The evolution of the electrical grid industry in Germany by 2020

Executive Summary
Much public attention has been focused on the four transmission system operators responsible for transporting electricity nationwide. The power grids, designed for the local and regional distribution of electricity, on the other hand, remain largely ignored. This is interesting since around 98% of Germany’s approximately 1.78 million kilometers of electrical network is made up of these distribution grids. Around 97% of renewable energy producers feed their electricity into the grid at this level. Grids designed originally for the simple distribution of electricity are, in the wake of the ‘Energiewende’, now confronted by considerable challenges; the work they do and the demands they must fulfill are central to the transformation of the power industry.

The Accenture position paper entitled “The evolution of the electrical grid industry in Germany by 2020” provides an empirically robust outlook on the prospects of Germany’s distribution grid operators. The paper is based upon a survey conducted according to the Delphi approach, in which 28 experts from the power supply and grid industries were asked for their views on the crucial themes and developments in the grid industry over the next eight years.

**Fragmented market structure and regional specifications pose challenges**

The regional and local electricity and gas networks are, unlike the nationwide transport grids, owned mostly by local public utilities. The distribution grid market is therefore as diverse as the public utility landscape itself: while there are just four German transmission system operators, there are no less than 850 players operating on the distribution grid side.

The concessions needed to operate these grids are put out to tender, often to private companies.

However, as in many other sectors, there is increasing pressure to have these concessions de-privatized. We expect this trend to continue over the next few years, during which time around 2,000 concessions for electricity and 600 for the gas sector, are due to be reissued.

There is a massive diversity of operator models (private, semi-public, fully public), of grid types and sizes, and of regional supply conditions and generating landscapes, and all these come together to pose a special challenge to operators in terms of expanding their grids. Load and demand profiles, together with the extent and need for expansion, depend largely on regional specifications. A grid operator in a conurbation faces a very different situation from an operator in a rural region; an operator in the south faces different imperatives from one in the north. Furthermore, the changing profile of demands in the operation of grids has brought with it new qualification requirements with which it is not always easy for operators to keep up.

What nobody disputes is that, nationally speaking, there is a substantial need for expansion, and this is assessed to be by 290,000 km. Forecasts by the German Association of Energy and Water Industries (BDEW) and Association of Local Utilities (VKU) estimate that this will require investments amounting to approximately 25 billion euros. Aside from expansion, there is also a need for a widespread shift towards smart grid technologies that enable bidirectional load flows within the grids, as well as flexible, transparent grid management.

Two in three experts doubt that the grids will be expanded in time and that investments in smart technologies will keep pace

In view of the immense challenges all this involves, the industry views the future with a certain amount of skepticism. As the results of the Accenture survey show, two thirds of experts asked (64%) doubt that the technological expansion and transformation of distribution grids planned for the year 2020 will be able to meet the requirements laid out in the nation’s roadmap for the ‘Energiewende’. Just under 80 percent of experts predict considerable delays in the expansion process.

The same applies to a timely implementation of smart grid technology: six out of ten experts (57%) expect delays there as well. The majority (52%) expect just 25 percent to 50 percent of all the concession regions to have been equipped with smart technology by the year 2020. Accordingly, the share of investment made in these technologies is expected to be low too. In fact, just under half of those asked, believe that even in the year 2020, investment could be as low as approximately 15 percent of the total.

The expansion of the electrical grid is one of the most critical infrastructural undertakings that Germany needs to tackle as part of its ‘Energiewende’, or energy transition.
Incentive regulation promotes consolidation, while de-privatization counters it

Incentive regulation is viewed as a major stumbling block in this respect, as it places great regulatory strictures on grid operators. On the one hand they are pushed towards cost efficiency since they are constrained by earnings limits, while on the other hand, regulation related to quality of service, obliges them to maintain a high level of supply quality. Nine out of ten experts (86%) doubt that grid usage costs can be reduced in this way while retaining the same high level of quality. Just under 60 percent (57%) think that costs will remain the same. Just under a third of the experts (32%) believe that there will be a reduction of up to 10 percent in costs. The most promising lever to reduce costs, by increasing efficiency is believed to be industrialization of the industry, involving activities such as centralization, standardization, process optimization, and automation. The other area offering important potential is considered to be through achieving economies of scale, achieved through alliances, mergers, and acquisitions.

Most of those asked, therefore believe that there will be a shift towards consolidation in the operator market: almost two thirds (71%) of those who took part in the survey expect closer collaboration among up to 200 grid operators who will enter into formal alliances over the coming three years. By the year 2020, 25 percent of those asked, believe that this number will have risen to 400. Given that the four biggest public utility alliances in existence today already bring together approximately 50 to 100 local power supply entities, the consolidation trend can be described as modest at best. One of the possible reasons why things are moving towards collaboration in the market is that new concessions are being issued to public utilities and new market players. Because of their size and lack of industry expertise, coming together improves the opportunity for savings they can achieve around grid operations and the related know-how. Almost half of the experts (40%) expect a change of operators in around 20 percent of contracts.

But 15 percent of them even expect a change level as high as 50 percent. The relative majority of those asked (44%) believe that up to 25 percent of grid concessions will not be reissued but will be de-privatized instead. But new market players are also to be expected: one in three experts (33%) considers it likely that financial investors will participate in more than 15 percent of distribution grids.

Focusing on core business, and market opportunities for technology providers

Evolving requirement profiles and the use of smart technologies are opening up new areas of business and opportunity. According to those asked, it will be technology suppliers who benefit above all from this, followed by public utilities and regional suppliers. Specialized suppliers, such as companies offering engineering and/or construction planning services, are also expected to enjoy strong business opportunity. Third-party suppliers will be able to profit from the fact that many public utilities will be incapable of meeting the new, more stringent demands placed on the operation of their grids. The grid operators themselves will, according to the view of 60 percent of experts, continue to concentrate on their core competence areas. The share of non-regulated business in total business is estimated to be a modest 5 to 15 percent.

Virtual power plants could be a game changer in the distribution grid market

According to the expectations of the vast majority (82%), virtual power plants have the greatest “disruptive” potential and will exert a decisive influence on the planning and expansion of distribution grids until the year 2020. These virtual power plants involve de-centralized generation units in different locations being networked to a centrally controlled power plant. There is skepticism, on the other hand, about the feasibility of power-to-gas technology, which aims to convert wind power into methane and store it.

Nine out of ten experts (86%) consider this technology not advanced enough to have any significant impact in the coming eight years.

The Smart City will also have to wait: just under 90 percent of those polled believe that a smart city concept of this kind will only be implemented, either fully or as a pilot project, in a maximum of 400 out of around 2,000 towns and cities.

Call to action

The situation faced by distribution grid operators remains a challenging one. To meet future requirements, operators will have to undertake a comprehensive transformation of their core functions. In the field of asset management. It will be above all, the implementation of more broad, integrated, system-based decision support, which will facilitate the planning and execution of even more comprehensive, and complex investment projects and maintenance activities.

In structural terms, operators will have to accommodate more concentrated models for operating. Also, they will need to manage the increasingly important business of interface management, as they deal with other market players. In the context of larger alliances between distribution grid operators, the greatest challenge will lie in the building up of shared-service units and in the outsourcing of standardized processes to specialized providers.

Furthermore, what is critical for the future is the ongoing training and education of employees, which will enable organizations to work through new requirements, and will facilitate knowledge exchange as the workforce is renewed.
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