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The Bioeconomy: biotechnology has become an economic policy issue

The German cabinet has implemented a “National Research Strategy Bioeconomy 2030 – our route to a bio-based economy”. What makes this remarkable is that, on a political level, biotechnology had hitherto been largely confined to risk-reward debates. With the exception of a few commendable isolated initiatives, mainly on the part of the BMBF (Federal Ministry of Education and Research), biotechnology has rarely been an economic policy issue. Now it is an integral part of an inter-ministerial government strategy, and additionally it has been incorporated into the bioeconomy initiatives of the European Commission. In February this year, in the paper “Innovating for Sustainable Growth: A Bioeconomy for Europe” the Commission topped its previous efforts by issuing an unambiguous declaration: biological innovations are the core of European economic strategy. This signifies that biotechnology has at last taken its rightful place: in the economic context of a large-scale industrial transformation.

It is to the credit of the federal government that it has secured a position at the very forefront – or, as Commission insiders comment appreciatively, it was “first out of the blocks”. This development started with the “Cologne Paper” published during the German Presidency of the European Council in 2007, followed up by the institution of a Bioeconomy Council in 2009, the inclusion of the bioeconomy in its coalition agreement and finally the “National Research Strategy Bioeconomy 2030”.

The National Research Strategy Bioeconomy of the German government follows the recommendations of the Bioeconomy Council, which has published an expert opinion entitled “Innovation Bioeconomy”, four sector-specific reports, a prioritised list of research recommendations and recently a controversially discussed study “Recommendations for Bioenergy”.

Central to the analyses of the Bioeconomy Council and also to the initiatives of the German government and the EU Commission, is the concept of the bioeconomy as a system, rather than as a specific technology or branch. The Bioeconomy Council's fourth recommendation "Ensure appropriate integration of the bioeconomic approach in the system" touches on the central challenge to industry: not only will the conventional boundaries of technological disciplines be transgressed (pathway engineering, synthetic biology, bioinformatics), but also new value chains will develop.

Accordingly, besides petrochemical corporate groups, now agricultural processors are entering the ring. The US\$ 6.6 billion takeover of Danisco, originally the "Königlich dänische Zuckerfabrik", by the US chemicals heavyweight DuPont is a striking example of this transformation: with Danisco, DuPont has gained access to the number two of the enzyme market Genencor (which Danisco had bought two years previously) and, most notably, to the requisite pathway engineering expertise for the conversion of renewable resources into industrial products, such as bioplastics.

As an economic policy measure, the integration of biotechnology into the bioeconomy makes good sense. The German government is investing € 2.4 billion over a period of six years. This has resulted in a call for proposals by the BMBF "Innovation Initiative Industrial Biotechnology" which is targeting unconventional alliances in the industrial value chain; the Industrieverbund Weisse Biotechnologie IW BIO (Industrial Association White Biotechnology) announced that it would put together five such alliances involving industrial partners with a total volume of € 184 million. It cannot be said that this country has been standing still!

The limiting factor continues to be the lack of an innovation-oriented capital market; this makes life difficult for industry, technology companies and investors. The post-crisis success of traditional German industry branches tends to outshine the existing structural deficit of this business location: industrial, economic change is not its strong point. In this context, it will be exciting to see whether Germany's powerful chemical industry will be capable of sustaining its attractiveness in a bioeconomy. The first bio-polyethylene plant has come on stream in Brazil; European biorefineries have been debated for years, yet no industrial operators have turned up. Maybe new players will take over the lead in the bioeconomic transformation: Novozymes of Denmark, the powerful number 1 in the global enzyme business, Roquette of France, DSM of The Netherlands (whose € 790 mio. acquisition of Martek has bolstered its position in the biotechnological nutrition segment), not forgetting Evonik with its Health&Nutrition business unit - they are all driving the agenda in Europe.

It is good to know that industrial biotechnology has a firm base in Germany and that it is receiving political support through the National Research Strategy Bioeconomy 2030. There even appears to be a consensus across the political parties. In February this year, the opposition parliamentary group

(SPD) raised a parliamentary question as to how the German government proposed to unlock the potential of white biotechnology. Moreover, the third pillar of sustainability, the social dimension, has been acknowledged: the issue is that of Germany as a location for industry.