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Financing large-scale wind parks through the cooperative financial sector

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Abstract
While the focus in the early days of wind farms was on coastal sites, given technical progress today operating wind energy plants is also economically viable in other rural regions. Technological progress has led to an on-going increase in the output of wind turbines. The size of wind farms is also gradually increasing, which leads overall to larger financing volumes that the small regionally organized cooperative banks can only muster with assistance from a cooperative central bank. The local banks are support by experts in the field of renewable energy from the cooperative central bank – irrespective of whether one wind turbine or an entire wind farm is to be financed. For example, large-size wind-farm financing packages – and in the case of five turbines this can swiftly exceed 20 million euros – can be handled as a financing consortium consisting of the cooperative bank and the central bank. Alongside long-term loan financing and reliance on the relevant government subsidies, the range of services also includes variable financing forms, and this extends to interest and exchange-rate hedges. Financing individual wind farms tends to be structured as project financing, meaning that a closed-end investment project is launched that constitutes a single economic and legal entity. The debt is exclusively serviced from the wind plant's cash flow. Depending on the expertise and needs of the regional cooperative bank, the central bank supports it in all project phases as regards financing one or several wind plants or farms. Rural cooperative banks can only manage to finance large-size wind projects through collaboration between the decentralized cooperative banks and the cooperative central bank. Financing large-size wind farms by cooperative banks will be compared below to other private-sector or government-supported forms of bank financing in Germany and the differences identified.

Keywords: *Cooperative Banks, Energy, Project Finance, Wind Parks*

JEL Classification: *G21, G32, P13, Q20*

1. Introduction – an historical outline

By the end of 2020 in Germany, or so one of the Federal government's plans, at least every third Kilowatt hour will be generated from solar, wind power, hydropower and biomass sources. In the wake of the Fukushima disaster, there was a general social consensus to approve the Energy Reform. Wind power is expected to be the single largest source of electricity, a technology that for many years was highly controversial (Kohler, 2013).

This was not always the case. In former times it was a matter of course. In 1882, or so the statistics of the German Reich reveal, there were still 18,901 wind mills in operation and they exuded, as recorded for posterity in thousands of Romantic oil paintings, the authority of calm rural life. The impressive figure was actually the maximum achieved in history. The construction and operation of the mills was for many years subject to regulatory supervision by the feudal overlords and the Church, but in the 19th century the demand for milled grains to feed the rapidly growing population led to regulations being relaxed. The number of wind mills thereupon swiftly reached record heights – until the steam engine took the wind out of their sails. By the end of the 19th century the first flour mills had been erected and these factories led to the swift demise of their wind-driven counterparts. Alongside the wind mills, the "pure" wind turbines continued to advance. In 1853, American mechanic Daniel Halladay

designed his first model, and blazed the trail. Up to eight paddle-shaped vanes formed a wheel that was mounted on a vertical rotating axis and was outfitted with an additional horizontal vane that automatically aligned the wheel optimally to the wind. Halladay's U.S. Wind Engine & Pump Company in Illinois flourished and in 1876 achieved its international breakthrough at the World Expo in Philadelphia. Technology transfer to Europe commenced. In the United States and Australia there were millions of such small wind turbines in operations by the early 20th century. Their energy was primarily used to pump water, but also to generate electricity. It became ever more popular to generate precious electricity using wind power (Kriener, 2012).

With post-War reconstruction, the demand for energy in Europe soared. Denmark, England, France and the Netherlands pressed the pedal on researching wind power until, in the 1950s, the enthusiasm for atomic energy steamrollered the efforts. An increasing amount of money was committed to researching atomic power, which by 1979 accounts for 60 percent of total research budgets. Only a few crumbs were left over to fund research on solar, wind, etc., namely a paltry four percent. Since the turn of the new millennium, wind power has experienced a heyday. The number of wind power plants had surged at breath-taking speed. In the record years of 2001 and 2002 a total of 4,407 wind turbines were installed in Germany. Meanwhile, offshore wind farms gradually became generally acceptable. Wind power, controversial for decades, emerged as a main pillar of the Atomic Exit, be it in the form of land-based or offshore wind farms. Since the turbines have become quieter and more eco-friendly, and the distances to residential areas greater, so society has come to accept them. Today, 94 percent of Germans, or so the latest Infratest survey shows, support the further expansion of renewable energy and feel it is important. It would seem that the Germans have rediscovered their erstwhile love of the wind mill (Kriener, 2012).

2. Status quo – Investments in Wind power in Europe

With a total of 12.8 GW connected capacity in 2015, wind power accounts for 44 percent of the total newly installed energy generating capacity in the 28 EU member states. Of the figure 9,766 MW was located on land, and 3,034 MW offshore. Compared to the prior year, this amounts to a 6.3 percent increase in newly installed capacity. The cumulative capacity at the end of 2015 came to 142 GW, meaning that wind power covered 11.4 percent of the European electricity requirement (European Wind Energy Association, The [EWEA], 2016). "These numbers show that wind is the driving force behind the EU's energy transition. Wind energy is a mature industry. It makes economic sense and is contributing significantly to Europe's energy security and competitiveness goals," comments Giles Dickson, CEO of the European Wind Energy Association (Bundesverband WindEnergie [BWE], 2016a).

New renewable energy generating plant installed in 2015 provided total capacity of 22.3 GW and thus 77 percent of the newly installed capacity for all technologies. Investments in the new onshore and offshore wind parks rose to a record EUR 26.4 billion, up 40 percent on the 2014 figure. Almost half the new installations in 2015 took place in Germany. Poland and France followed with new installed capacity of 1.3 GW and 1 GW respectively (European Wind Energy Association, The [EWEA], 2016).

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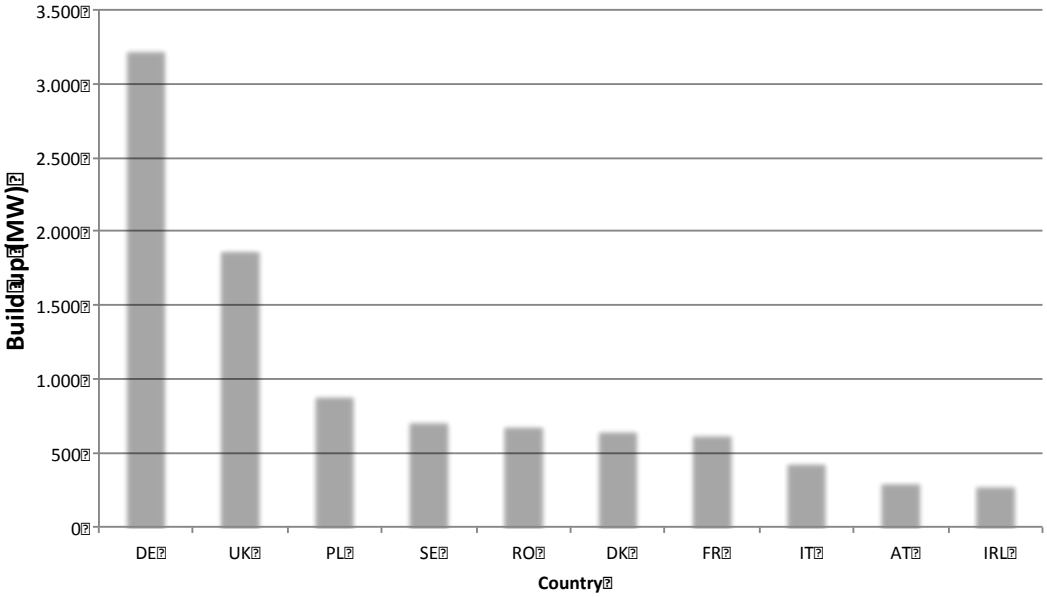
Figure 1: Build up (MW) worldwide in 2013



Source: Bundesverband WindEnergie [BWE], 2016a

Dickson said (Bundesverband WindEnergie [BWE], 2016b): “We’ve seen strong expansion in Germany in 2015 and a strong year for offshore wind. But growth is uneven geographically. We're not doing as well in countries where the policy and regulation is unclear and/or ineffective – investors and developers go elsewhere. Policy is key, especially when we look at the longer term. As of now only 6 out of the 28 EU states have clear targets and policies in place for renewables post-2020. We see more ambition in emerging economies - which puts a question mark by the EU's goal to be No. 1 in renewables. The Commission's proposal for a new Renewable Energy Directive, due in December, is a key opportunity to drive greater ambition from member states in the absence of binding national targets.”

As regards the wind industry, the following key figures obtain for Germany: In 2015 it was the single largest market in Europe and the third largest world-wide (after China and the USA), with total sales of EUR 11.8 billion and a payroll of 150 thousand. Manufacturers from Germany hold an excellent position in the world market, accounting for a share of over 20 percent. About two thirds or some 66 percent of their output was exported in 2015. The following overview indicates that the growth trend continues unabated in Germany (Bundesverband WindEnergie [BWE], 2016a).

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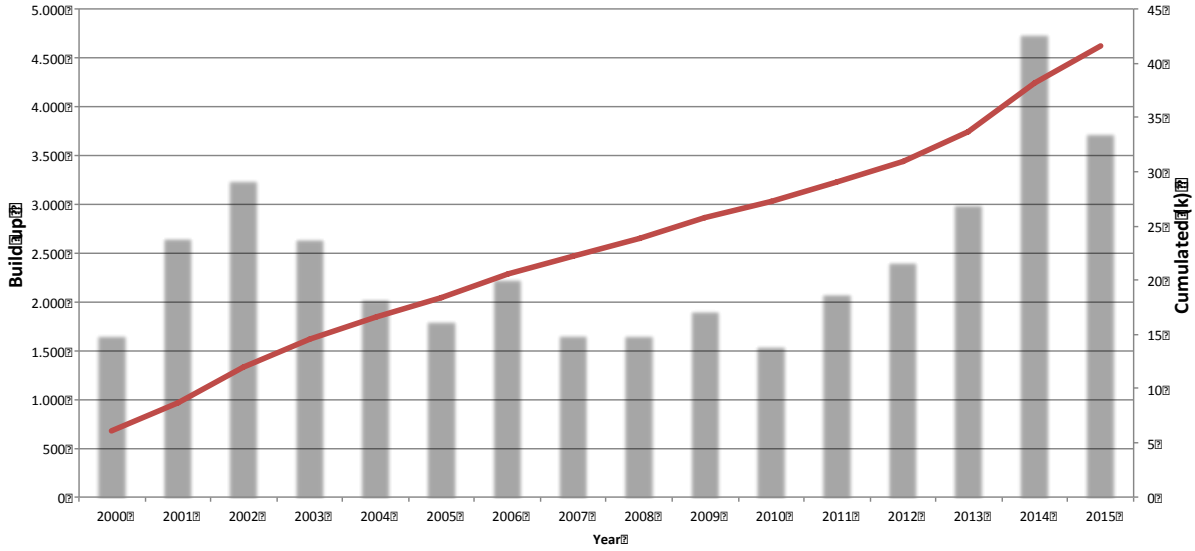
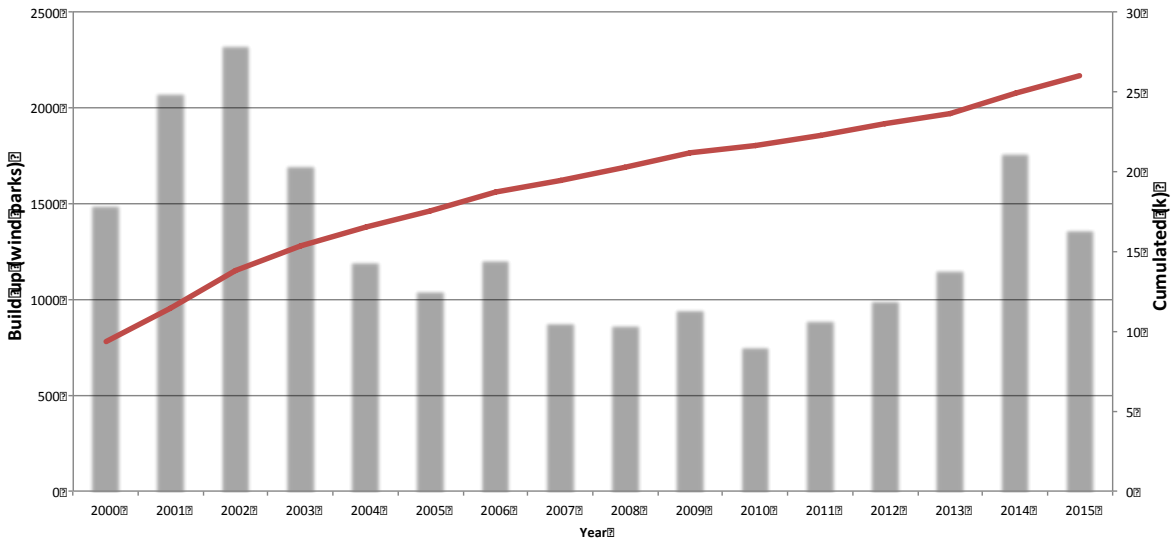
Figure 2: Increase of MW-output in Germany (wind power)



Source: Bundesverband WindEnergie [BWE], 2016a

Industry estimates indicate, for example, that the global market for onshore wind power in 2015 saw substantial growth of at least 55,000 MW, which translates into an increase of more than ten percent on the year (50,000 MW). These numbers highlight the potential and importance of the wind industry and also point to the fact that we can expect an immense financing demand in the future (Bundesverband WindEnergie [BWE], 2016a).

Figure 3: Increase wind parks in Germany



Source: Bundesverband WindEnergie [BWE], 2016a

The chart shows quite clearly that growth rates for wind power plants may not be as strong as at the beginning of the millennium, but that there is nevertheless a persistent increased in the wind energy output generated. One reason for this is that wind power systems have become ever more powerful as a result of technological progress in the sector.

The number of employees in the wind industry likewise continues to head North unperturbed. An ever greater number of new wind-energy-generating technologies coupled with the further expansion in the field of renewable energy could offset the loss of jobs in other industries. It

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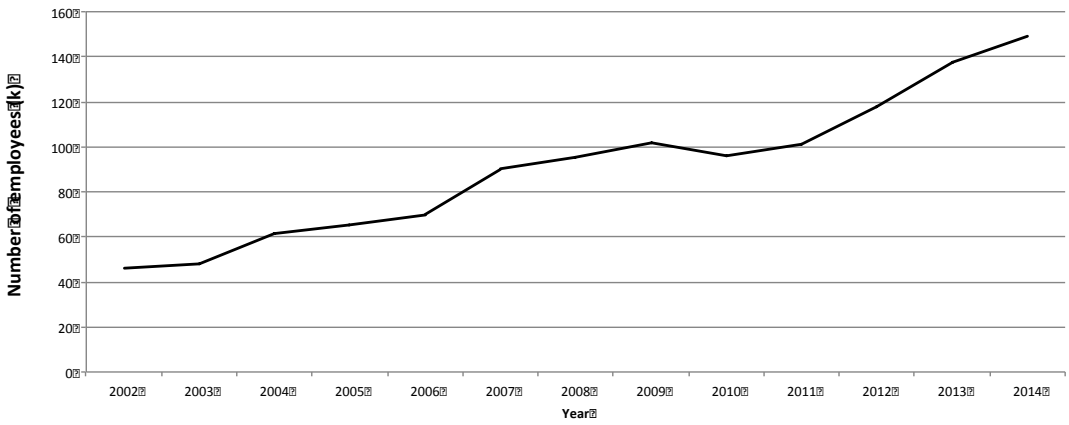
is hard to ignore the macro political importance of the sector for an economy. We have not factored into these figures associated segments, such as the need for skilled staff in financing or those required for recycling wind turbines.

Figure 4: Employees in wind industry in Germnay



Source: Bundesverband WindEnergie [BWE], 2016a

3. Financing requirement for wind power

3.1 Financing a wind energy project

Almost all wind power plants or wind parks are financed by relying on so-called project financing. In other words, an (energy) company or a certain group of persons sets up a special project vehicle (SPV) to finance a specific wind park, and the SPV is exclusively responsible for operating and financing the wind park and can also be made liable for it.

The special thing here is that the lender is only able to rely on future cash flows, assets and project rights when undertaking its due diligence / assessment of the project's creditworthiness (Kuttig & Matthes 2003). In other words, the once-off financing of the equity capital and the debt will in future only be offset by the current revenues from the wind project. The SPV has only this future cash flow to draw on for the repayment of the principal and for the future interest redemptions (Tytko, 2003).

The only collateral available is the assets of the SPV established and the future cash flows. The SPV's sole assets are the wind power plant itself. Those assets are not particularly mobile, meaning that once the plant has been erected it can only be moved elsewhere at a great financial cost. Moreover, there is no market for wind power plants as these swiftly age given technological progress and for this reason there is little demand for existing wind energy plants. For these reasons the SPV's actual asset is not fungible and thus the lender can hardly put a value on it. In other words, the expected future cash flows from the wind power plant are just about the only asset that the SPV can present (Lange, 2011).

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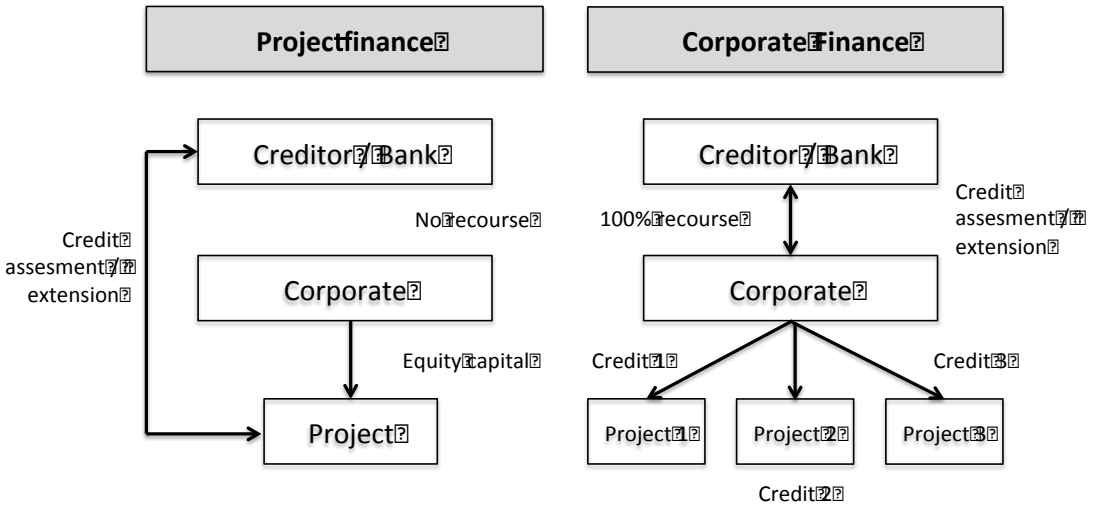
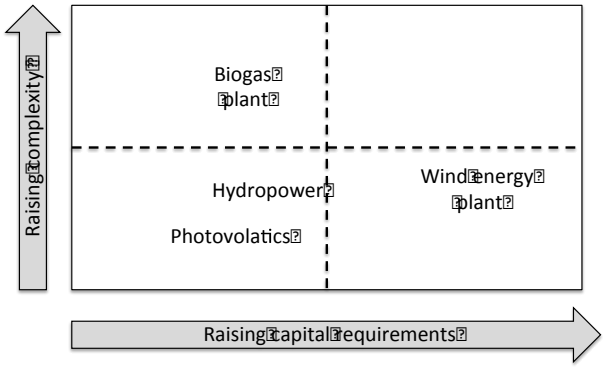
Figure 5: Specific features of a project finance process



Moreover, financing wind energy plants entails a complex type of financing compared to financing schemes for other energy projects, and it moreover involves a high capital requirement.

Figure 6: Financing wind plant in the context of other renewables



Source Data from: Lange, 2011.

3.2 Agribusiness as the Cooperative banks' operating environment

In line with principles of self-help, self-administration and self-responsibility, in 1850 Hermann Schulze Delitsch founded the first "Vorschussverein" or credit association, the precursor of today's Cooperative banks (BVR, 2008). At the same time, Friedrich Wilhelm Raiffeisen discerned the need to develop a model for farmers who had no financial resources in order to enable them to purchase production goods at an affordable price. The cooperative idea thus had its roots in both the agriculture and financing sectors. In agribusiness the Cooperative banks were able to rely on long-standing customer relationships. Cooperation with this clientele was based on the notion of reliable partners. Moreover, the rising demand for foodstuffs, the enduring organic farming boom and the increasing importance of regenerative raw materials all constitute interesting future alternatives for agricultural corporations (Raiffeisen, 1987).

Operating a biogas plant, maintaining and updating a solar PV plant, or handling the design of a wind turbine project on one's own land all require that a farmer today have specialist knowledge and be able to handle dynamic risk management. A bank's success in this segment will therefore centre crucially on how they judge the farmer's management skills. The

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assessment will rest on the recognition that it has not been the classic lending approval criteria that have hitherto countered for the success of an investment in renewable energy, e.g., a high share of own land used to generate the substrate required for the biogas plant, or a high equity gearing for wind turbines. Instead what has counted has been the farmer's flexibility and risk management prowess as proven in managing his farm up until that point.

Agribusiness already relies on product and process innovations to tap new markets. Be it electricity generation from renewable sources such as wind power or biogas plants, or the exploitation of regenerative raw materials, such as bio-degradable packaging materials made from corn starch that will in future replace the customary polystyrene chips. Moreover, farmers are booking additional revenue from services for local communities, forestry work, direct marketing of products, and even tourism. This large number of different fields of activity gives the sector the scope to respond flexibly to changes in the market. All the external factors involved lead to ever more pronounced volatility in the markets, to ever more complex investments, and to ever greater challenges from entrepreneurial activity. A cooperative bank must seize these changes with enthusiasm and be understanding and supportive to successfully accompany agribusiness into the future (Ederle, 2012).

3.3 Financing wind parks by a Cooperative bank

For a regional Cooperative bank, this form of financing for wind energy systems usually seems problematic as the projects tend to exceed the normal financing volume handled by a Cooperative bank. Moreover, rating the risk of financing based purely on cash flow is a problem that can exclusively be handled by specialists. Such valuation expertise can hardly be provided by a small Cooperative bank – or only at disproportionate expense. This is especially true of Cooperative banks in rural regions that still are small organizations compared to their cousins in the cities. However, precisely these Cooperative banks are interested in providing the financing as the wind parks are exclusively erected in less densely populated areas. And this is the specific advantage of the small, regionally geared Cooperative banks based in rural areas. There, existing business relationships with the local population are very important. The Cooperative bank is thus one of the first to hear whether farming land is being tendered as a wind energy zone and whether local farmers are considering releasing fields for use as a wind park.

Today, the decision for or against a bank depends on the latter's lived interest in agriculture. A clear accounts management strategy, networking with local and regional opinion-makers in the agribusiness, suitable products and a focused approach to agricultural clients are all key factors influencing successful market development.

This dieses between proximity to the client and existing client relationships, on the one hand, and the limited ability to shoulder financing for large-scale projects and to put the processual framework for precisely such loans approvals in place, on the other, is solved thanks to the cooperation financial system. For such undertakings all the individual Cooperative banks work together with a cooperative central bank, in which they themselves hold a stake. That central bank supports the Cooperative banks not only in locking into economies of scale (such as for payments transactions and foreign business) but also precisely for the type of project financing outlined above. The following chart illustrates how the process of financing a wind park could be managed by a Cooperative bank with the support of its central bank:

Figure 7: Project financing with the cooperative central bank

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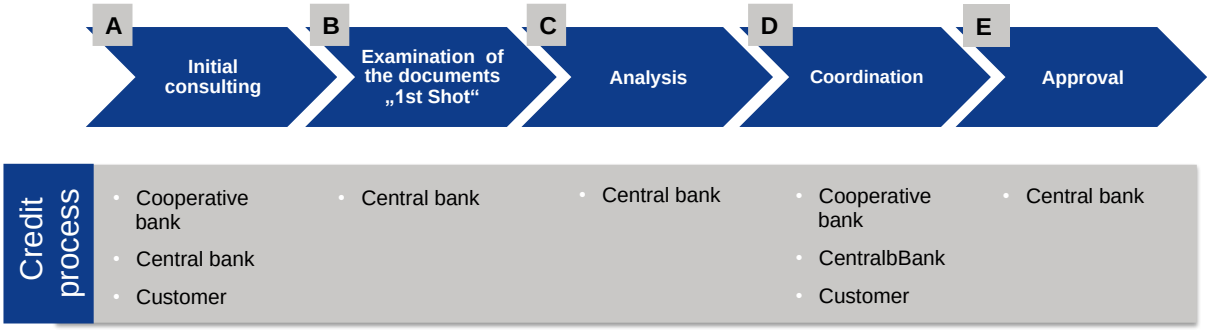

Such collaboration makes sense not only with the pure financing of agribusiness projects, but also when it comes to expertise over the project's life time and to providing consultancy and sales of cross-selling products. For example, structured products, such as derivatives to hedge interest or foreign exchange risks can be marketed with the long-standing experience of the central banks – by the respective Cooperative bank. Project financing of wind power plants constitutes exactly such a product as goes beyond the Cooperative bank's basic business line, in particular if one bears in mind that the wind industry also profits from the cash-flows from exports.

Moreover, government grants and subsidies presume an applications and management process that a single rural Cooperative bank cannot on its own handle. At the European level, such grants and subsidies are, however, a key pillar of the agribusiness. Here, again, the cooperative central bank acts as the "clearing house" that provides the technical and processual basis for the successful loans approval by the Cooperative bank in question. The general role of the financial adviser is discussed by Bröger and Boll (2003).

In other words, only by collaborating with the cooperative financial system can the individual Cooperative banks tap growth opportunities that are then to the benefit of their members. And do so with regard to a high-earning and low-risk client group.

3.4 Relevance for the cooperative banking sector

This interaction between the individual Cooperative banks and the cooperative central bank is strongly reflected in the loans volume that the German banking sector has invested in the field of "energy". The field includes not only investments in wind energy but also loans approved for the mining, hydropower and biogas segments. However, as these only constitute a marginal share of total loan approvals and within the cooperative sector account for as good as "zero" loans. Such investments can definitely be considered representative of those in wind parks. Indeed, if there have been loans approved for mining and hydropower companies of late, then such credits tend to have gone through the large banks given the volumes involved, meaning that the share in question should reveal even more pronouncedly negative growth rates.

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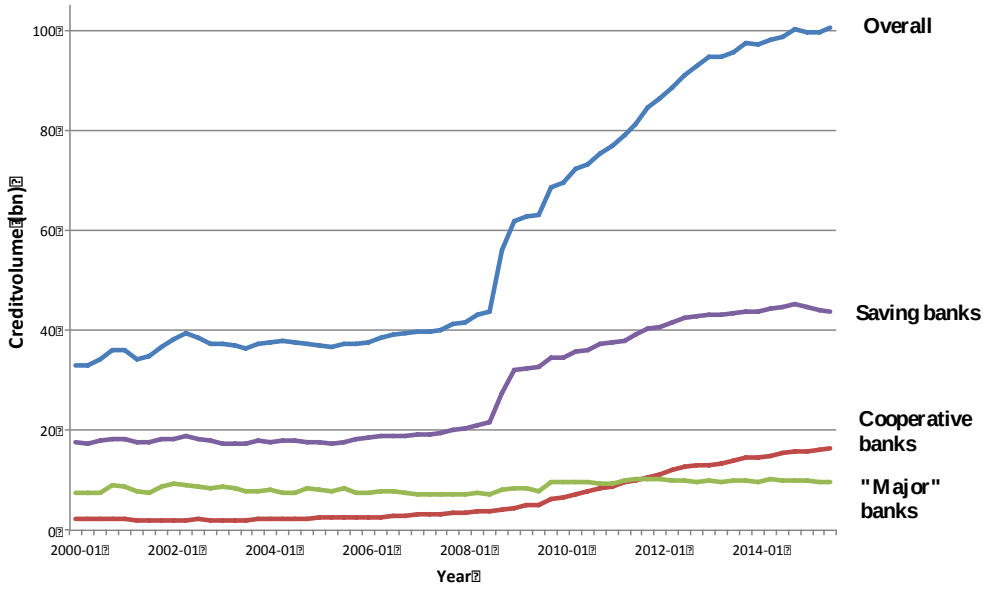
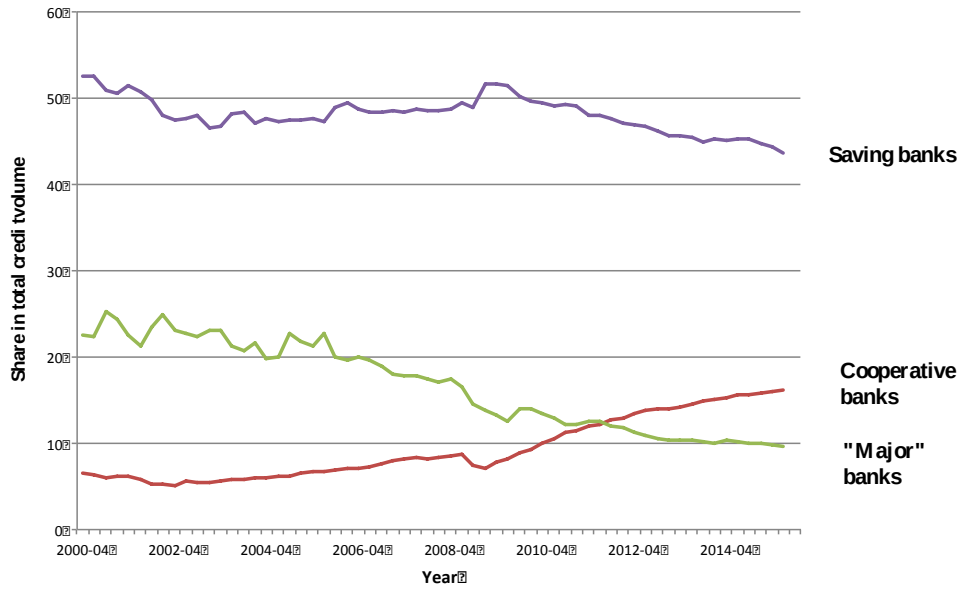
Figure 8: Credit volume (nominal) in Germany`s wind power sector



Source Data from: Macroeconomic Database (Bundesbank, 2016)

Figure 9: Credit volume (pro rata) in Germany`s wind power sector



Source Data from: Macroeconomic Database (Bundesbank, 2016)

These charts reveal that since 2000 the cooperative financial system's investment volume in the field of (wind) energy has as good as trebled. While that of large banks has fallen by half. Moreover, the period of the financial crisis (from 2007 onwards) shows an interesting trend. Investment patterns by both banking segments point south. However, loan approvals by the cooperative financial system recovers, while investments by major banks continues to head downwards. This can be considered an example of the fact that the cooperative financial sector was less hard-hit by the financial crisis and was swiftly back investing in growth

markets. In the wake of the financial crisis, the large banks have not succeeded in regaining their hold on this sector.

Banks incorporated under public law have a special importance in the financial sector compared to cooperative banks. Such banks are structured similar to the Cooperative banks, meaning they are a banking group consisting of a very many small decentrally structured primary banks that are likewise supported by public central banks. Such banks have from the outset held an extremely high share of the market but in the period in question have seen business stagnate or dwindle slightly. While the high initial level of investments can be attributed to increased interest by the public sector and thus financing by "its" banks, the trend points to there now being greater competition in this sector from the cooperative banks.

4. Conclusion

While the in part exceptionally high growth rates in the field of renewable energy and in particular for wind parks have been highlighted in many discussions and cooperatives as a corporate form have of late started to experience a renaissance, cooperative banks financing a growth sector is a topic that has hitherto largely gone unheeded – although as we have seen above there is considerable growth potential. While of late there have been no discernible major shifts in purely nominal growth among cooperative banks, the growth rates for financing wind energy systems by cooperative banks are a first indication of a shift in market shares in a steadily growing market.

This is where in particular four of the above-mentioned core competences of a rurally-structured and decentrally organized cooperative bank come into their own. Regional market entry is characterized by:

- A focused Cooperative bank key account strategy for agribusiness clients
- Focused networking with agribusiness clients by the Cooperative bank
- A product policy for individual inquiries from agribusiness clients (supported by a central bank)
- A market analysis and expert know-how provided by the central bank in question

This success bears emphasizing specifically against the backdrop that at the turn of the millennium many discussions hinged on predicting that the cooperative banks did not have a rosy future. In particular, their agricultural focus and decentral structures seemed to pose a problem for the future in an age of digitalization and a shift into the service society, when bank services ceased to focus on close links to clients. Likewise, many Cooperative banks seemed to small to survive. However, with the rethink in energy policy at the European level a new, very lucrative field emerged precisely for these banks. Moreover, thanks to their sound business model, one that had in part been questioned for being overly conservative, precisely the small Cooperative banks came out the winners in the financial crisis. Their business policy and their financing services as supported by a cooperative central bank not only enabled them to emerge unscathed from the financial crisis but also ensured they were able to attract market share in business fields away from other institutional groups following the crisis. This was described above taking the example of wind energy.

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