The rebound effect involves increases in energy use that are paradoxically caused by increased energy efficiency. This effect actually takes three forms.

First, when energy use is more efficient, consumers may actually increase some of their energy-using activities. For instance, if lighting is very energy efficient, consumers may be less careful about turning off lights in vacant rooms. Or they may simply use more lights in order to have a brighter room.

Second, if they use less power, consumers will have lower electrical bills. This gives them more money to spend on other things, and many of those other things may require energy to produce or use.

Third, if less energy is used, demand for fuel is lower, which decreases the price of fuel. This may cause consumption elsewhere in the world to increase.

From an environmental point of view, the rebound effect is a negative. Efficiency causes direct benefits in terms of lower emissions, but some of the benefits are offset by increased energy use and emissions elsewhere. At the same time, however, the rebound effect has economic benefits because consumers are able to buy more goods and services with the money they save from less energy usage or from lower fuel prices.

Because of the rebound effect, it is even theoretically possible that increased energy efficiency could actually lead to greater total consumption of energy. This is most likely to be true with regard to industrial uses of energy where increased energy efficiency might cause higher productivity and economic growth, that would in turn increase the use of energy. This phenomenon is called “backlash.” It is an extreme form of rebound, as if a dropped ball bounced higher than the original height.

How serious is the rebound effect? Stay tuned for a discussion of the extent of the rebound effect and how methods to control it.