

## **Technology Forecast**

### ***An Actuator for More Efficient Combustion***

Thanks to a device called a magnetic actuator, engine intake and exhaust valves may soon be operated electronically. Today's mechanical camshafts or push rods will no longer be needed.

How does it work? The actuator sits on top of each valve. It moves back and forth when electricity is sent to it by a computer. When the actuator is turned on, it pulls the valve open. When the actuator is turned off, a spring attached to the valve pushes it closed. This design will let automakers build engines with lower emissions and higher fuel economy. Performance will also be improved.

Electronic valves make these benefits possible, thanks to variable valve timing. By being able to control when a valve opens and closes, the engine can operate more efficiently. The computer orders these changes based on how the vehicle is being driven.

New ways to get more oxygen into the engine are also being studied. Special filters are being developed to collect oxygen from the air coming into the engine. The oxygen will then be sent to the combustion chamber. What are the benefits of adding oxygen to the engine? Extra oxygen will help fuel burn cleaner and more efficiently.

#### **Action Activity**

Valve actuators are being developed as part of “camless” engines. Research and report on the relationship between actuators and combustion efficiency. How do the size and number of valves affect the combustion efficiency?