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Climate protection as a business case

Compile an emissions balance sheet, evaluate climate-protection measures and implement the most efficient of these first: Researchers from three Fraunhofer institutes have developed a method with which companies from all sectors are able, based on scenarios, to evaluate their climate-protection measures in accordance with ecological and economic criteria.

Germany aims to be climate-neutral by 2045, and the European Union by 2050. For many companies, this means that they are obliged to create a transformation plan stating how they intend to reduce their greenhouse-gas emissions. This presents companies with a number of immediate challenges: First of all, they need to ascertain precisely what emissions are being generated along the entire value chain, as realistic targets and suitable climate-protection measures can only be defined once the status quo has been determined.

In order to achieve this, the individual climate-protection measures must be evaluated and prioritized. "The most efficient and economical measures should be implemented first," advises Michael Rentschler from the Sustainability Modeling and Analytics research team at the Fraunhofer Institute for Manufacturing Engineering and Automation IPA. Together with his colleagues from the Fraunhofer Institute for Production Systems and Design Technology IPK and the Fraunhofer Institute for Surface Engineering and Thin Films IST, he has developed a dynamic and scenario-based method with which companies can evaluate their climate-protection measures in accordance with ecological and economic criteria in order to determine the most efficient options.

A detailed emissions balance sheet is a prerequisite

The prerequisite for this is a detailed and standard-compliant emissions balance sheet. However, due to the fact that incomplete datasets are a reality in many companies and important information is sometimes completely missing, the researchers must first complete the database. To accomplish this, they evaluate existing production data, public statistics and the relevant specialist literature. "For example, a company knows which products were sold in which quantities on which continent. With a little luck, statistics are available that can be used to estimate how many of these products are disposed of at the end of their useful life and in what way. Using this information, we can then draw conclusions regarding the emissions generated in the downstream value chain," explains Felix Budde from the Fraunhofer IPK. The situation is similar with upstream emissions, for example through the purchase of raw materials.

Once all the relevant information is available, the search for suitable climate-protection measures begins. "Anyone who simply bans the old combustion engines from their

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fleet and buys electric vehicles instead is spending a lot of money but may potentially save barely any emissions," warns Professor Stephan Krinke, Head of the Sustainability Management and Life Cycle Engineering department at the Fraunhofer IST. "The decisive factor is the emission-avoidance costs, i.e. the money that has to be spent in order to save one ton of greenhouse gases. It is often possible to achieve a significant reduction at a manageable cost by replacing particularly energy-intensive raw materials, making one's own products more energy-efficient, eliminating superfluous components or adopting non-destructive testing methods in quality assurance. It is even possible to save up to 25 percent of emissions without incurring any additional costs."

The decision for or against climate-protection measures also depends, however, on the political and social framework conditions. The model incorporates three scenarios, which are comprised of generally applicable and company-specific parameters:

1. Progressive scenario: Social and political framework conditions are conducive to ambitious climate protection. The CO₂ prices and the availability of emission-reduced raw materials and technologies are high, the costs for renewable energies are low and consumers demonstrate a considerable willingness to pay for decarbonized products. Under such conditions, many climate-protection measures would pay for themselves within a short period of time. A large proportion of emissions could be reduced through such measures.

2. Conservative scenario: The global framework conditions for climate protection deteriorate: falling CO₂ prices, cheap fossil fuels and weak incentives for customers to spend more money on emission-reduced products. In addition, the supply of alternative technologies, fuels and materials is low. In such a world, only very few climate-protection measures would make economic sense. The overall reduction potential would remain low.

3. Business as usual: Current developments and trends are unabated or remain at their current level. This implies a moderate CO₂ price, with costs for renewable energies and fossil fuels remaining stable, and an average willingness to pay for decarbonized products.

Methodology is suitable for companies from all sectors

Evaluate climate-protection measures holistically and then implement the most economical options first: The methodology developed by the Fraunhofer researchers is fundamentally suitable for all sectors. The prerequisites are a solid data basis and a comprehensive analysis. The scientists would be delighted to help companies in this regard.

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Solar panels on the parking garage of Fraunhofer-Gesellschaft in Stuttgart.

Source: Fraunhofer IPA/Photo: Rainer Bez

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