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'The effects balance each other out'

It's entirely possible to protect the environment and create employment opportunities. A scenario for the German economy

Read this interview in German.

You have examined the impact of the energy system transformation on employment. What are the results of your research?

M. Hoch: The macroeconomic effects of the transformation of the energy system are positive. However, there are differences between the sectors. Some sectors have lost out – for example, the mining and energy supply sector. Positive employment effects, on the other hand, can be found in the construction and manufacturing industries.

What would the employment trend in Germany look like without the energy system transformation?

M. Hoch: We have examined the years between 2003 and 2018, during which time the transformation of the energy system employed about 70,000 more people than would have been the case in a counterfactual scenario without this transformation.

You mentioned that the development of employment depends on the sector. That also brings us to the regions. What impact do climate protection measures have on employment development in regions that have hitherto been heavily dependent on conventional energy sources?

M. Hoch: The future employment effects of the scenario examined are in total positive in each federal state. Although employment is falling disproportionately in some regions, for example in (lignite) mining, there are also positive developments there, for example in the construction industry. One example is North Rhine-Westphalia, the most energy-intensive federal state. There may well be job losses in individual sectors. But it's also the most populous federal state – accordingly, there are many buildings that have to be renovated. So the effects balance each other out. In spite of all that, problems will

arise in some sectors.

You warn that jobs in conventional energy generation and some energy-intensive sectors will be affected by the climate targets in the long term. What forward-looking measures could be taken now to enable employees in these sectors to move to another field of work?

M. Hoch: There are various measures that can help: On the one hand, individual support or protection for certain groups of employees and, on the other hand, infrastructural and economic policy measures for the region. With regard to individual support, it depends on the age and qualifications of the employees. For older workers, who will retire in the foreseeable future anyway, early retirement programmes or financial assistance can be considered. If young workers do not have the necessary qualifications for other sectors, targeted training programmes can help. In terms of structural policy, investments that increase the attractiveness of business locations in certain regions are important, as well as the promotion of sectors that will grow more in this region in the future.

Which measures must be implemented so that Germany can actually reduce its CO2 emissions to a minimum by 2050?

A. Kirchner: On the one hand, we have to convert the entire electricity supply system to renewable electricity. In other words, we will be phasing out coal as soon as possible and, in the long run, gas as well. We would also synthetically produce the gas we still need to secure the electricity system, with the help of renewable electricity. The networks must also be expanded accordingly and made fit for such a completely transformed electricity system, in which the relationship between supply and demand varies greatly both regionally and over time.

It's very important that by 2050 all buildings are renovated to a very high energy standard – this is where the construction industry comes into play again. To do this, we would have to almost double the renovation rate. Moreover, in the long term, the heating of buildings needs to be generated from renewable sources. We would then essentially only have heat pumps and local heating systems, which are themselves heated and fed with renewable energies.

Transport must be electrified to a large extent. In the long term, four-fifths of passenger cars will be electrified. In the case of trucks, it's most cost-effective to electrify the large transit routes with overhead lines and to use appropriate hybrid trucks. The remaining routes have to be covered by the trucks with synthetic fuels. However, these would then have to be imported from countries where they can be

produced cheaply.

That would not be possible in Germany?

A. Kirchner: Yes, the production of relatively small quantities of hydrogen would. But the production of so-called power-to-liquid materials on a large scale is cheaper in regions with greater potential and, above all, higher full load hours in the solar and wind energy sector. These would be, for example, countries in the desert belt of the world.

This way, employment and development opportunities could be created there?

A. Kirchner: Exactly! It's of course very important that these countries don't only produce for Germany or for the export of these energy sources, but also have a development perspective for themselves, for example in the expansion of the electricity supply. In that case, there are very great opportunities for these countries.

What about the agricultural sector?

A. Kirchner: In agriculture, we essentially have three levers: one is very efficient fertiliser management. If we don't find any other compensation mechanisms, however, emissions from agriculture will have to fall even further, to about 50 per cent of today's level. Here we see above all a reduction in the ruminant population, which would mean less export and possibly less beef consumption. There are also certain natural feed additives from algae that can reduce methane emissions from digestive processes. These reduce the methane emissions from ruminants. That would probably be controversial, but it works.

What kind of changes are needed in the industrial sector?

A. Kirchner: Basically it's necessary to exploit all potential for technical efficiency – for example in engines, pumps, compressed air generation, waste heat utilisation, cooling and so on. In the long term, biomass will increasingly be used as an energy source – solid biomass for low-temperature process heat and biogas for high-temperature process heat and, as far as possible, already renewable carbon as input, for example in the chemical industry. In pig iron production, waste incineration and cement production, CO2 capture and storage (CCS) will have to be used to capture carbon dioxide and either use it or store it underground.

Which is controversial.

A. Kirchner: It's completely controversial. But if we really want to decarbonise the economy almost completely, it's extremely difficult without CCS. There are other possibilities here and there, at least with steel; you can work with hydrogen using the so-called direct reduction process. However, it's not yet clear whether this can be achieved at competitive costs, so the CCS solution is likely to be the more cost-effective solution.

This would then at least prevent jobs from moving abroad?

A. Kirchner: Exactly. For this study, we calculated and evaluated a rather extreme scenario. We aimed at reducing greenhouse gas emissions by 95 per cent by 2050 compared to 1990. Such a scenario is only conceivable with international integration and internationally binding multilateral treaties. Global CO2 taxes or global emissions trading would be a prerequisite. Such a system is only possible if we have new long-term trading relationships, new certificate trading relationships and good international technology exchange and development. We therefore need an international division of labour, otherwise we will not be able to achieve this at the necessary speed. If the other countries do not follow suit, domestic industry would have to be better protected – if that were possible at all. That would put an additional burden on the taxpayer.

Provided that all the above measures are implemented, what is the forecast for employment growth?

M. Hoch: This is not a forecast, but a possible scenario. All the measures mentioned require investments with a certain volume, for example investments in building stock, energy refurbishment, efficiency technologies and renewable power generation. This in turn creates jobs, especially in the areas of energy supply, construction, plant construction and materials. But, of course, these are measures that need to be implemented politically. Whether this will really happen in the end is a different matter. These measures have a rather neutral effect on the development of employment in the economy as a whole. Therefore, from our point of view, the discussion that's partially taking place as to whether people in Germany would rather have climate protection or jobs doesn't really bring us closer to our goal.

This interview was conducted by Claudia Detsch.



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