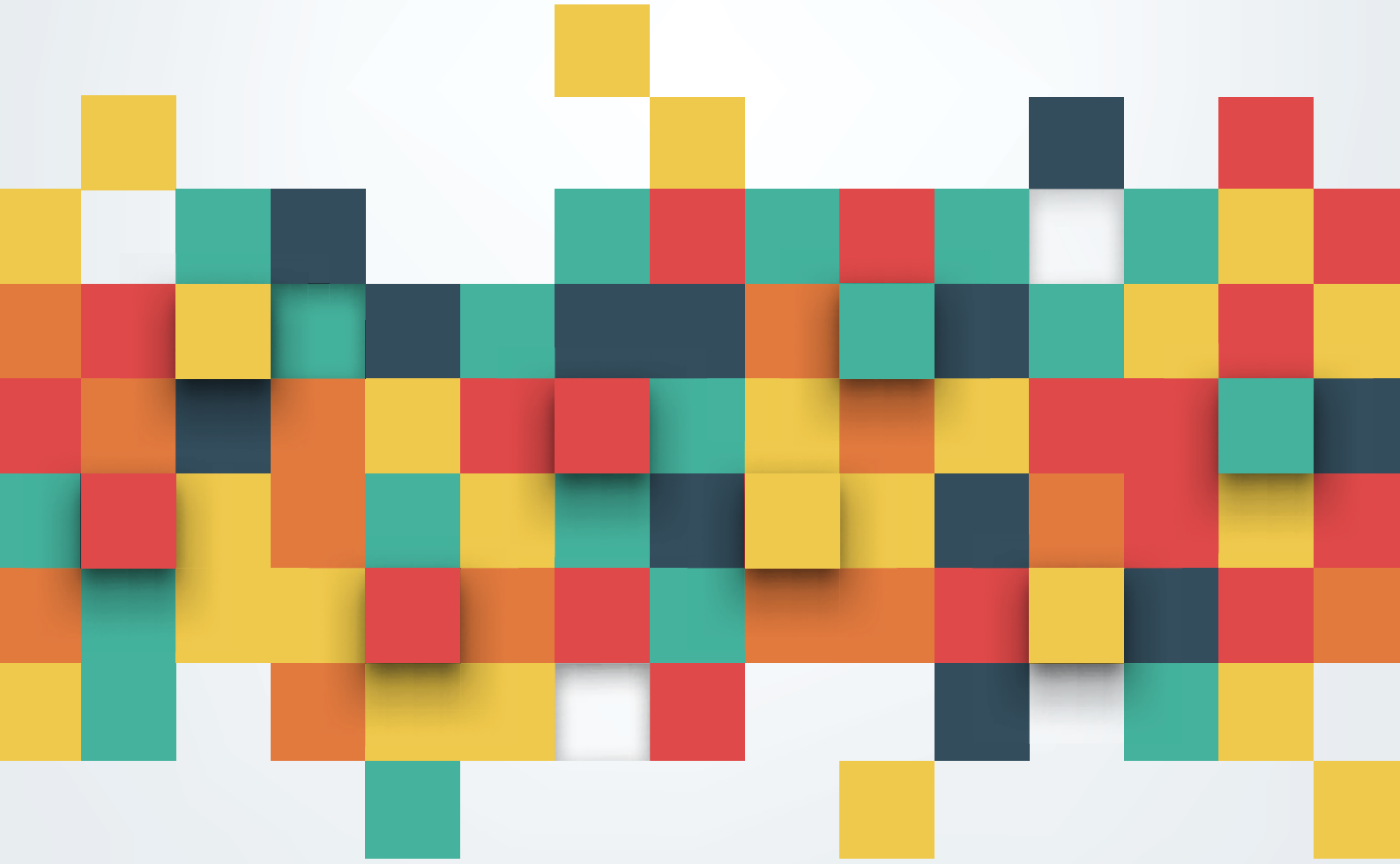
GIDRA Global Intelligence for Development, Research & Analysis

ISSUE #1, January 2016

DID YOU KNOW?

ENERGY EFFICIENCY AND THE REBOUND EFFECT



COLIBRILAW

ENERGY EFFICIENCY AND THE REBOUND EFFECT

The rapid depletion of energy sources as a result of global population growth and increased energy consumption poses a serious threat to all economies. The heavy reliance of key industries on non-renewable energy sources is likely to lead to massive reductions in the supply of fossil fuels, as well as increased carbon dioxide emissions. Indeed, the continuing increase in carbon dioxide emissions is threatening to leave nearly 200 million people without water and decrease crop fields by 30% in Central and South Asia, resulting in global food and drinking water shortages[1]. Therefore, global warming is a huge concern and the urgent need for alternative sources of energy has featured heavily on the global development agenda over recent years.

In short, achieving energy efficiency implies being able to produce the same amounts of goods and services as before while using less energy resources. Governments around the world are thinking of ways to create incentives for businesses to achieve energy efficiency. However, their efforts are jeopardised by the so-called "rebound effect". This basically means that energy efficiency will naturally lower the overall unit prices for energy services by reducing demand. As a result, the consumption of energy may increase, partially offsetting the positive impact of the strides made in the quest for energy efficiency in the first place.

The existence of this phenomenon has been documented extensively in research literature[2]. However, its magnitude varies across economies. Numerous studies acknowledge that in developed countries, direct rebound effect is high in the areas of transportation and home heating, but lower for other consumer energy services[3]. Indirect effects are associated with changes in consumption patterns for non-energy goods and services as a result of the income effect. Excess income that appears due to a reduction in the share of energy in total expenditure stimulates the consumption of other, non-energy products. Therefore, when energy efficiency improvements are made, industries experience higher demand for their products. However, the rising consumption of non-energy goods and services requires more energy in order to produce them. Furthermore, cheaper energy shifts the production towards energy-intensive goods, as the industries producing such goods experience a significant increase in efficiency. In some instances, the income effect may result in lower energy consumption, especially when energy-intensive goods are expensive or less popular[4].

A combination of direct and indirect economy-wide effects occurs due to changes in consumption, production and distribution patterns. For example, decreasing costs of energy efficiency products may lead to the development of new applications, as in the case of the steam engine and LED lighting[5]. Technology-induced decreases in the price of energy cause the prices of commodities to alter to levels that are consistent with each other. Demand and supply of resources and commodities will, therefore, adjust to these price changes. Consequently,

aggregate consumption, investment and employment will increase, boosting economic growth, which in turn increases total energy consumption.

Many international initiatives to tackle this problem are in the pipeline. Consider, for example, the recent COP 21 meeting in Paris, where the 195 participating countries agreed to reduce emissions. However, because of the strong economic forces behind the rebound effect, creating incentives to curb energy consumption and prevent the rebound effect is an extremely challenging task for any regulator.

The development of powerful enforcement mechanisms to ensure that emissions commitments and targets are properly met is going to dominate the agenda in the coming years. One promising fact is that corporate social responsibility (CSR) seems to have real financial value for businesses. Recent studies have found that stock markets respond positively to the implementation of CSR initiatives by public companies. Therefore, CSR seems to be a good way to incentivise corporations to follow the energy efficiency route .

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[1] Climate Change (2007)

[2] See Jevons (1865), Khazzoom (1980), Brookes (1990), and Saunders (1992)

[3] (UKERC, 2007). For instance, sector specific direct rebound effects of 10 percent were found in lighting systems, zero percent for water heating and cooling systems and less than 30 percent in heating systems.

[4] Binswager (2001)

[5] Bessho and Shimizu (2012)

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