems produced impressive results.

NREL compared energy use of induction motors to the SMC Smart Motor System in three scenarios. The side-by-side testing involved installing nine 1.5 horsepower Smart Motor Systems parallel to the same number of legacy induction motors on condenser fans serving the low and medium temperature racks. The SMC motors were more efficient than the legacy induction motors in every case. In the scenario comparing condenser fans with induction motors driven by a VFD with variable head pressure control, the SMC Smart Motor System produced 33% energy savings. The greatest energy savings were gained by implementing both variable head pressure control (VHPC) and the Smart Motor System, resulting in 71% energy savings.

Read the report at: https://www.nrel.gov/docs/fy19osti/72476.pdf

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Testing Profile

Evaluating SMC's Smart Motor System for use as a condenser fan motor for commercial refrigeration systems at a test site near Denver, CO.

Table 1. Scenarios That Were Evaluated

BASELINE CONTROL	EEM CONTROL	BASELINE MOTOR	EEM MOTOR
CFS	CFS	Induction	HRSR
VHP	VHP	Induction	HRSR
CFS	VHP	Induction	HRSR

Table 2. Annual Energy Savings Results

BASELINE ENERGY (KWH/MOTOR)	EEM ENERGY (KWH/MOTOR)	SAVINGS (KWH/MOTOR)	SAVINGS (%)
6,186	4,369	1,817	29%
2,641	1,775	866	33%
6,186	1,775	4,411	71%

Southern California Edison study of the SMC Smart Motor System shows up to 57% reduction in energy use over a 3 HP single-speed induction motor

This project measured the performance of SMC's three-horsepower (3 HP) Smart Motor System (SM-3s) in comparison to a nominal 3 HP baseline induction motor controlled by a Variable-Frequency Drive (VFD) in laboratory testing, and a nominal 3 HP baseline single-speed induction motor for field testing. The difference in performance between the two motors was used to forecast annual energy and demand savings expected to result from replacing the baseline technology with the emerging technology.

Potential annualized savings for the SM-3s was calculated for a 10-ton RTU with a centrifugal indoor fan (15" in diameter and 15" deep) that conditions a commercial space in SCE's service territory. The results illustrate the Smart Motor System could reduce annual energy usage by 50% to 57% when compared to the baseline single-speed induction motor, and 11% compared to an induction motor controlled by a VFD.

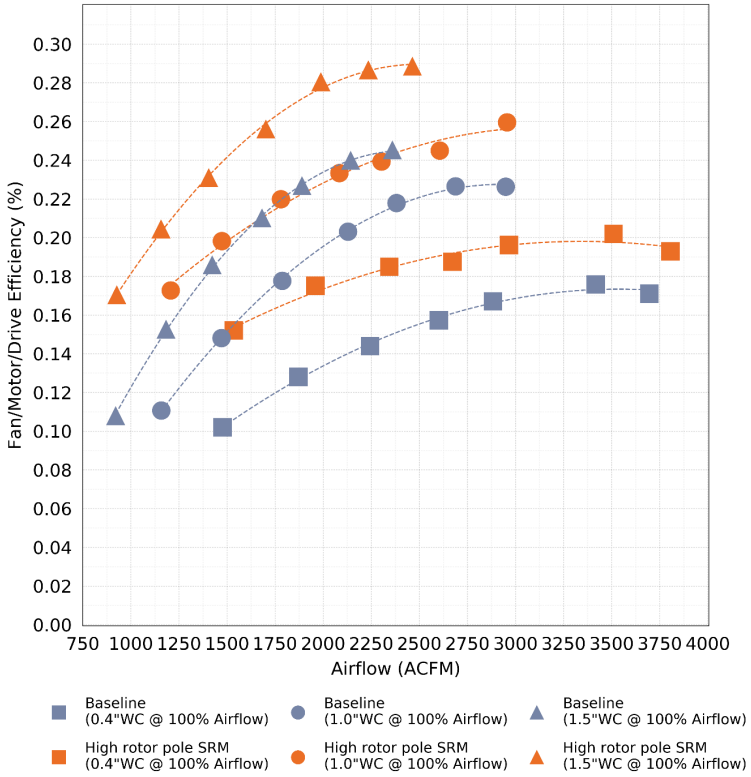
RTU lab test results show that both motors operate with a higher fan/motor/drive efficiency as the airflow rate and airflow resistance increases but the Smart Motor System had a higher fan/motor/drive efficiency across all static

pressures and airflow rates. Average efficiency increases were 26%, 23%, and 28% for the low, medium, and high-airflow resistance tests. The greatest improvement (+57%) was measured at the lowest airflow rate of the high-airflow resistance tests.

SCE Recommendations

The SMC Smart Motor System has the potential to save energy and reduce demand compared to constant-speed and induction motors with VFDs in RTU indoor fan applications, due to technological advances that allow it to operate at a higher efficiency over a range of loads and speeds.

Find the full report at https://www.etcc-ca.com/reports/software-controlled-switch-reluctance-motors



Energy Trust of Oregon Technical Analysis Study (TAS): High Efficiency Fan Motors

This analysis focuses on the refrigeration systems serving Sygma Network's Clackamas, OR site, with the purpose of evaluating The SMC Smart Motor System as an EEM for evaporator and condenser fan motors. The evaporator and condenser fan motors for a freezer condensing unit (3 fan motors and 2 condenser fan motors) were retrofitted with SMC systems. Power metering was performed on the original fan motors and high efficiency motors, respectively—evaluating the performance of the SMC EEM at constant speed identical to the baseline case. Results show a 31.3% reduction in evaporation fan energy use and a 24.9% reduction in condenser fan energy use.

This TAS analyzed energy savings of the fan motors operating at constant speed, but as SMC's software driven motors are capable of variable speed operation, recommends variable speed to achieve additional energy savings.

For a copy of this report, please contact us at sales@softwaremotor.com.

Indemnity

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The Silicon Valley based Software Motor Company is setting a new standard of efficiency, reliability, and intelligence with the SMC Smart Motor System. SMC combines modern computing and software control with the proven reliability of switched reluctance motor technology to achieve an unprecedented optimal efficiency. The patented SMC Smart Motor System only uses energy when it is needed, thereby significantly reducing space conditioning and refrigeration energy costs. A fully programmable IoT controls package facilitates maintenance savings and easy integration with existing building systems.

POWER IS VALUABLE. USE IT INTELLIGENTLY.