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Multiple Impacts Calculation Tool

Empirical basis of Economic Impacts Energy Price Effect

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Also, a shift to district heating or changes in the industrial heat demand will result in overall system-wide energy savings but will lead to an increase in steam/heat demand, so the effect on energy carrier prices is not evident.

Further, the changes in the prices will require also the adaptation of the power system to meet the "new" demand after the application of the energy efficiency measures and it is difficult to isolate what part of the change in prices is due to the change in energy demand compared to what may be due to other policies (e.g. policies increasing RES shares in power generation).

Methodological challenges

The key challenge in linking energy efficiency and energy prices is the multiple effects that energy efficiency may have on energy demand and therefore indirectly on the market for energy carriers.

The main aim of energy efficiency measures is to induce energy savings: energy savings can either reduce demand for the energy carrier which was initially used (less oil, gas, electricity) or induce fuel switching (e.g. a shift to an electric heat pump). Energy efficiency can therefore lead to a reduction in demand for energy carriers, which relieves the stress on the market and therefore reduces prices. On the other hand, if energy efficiency leads to a fuel shift – as is expected in the context of the energy transition – it may lead to higher demand for specific energy carriers e.g., electricity or district heating. In this case, the effect on prices could potentially have both upward and downward trend.

The quantification of such an indicator would require information about scenarios with and without the efficiency measures, the relative changes in prices of end user prices.

Higher demand for an energy carrier would in general lead to high prices. However, in a number of cases prices might also decrease. In the power market, and the load curve may be smoothed if demand takes place off-peak (e.g., with smart charging for electric vehicles), leading to improved system utilization and thus lower average prices.

Data requirements

The quantification of such an indicator would require information about scenarios with and without the efficiency measures, the relative changes in prices of end user prices.

Impact factor/functional relationship

To measure an effect of change in electricity (heat) price due to a change in quantity of electricity (heat) consumed, we estimate the price elasticity μ on EU, national and sectoral levels:

$$\frac{P_i^1 - P_i^0}{P_i^0} = \mu_i \frac{Q_i^1 - Q_i^0}{Q_i^0}$$

where Q_i^0 and Q_i^1 are the quantities for the energy consumed in baseline and in scenario with EE intervention in sector i. P_i^0 and P_i^1 are electricity and heat prices in the baseline and EE intervention scenario for the sector i .[2]

[2] Reuter, M., Patel, M. K., Eichhammer, W., Lapillonne, B., & Pollier, K. (2020). A comprehensive indicator set for measuring multiple benefits of energy efficiency. Energy policy, 139, 111284.

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