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The Great Transformation to a global low carbon society

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Since Fukushima the energy policy change in Germany has been accelerating at breathtaking speed. A cross-party agreement has emerged on the goal of launching the switch to renewable energies as quickly as possible. Germany could be the world's first major industrialised country to make a serious effort to develop a climate-compatible energy system. By 2050 energy supplies could be emission-free. This change would be no mean feat. It might be as important for the continued development of the global economy as was once the spread of the steam engine, which helped the industrial revolution to its breakthrough, or the introduction of the assembly line by car-maker Henry Ford in the USA almost exactly a hundred years ago, heralding the age of mass production. The change to renewable energies will, after all, mark the beginning of a new industrial system, one in which the main emphasis must be on a radical increase in energy and resource efficiency.

Electric vehicles and new mobility systems will change urban areas. Buildings that today account for a large proportion of energy demand will be plus-energy houses and so components of a decentralised power station complex in the future. New, intelligent systems and control technologies will link sources of renewable energies throughout Europe and, if possible, North Africa and final consumers. This major change can succeed only on the basis of technological and social innovation, creativity and vision: it is for engineers, architects, urban planners, local authorities, boards of companies, research institutions and consumers to take up the challenge. There is currently only one other place in the world investing in renewable energy solutions on a similarly significant scale: China.

On 7 April 2011 the German Advisory Council on Global Change (WBGU) submitted to German Ministers Schavan and Röttgen a report setting out how the "Great transformation to the climate-compatible global economy" can be accom-

plished. Germany could play an important part in this change. The WBGU describes the abandonment of the fossil and nuclear industrial system as being necessary not only economically but also from a normative perspective. As the carbon-based model of the global economy is threatening the stability of the climate system and thus the very foundations of future human life, the transformation to climate compatibility is as morally right as was the abolition of slavery and the proscription of child labour. The switch to a non-fossil-based and resource-efficient global economy is economically necessary because perpetuating the established pattern of growth in a world with a population soon to increase to 9 billion, rapid urbanisation and rising prosperity in developing and emerging countries will undoubtedly take the Earth system to the edge during this century. The "business as usual" option is a rejection of reality which will end in a blind alley in the foreseeable future. The argument that the established energy system is cheap, while the change to renewables is expensive, is simply absurd, when it is remembered that the fossil growth path leads straight to climate crisis – with irreversible damage and incalculable consequential costs for future generations.

It is a paradox that knowledge of this complex of problems is largely accepted, but that the response has so far been too slow – for the climate crises will not occur until some time in the future, which means that the damage is to be left to our children and grandchildren to deal with. It is a crying shame that our societies still seem capable of changing course only when manifest crises force them to do so, the collapse of the financial markets and the Fukushima nuclear disaster being the most recent examples.

If the Great transformation is to succeed, the energy system of the global economy must be turned on its head. Currently, 80 per cent of energy supplies are based on fossil fuels, 20 per cent on non-fossil sources. By 2050 this ratio must be

reversed if hazardous climate change is to be avoided. The global economy therefore needs a new basis for doing business. The WBGU study shows that the transformation is technologically possible, that it can be financed and that the tool-boxes stand ready for the work to be done. To reduce the cost of the changeover, global energy demand should be stabilised at a level of about 400-500 EJ (exajoules), only slightly above the present level of 350 EJ. Energy efficiency strategies and responsible life-styles are therefore just as important as the development of renewable energy sources. If the US\$ 350-800 billion of global subsidies on fossil energy sources were dismantled or even partly diverted to climate-compatible infrastructure, obstacles to the transformation could be removed.

For Germany the WBGU proposes a climate protection legislation and the creation of a "Chamber of the Future" as a complement to the upper and lower chambers of the German parliament, to bring home to politicians what the long-term effects of their actions will be, rather than leaving them to find out only when the crises occur. Particular attention must be paid to the global urbanisation thrust. In Asia alone the urban population will double in size to between 1.5 and 3 billion by 2030. If the new cities are built to the

energy-intensive standards of established urban areas, dangerous climate change is almost inevitable. In a very short period, then, plans for virtually emission-free cities must be drawn up and put into effect. All in all, the tasks the politicians face in the fields of energy, technology, economics, development and foreign affairs are nothing short of Herculean.

In 1944 the Hungarian economic theorist Karl Polanyi published a book on the "Great transformation" to the industrial era, in which he showed that the newly emerging society would not be stabilised and accepted until the uncontrolled dynamics of the market had been embedded in the rule of law, democracy and, later, welfare arrangements. During the transformation to the climate-compatible global economy humankind must now learn to safeguard prosperity, democracy and security within the shrinking boundaries of the Earth and climate systems. This will require not only technologies, but also institutional guardrails, social innovations, societal participation, vision, a high degree of international cooperation and, not least, political leadership. What is needed for the Great transformation to a global low carbon society is a personality and change maker like Nelson Mandela.



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