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## Optimizing the transformation of energy in Germany

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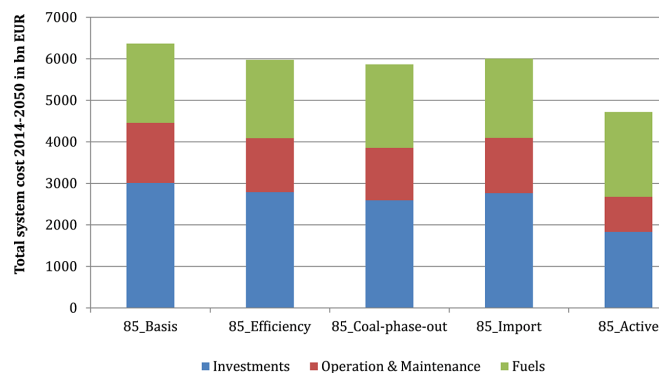
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## Optimizing the transformation of energy in Germany

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Using a quantitative model analysis, a new article looks at three core elements affecting a nation's energy transformation from fossil fuels to renewable energy.



The Paris Agreement brings nations together to combat climate change and intensify actions needed for a sustainable, low-carbon future. To make this goal more challenging than it already is, recent studies have shown that replacing fossil fuels with renewable energy technologies alone may not be enough to reach these climate targets.

Kost et al. looks at the impact of three additional elements that must be considered during a nation's energy transformation: efficiency of renewable energy technologies, phasing out coal-fired power plants, and import of electricity across borders. The authors performed a quantitative model analysis in the case of Germany to determine how important these elements are for the success of a nation's transformation towards a decarbonized energy system.

The analysis was carried out using the model REMod-D, a cost-based structural optimization of the transformation of the German energy supply system. The model calculates technically possible development paths of the energy system and optimizes them based on cost minimization.

The authors compared five different scenarios: one reference scenario based on data from prior years as well as future projections, three scenarios each focusing on a single element (efficiency, coal phase-out, electricity imports), and one that combines all three. The findings indicate that these key elements contribute positively to the energy transformation. If employed, each would lead to a reduction in terms of development efforts, such as deployment of renewable energy and electrification of vehicles.

The scenario combining all three elements showed that the positive effect of each element is complementary to each other, and each element can reduce the total energy system cost roughly by an additional 16 billion Euro per year.

**Source:** "Coal phase out, energy efficiency, and electricity imports: Key elements to realize the energy transformation," by Christoph Kost, Andreas Palzer, Philip Sterchele, Cyril Stephanos, Niklas Hartmann, and Hans-Martin Henning, *Applied Physics Reviews* (2019). The article can be accessed at <https://doi.org/10.1063/1.5055269>.

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