

Unravelling The Real Story Behind European Power Demand

Twan Vollebregt

Managing Director, EPSI Platform

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INTRODUCTION

Economic events of the last ten years have fundamentally reshaped the European electricity industry. While it is no surprise that electricity demand has reacted strongly, particularly in the industrial and commercial sectors, the response has by no means been uniform across countries like Germany, Spain, and Greece. The different responses from different countries illuminate details about their relative demand elasticity and the power-to-GDP intensity.

WHEN ECONOMIC CRISIS HITS DECLINING GROWTH

Between 2004 and 2007, the rate of growth in power demand steadily declined across Europe (see Figure 1) despite apparently favourable economic conditions. In many ways, the onset of a recession was already being flagged up. In 2009, demand strongly fell in all European countries as a consequence of the financial crisis. The following year saw a bounce, albeit less strong than the 2009 dip, but rather than a return to normal levels, 2011 saw a further two percent drop. Benefitting from a relatively cold winter, 2012 saw near-zero growth, but thereafter demand has continued to fall steadily. This is largely in line with the general economic situation.



This dramatic picture was more or less replicated across individual country profiles. However, interesting differentiated patterns do occur.

Before the downturn, European countries could be split into three broad groups: those with around two percent growth (Austria, Greece, Netherlands and Spain); those averaging around one percent growth (Germany, France); and those growing more slowly or even showing a decline (Denmark, Belgium, Italy, and Sweden). These groupings represent the combined impact of GDP growth and the type of economy in each country; those that use power as part as part of a growth strategy naturally differ from those focused on energy efficiency. By looking at both Greece and Spain, with the help of hindsight, rapid economic growth showed certain bubble-type characteristics. However, neither country had much focus on energy efficiency, which resulted in simultaneous growth in power demand. Similarly, Austria and the Netherlands, although mature economies, were still strongly growing and using power consumption as a key driver of that growth. Germany and France were struggling somewhat in terms of GDP, so despite their strong economies they experienced a slower growth in power demand. Among the lower growth countries, both Belgium and Italy were on a flat economic trajectory with little if any growth in GDP. In contrast, the Nordic countries (Denmark and Sweden) had focused significantly on efficiency and reducing consumption, which led to lower growth in demand.

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<u>Clarity in a Complex Market,</u> <u>Commodities Now, April 2015</u>

COMPARING APPLES AND ORANGES

Before any further analysis, it is important to understand that "power consumption" is a rather poorly defined term. Does it include network losses? What about de-centralised consumers with on-site generation? Does the consumption of pump storage plant count? It is all too easy to end up comparing apples with oranges.

Add to that the real challenge of obtaining high quality accurate data for an individual country. By looking at the Netherlands as one example, it is relatively easy to use incorrect numbers: the ENTSO-E figure for power consumption in 2013 was 110.5 TWh, while the transmission system operator, TenneT showed 101.4 TWh. At the same time the CBS – the state statistics office – reported a total consumption of 119.1 TWh. These are material differences, derived from differences in scope and definition.

Even the use of a single source for all years can produce inaccurate results due to definitional changes over time. In January 2015, ENTSO-E launched a new transparency platform with data being made available for hourly German power demand that is subtly different from the data that (until recently) was made available via the old ENSTO-E platform. In the chart below, the differences between the series are illustrated.



As the chart shows, the new German demand series is on average lower by roughly 4GW, but with a strong peak/ offpeak shape. During the offpeak the differences are substantial, while during the peak they are minimal. Detailed analysis reveals that the new ENTSO-E German demand data excludes pump storage demand, whereas the old data included it. Without correcting for such differences, it is easy to derive erroneous conclusions about demand growth.

A correct interpretation of demand data is therefore crucial to identify and understand the dynamics of power demand. In the EPSI platform, a very strict definition of power consumption is used - which includes network losses and decentralised consumption but excludes pump storage consumption - that is the basis for the charts in this paper.

A NOT SO CLEAR NORTH-SOUTH DIVIDE

Turning back to the power demand growth rates of European countries, the cumulative growth of a selection of countries since the pre-crisis year 2007 are of particular interest, revealing some interesting and somewhat unexpected patterns.

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By 2014, the EU average cumulative power demand growth rate was still approximately five percent below the 2007 level, as a result of a seven-year period of relatively consistent negative power demand growth: an unprecedented phenomenon in recent decades. However, this played out in different, and often in somewhat counter-intuitive ways in different countries.

In line with the drop in its economic growth, German power demand fell sharply in 2009. However despite its strong economic performance subsequently, there has been a very weak recovery in power consumption. This is mainly due to a structural reduction in industrial demand, offsetting household and services demand that has returned to growth. From 2010, the impacts of the energy efficiency policies and measures have started to impact power demand which has continued to constantly decline. With its greater economic woes, but much smaller industrial sector and strong household/services growth momentum in 2007, Spain was affected less than might be expected, resulting in a cumulative growth rate not far from zero between 2009 and 2012. However, since 2012 Spanish demand growth has been negative as a result of the continuing recession. Greek power consumption growth has followed a similar trajectory during this period. Despite its very poor economic performance over the 2007-2011 period, Greek consumption growth is relatively inelastic and has carried forward much of its trend momentum – in 2011, a six percent GDP reduction resulted in a power consumption reduction of less than 2 percent. Nevertheless, since 2012, demand has strongly dropped and demand in 2014 was 25 percent below the level seen in 2007. At the opposite end of the spectrum, Poland is the least affected country; it's strong economic performance means that power consumption growth is now growing at almost pre-2007 levels once more.

Putting all of this into perspective is the 'trend' growth, which depending on the type of economy would be expected to range between one and two percent per year. Had that growth trajectory been followed since 2007, at 1.5 percent average annual growth the cumulative European power demand growth would have been 12 percent in 2014, rather than minus five percent. This gap of 1700 basis points has had huge consequences for investment in the sector, leading to capacity margins that are much larger than anticipated and upsetting investment plans that had assumed ongoing growth. Add to this the large volumes of renewable energy generation that have entered the market – despite strong economic signals to the contrary – and the result is a market that is showing significant oversupply in many countries.

THE PEAK DEMAND CHALLENGE

Even if total electricity demand has generally decreased since 2007-2008 due to low economic growth and more efficient appliances, peak load keeps rising. A significant increase in peak loads has been seen in most of the European countries over the past decade. A slowdown has however been observed over the past two years due to very mild weather conditions during winter months.

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Figure 4 - Evolution of peak and total loads (basis 100 in 2004)



The effect of mild and strong winters is most clearly seen in France, as electricity consumption in the country is very sensitive to temperatures due to the major role played by electricity in the heating systems. In 2012 (a cold winter), peak load was 25 percent higher than in 2004, while total demand remained fairly constant. In contrast, 2013 and 2014 (mild winters) saw sharp reductions in peak load.

The de-correlation between peak and total load is a key challenge for the sector as numerous flexible fossil fuel-fired units will be decommissioned in the coming years following the implementation of the Industrial Emissions Directive.

CONCLUSION & LESSONS FOR THE FUTURE

The key lesson to be learnt from unravelling these growth patterns is that scenario-based fundamental market analysis remains a critical part of the risk management process. As rapidly changing economic fortunes have indicated, investment decisions cannot be made purely on the basis of short-term curves or historical movements. The broader context – including the financial environment – must be considered, as well as country-specific factors. Investment decisions cannot be made on over-simplified observation of the markets. In-depth analysis and quality data is key, as the comparison between Greece and Germany demonstrates.



About the Author: Dr. Twan Vollebregt heads up Genscape's European power market analysis activities. He is the former CEO and founder of Energy Fundamentals, where he led the development of the EPSI platform before its acquisition by Genscape. Prior to this he was the Managing Director of Elan Energy Consulting.

THANKS FOR READING!

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