

# Appliances start saving energy as population grows

By Paul Rako

The population of earth uses 13.5 TW of energy per year. But if the entire population of the world used energy at the same rate as US citizens, we would need 76 TW (*Reference 1*). And that's just the beginning. In 2050, when the population reaches a projected 9 billion, we would need 102 TW. There are alternatives, of course. If we turned all the food in the world to biofuel, we could get 7 to 10 TW of energy, but we would have nothing to eat. Nuclear power could supply 8 TW if we build 8000 new reactors. And wind power would generate 2 TW if we paved the earth with windmills everywhere the wind blows at 11.5 miles per hour 33 feet off the ground.

Although we no doubt will need additional energy production, the future points squarely to energy conservation. Converting appliance motors from hard-wired to ac-inverter-driven can save 20% of the energy used. Converting to a brushless-dc motor and drive can save another 20%.

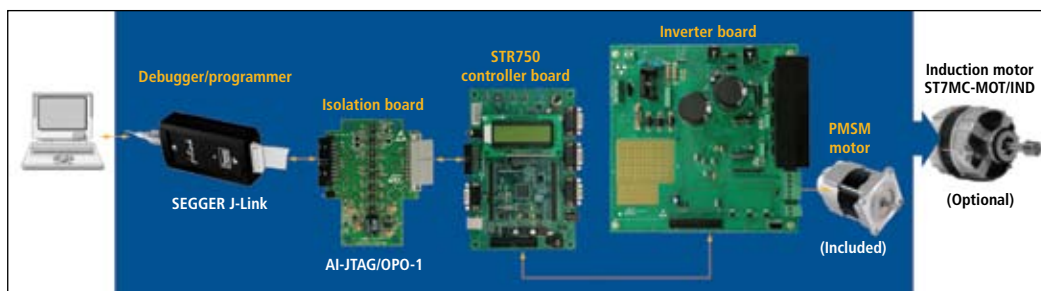
The remarkable thing about converting to a more sophisticated motor system is that manufacturers can do it at no cost penalty to the consumer. Air conditioners will have variable-speed motors so they can save as much electricity in the first year as any incremental cost increase. In washing machines eliminating the belt drive and transmission more than pays for the cost of the electronic drive. In addition to lower price, the machine will have software-defined agitation, use less water, and operate far more quietly than currently available machines.

"We can save more than 60% of the energy consumed by washing clothes," says Alex Lidow, chief executive officer of International Rectifier, noting that electronically commutated brushless-dc motors can also save 60% of the energy that refrigerators and air conditioners consume (*Reference 2*). Converting to efficient motor controls in all appliances would save 20% of the world's energy use, or about \$14.5 billion.

Thomas Hopkins, director of applications for STMicroelectronics, says "ST has a broad product line that covers the digital control in parts like the ST7FMC and ARM-based STR750 to the L6385 and L6386 half-bridge

gate-driver ICs." He adds that ST is offering a complete motion-control demo board that even includes the motor (**Figure 1**).

Fairchild Semiconductor, meanwhile, is leveraging its leadership in power FETs and controllers to address this market. Taehoon Kim, PhD, the vice president overseeing Fairchild's high-voltage segment, says that integrating IG-



**Figure 1** STMicrosystems offers the STR750 motor-control-starter kit (STR750-MCKIT), which includes even the motor.

BTs (insulated-gate bipolar transistors) into smart power modules along with the circuits to drive the transistors creates a part with thermal and performance advantages.

International Rectifier is taking system integration one step further. The company's iMotion integrated design platform combines the microcontroller with a specialized motion-control digital engine. This digital section is far more application-specific than a general-purpose DSP. The platform also integrates the analog-drive circuits. In addition, the platform features modules for PFC front ends as well as the large IGBT power stages.

Energy conservation will be critical to the prosperity and comfort for the entire world. As Mark Thompson, president and chief executive officer of Fairchild, says: "We are excited by this as a business opportunity, but we feel a great obligation to whatever we can to make this planet a better place to live." In the future, it may take less energy to do just that.

## References

1. Bailey, Ron, "Brother, Can You Spare 22 Terawatts?" *Reason Magazine*, Nov 24, 2006, [www.reason.com/news/show/116887.html](http://www.reason.com/news/show/116887.html).
2. Lidow, Alex, "Variable Speed Motion: A Key A To Energy-Savings," [www.irf.com/pressroom/presentations/alidow050411](http://www.irf.com/pressroom/presentations/alidow050411).

Paul Rako is a technical editor at EDN.