Rebound: background information

The myth of absolute decoupling

At the heart of the idea of decoupling lies the hope that it is possible to reduce resource consumption by increasing efficiency, while still continuing to enjoy economic growth.

However, in recent years it has become apparent that greater efficiency does not result in the anticipated resource savings. Absolute decoupling in particular has yet to be observed anywhere in the world. A key role in this regard is played by rebound effects.

Direct and indirect rebound

Rebound refers to an increase in resource consumption caused – or at least enabled – by increased efficiency. As a result of the rebound effect, a significant portion of the efficiency gains are simply squandered. This diminishes the ecological benefits of efficiency in the overall balance.

A distinction can be drawn between direct and indirect rebound effects:

Direct rebound refers to an increase in consumption directly involving the product responsible for the increase in efficiency: a direct rebound effect can be observed, for instance, if I buy a "more economical" car and then drive it more often than my previous one. Replacing conventional light bulbs with energy-saving ones and then leaving the lights on for longer is another example of direct rebound.

Increased efficiency, reflected in lower costs, gives the consumer surplus purchasing power which can be spent on all kinds of products or services. This is known as indirect rebound. For example, insulating a house, thereby reducing heating costs, only to spend the savings on a holiday in the Seychelles, is a classic case of indirect rebound.

Backfire

Rebound can counteract 5, 50 or 95% of the efficiency gains. It can even exceed 100% if the efficiency gains lead to even greater consumption of resources than before. This effect is known as backfire. A classic example of backfire is provided by the example of lighting: from 1700 to 2000, lighting efficiency measured as lumen-hours per kWh rose by a factor of around 1,000, while production and consumption of lumen-hours rose by a factor of 36,000. In iron production, consumption rose around 3.7 times faster than the savings resulting from greater energy efficiency, and in aluminium production around 11.4 times faster.

Efficiency and growth

Examination of rebound effects shows that decoupling is more a case of wishful thinking than reality.

Nonetheless, research generally concludes that relative decoupling is being achieved in "developed" countries, and probably on a global scale. However, there is no universal agreement in this regard. What is more, relative decoupling does not reduce the pressure on the environmental. This is because efficiency is itself a driver of growth, intensifying resource consumption. Efficiency gains in technology enable us to produce more goods more cheaply, thereby using up more resources. Accordingly, relative decoupling is by no means incompatible with an increase in resource consumption.

Efficiency is an important condition for economic growth. However, it is not a sufficient condition, because if our needs were completely satisfied, we would not feel the need to consume more illumination, more mobility, more space or more heating. For truly sustainable growth, efficiency must be replaced by sufficiency.

Source:
Madlener, Reinhard, Alcott, Blake: Herausforderungen für eine technisch-ökonomische Entkoppelung von Natur-Verbrauch und Wirtschaftswachstum unter besonderer Berücksichtigung der Systematisierung von Rebound-Effekten und Problemverschiebungen, commissioned by the Enquete-Kommission (Parliamentary Commission of Enquiry) „Wachstum, Wohlstand, Lebensqualität" (Growth, Prosperity, Quality of Life) of the German Bundestag, 2011.