

IDENTIFY ALL ELEMENTS OF THE ENERGY PUZZLE, THEN LOOK FOR ANSWERS



By Angus McCrone
Chief Editor
Bloomberg New Energy Finance

A few years ago, I spent a good half hour at a school parents' quiz sweating over a question that posed the riddle "What is greater than God, more evil than the Devil, the poor have it, the rich need it, and if you eat it, you will die?" Eventually, just in time to submit an answer, I got it.

THE ENERGY DEBATE

Those taking part in the world energy debate are currently sweating over a riddle that seems just as impenetrable: how can it be that renewable energy simultaneously reduces wholesale electricity prices, raises consumer electricity bills, and undermines the business model of the utilities?

A casual observer might hazard that lower wholesale prices should mean either lower retail prices or fatter profits for the utilities. Of course, there is a more informed response too, but even that may only constitute a partial answer.

That is far from the only conundrum currently troubling participants and policy-makers in the energy sector. Here is another: in a world where wind and solar plant operators receive only market prices for their electricity – without subsidy – then wholesale market prices will normally be very low, because of the effect of renewable generation on the system, and so their revenues will also be very low. How then can investment in new capacity be encouraged?

And another: should this effect, of greatly reduced wholesale prices when it is sunny and windy, be credited to renewable energy – to some extent offsetting the expense of subsidies – in any holistic calculation of the true cost to users of different technologies? What

about the cost of maintaining and operating back-up capacity made necessary by the growth of wind and solar – should that be charged to renewables or socialised across the network? And how can it be adequately estimated, when techniques for predicting variable generation are improving all the time and alternative balancing options such as demand response and interconnectors could dramatically reduce the problem in the medium and longer term?

And a final one: if the major reason why onshore wind power is still on average a few percentage points more expensive than coal-fired or natural gas combined-cycle generation, according to our Levelised Cost of Electricity model, is the cost of capital associated with building wind farms, which have most of their cost upfront and no feedstock to buy during the operating phase, then should not governments strain every sinew to reduce that cost of capital, rather than risk the opposite by debating loudly (and unsettlingly) the impact on electricity bills?

The recent Bloomberg New Energy Finance Smart Power Leadership Forum, held on 7-8 November in Copenhagen, took 50 senior executives from utilities, fossil-fuel and renewable generators, governments and transmission operators in teams and posed them these and other riddles.

FOUR SCENARIOS

The answers they came up with were intriguing. They explored four scenarios – "Tradition, Tradition", in which governments intervene to protect established utility business models; "All Out Green", in which governments do

everything to encourage renewables and their integration; "Efficiency Squeeze" in which money is hard to come by for everyone in the power sector; and "Free Market Rules" in which there is full liberalisation and market integration, and no explicit government support for any technology.

The teams concluded that in all four scenarios, the prospects for baseload thermal generation were poor, with growth and profitability both well in negative territory. Peaking thermal generation, by contrast, would enjoy healthy growth and profitability under the "Free Market Rules" and "All Out Green" scenarios, but almost nothing of either under "Efficiency Squeeze" or "Tradition, Tradition".

Utility-scale renewables would enjoy the best profitability – ironically – under the "Tradition, Tradition" scenario, would grow strongly with middling profitability under "All Out Green" and "Free Market Rules", and grow more modestly with almost no profitability under "Efficiency Squeeze".

The stars of the show were distributed generation and commercial and residential demand response, which expanded and were profitable under all scenarios, and grew at 5%-plus per year with high profitability under three of the four eventualities.

The Leadership Forum's participants were also asked to cite the technologies and types of investment that had advanced quickly in the last three years, and those that had gone backwards. Those that had progressed the most, they said, were "new, responsive generation" and interconnection, those that had fallen back included "old generation retention" and – more worryingly – energy efficiency services.

What I detect from the answers at the Forum, and some of the most recent musings from policy-makers, is the energy debate may have reached a point where, even if the answers are not clear,

at least the identity, and complexity, of the questions is becoming clearer.

RENEWABLES IN EUROPE

One sign of this is the way that some European governments are starting to have second thoughts about how renewables are subsidised. There is greater questioning, from Berlin to London, of the assumption that relying on electricity bills to subsidise renewable energy was the right way to go, in light of the impact on impoverished households and energy-intensive industries. This despite the fact that people do not like their taxes going up either, and charging more for something polluting would seem a good thing. Perhaps the US, which incentivised renewables through tax credits and state mandates, had it right all along. Or perhaps Europe should have incentivised renewables via subsidised (or de-risked) finance – along the lines of what the UK government is shaping up to do to a range of “nationally significant” infrastructure projects with its GBP 40bn guarantee scheme. Among the latter’s pre-qualified projects are a 60MW wood-fired power station, two coal-to-biomass conversions and a 450MW offshore wind farm.

SPAIN

Spain has been anathema to renewable energy investors in the last three or four years, given its swingeing, retroactive cuts in support for existing solar and wind projects, and I am not about to do a *volte face* to pat its government on the back. But in its latest piece of beastliness towards the solar sector, it has at least highlighted something interesting.

SOLAR

Madrid is currently considering a bill that would slap a charge on households and business with distributed PV for each kWh of electricity that they generate and use themselves. The proposal itself is unfair, regressive as far as curbing emissions is concerned, and absurd – a bit like supermarkets charging gardeners for growing their own potatoes.

However what it could open up is more debate on the right balance between the different charges levied on consumers for electricity. Perhaps, in consumer bills, less should be charged per unit of electricity used and more charged for access to the grid. This might necessitate big changes to the structure of the electricity industry, but it also might start to address the criticism that small-scale renewable energy subsidies benefit the relatively well-off, who can afford to slap solar panels on their ample roofs, at the expense of the less wealthy, who cannot but end up paying a bit extra on their bills for renewables support. On the other hand, a shift in the balance towards fixed charges and away from charges per unit would be regressive in its own way, with owners of larger properties benefiting.

The correct design for electricity markets, one which remunerates investment without creating excessive rents and high electricity prices, is certainly a riddle. It is also wrapped in a number of mysteries, inside of an enigma.

How quickly will electric vehicles encroach on conventional transport? Will

Madrid is currently considering a bill that would slap a charge on households and business with distributed PV for each kWh of electricity that they generate and use themselves. The proposal itself is unfair, regressive as far as curbing emissions is concerned, and absurd – a bit like supermarkets charging gardeners for growing their own potatoes.

the shale gas phenomenon spread meaningfully outside North America, or will it in Europe and Asia be just a minor contributor to gas production, at prices similar to those of imported gas at present?

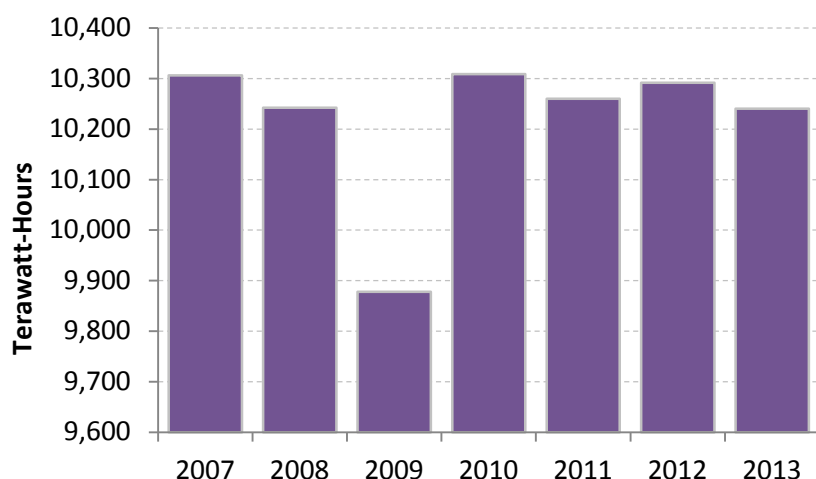
And perhaps most uncertain of all, will developed world power demand now continue to drop even as economies recover? The International Energy Agency’s World Energy Outlook 2013, published earlier this month, projected that OECD electricity demand would increase, albeit at just 0.9% per year, all the way to 2035.

ELECTRICITY DEMAND

Yet recent figures on electricity demand in developed countries have hinted at the possibility of a very different trajectory. Data from the Energy Information Administration show that electricity end-use in the US hit a peak of 3,890TWh in 2007, fell predictably as recession took hold to 3,724TWh in 2009, but only recovered to 3,823TWh in 2012. In the first seven months of 2013, it was 0.2% down on the equivalent period in the previous year. This is despite the fact that in 2013, the International Monetary Fund expects US GDP to be 5.9% above that in 2007.

This is not just some US oddity. From the figures in the IEA’s own database, electricity supplied in the OECD as a whole was 10,306TWh in 2007, then fell,

Electricity supplied to OECD only recovered to 10,292 TWh in 2012



Source: International Energy Agency, Monthly Electricity Survey

For a few years after the financial crisis, it was feasible to argue that these depressed electricity trends reflected the damage done by the recession, and by a one-off shift of manufacturing to China and other emerging markets. However, the longer they go on, the more difficult it is to hold the line that upward momentum will resume.

only recovering to 10,292TWh in 2012, and in the first eight months of 2013, was down 0.5% year-on-year.

For Japan, the second biggest developed economy, electricity supplied was 1,110TWh in 2007 but only 1,015 in 2012, a fall of nearly 9%, and was a further 2.7% down in the first eight months of this year. For Germany, the third-biggest OECD economy and a relative out-performer in recent years, electricity supplied was 580.6TWh in

2007, only 563.4TWh in 2012, and down a further 2.2% in the year to August.

For a few years after the financial crisis, it was feasible to argue that these depressed electricity trends reflected the damage done by the recession, and by a one-off shift of manufacturing to China and other emerging markets. However, the longer they go on, the more difficult it is to hold the line that upward momentum will resume.

I realise that in this article, I have posed a lot of questions and not delivered many of the answers. But, faced with a riddle as complex as today's energy landscape, identifying the right questions is at least a precursor to arriving at answers.

Oh, and in case anyone is as flummoxed by the "What is greater than God?" puzzle as I was, this is what I can offer them: nothing.