



23 September 2016

Dear Frances Warburton

CUSC modifications CMP 264 and 265

Green Frog Power builds fast-starting and flexible gas-fuelled power-generating plant. We've built more capacity that is reliable than any other British company in the past five years. We commissioned the first gas-fuelled plant built under the Capacity Market; we're now nearing the completion of 230MW of gas-fuelled Capacity Market plant and we're about to prequalify another 400MW. We provide exactly what the market most needs: flexible, efficient gas-fuelled energy.

The CUSC process

Ofgem should be aware of the wider implications of the two CUSC modification proposals, CMP264 and CMP265. The whole energy sector is watching—commentators, analysts, investors, bankers and participants. They are all now familiarising themselves with the CUSC processes and, without exaggeration, they are horrified. If the outcome of the two modification proposals is that Triads are swept away overnight, then a) the lights will go out and b) investment of any sort will disappear in the energy sector as the trust in the regulatory regime will be obliterated.

Whilst the CUSC panel has been around for a long time and set up in good faith as a cosy club by which the incumbent large energy companies can adjust the rules to their benefit, it has now become a battleground between various parties, but with the outcome predetermined. The system is not fit for purpose and cannot be defended as being so.

The wider industry had not, until now, recognised the extent and significance of the code administration practices and processes. They had not realised how much control major market players had over the rules of the game and how changes to the rules have major impacts on their investments.

In the context of transmission charging and use-of-system charging, it seems very much as though the inmates are in charge of the asylum. As smaller embedded generators we have not been involved in these processes until recently. We had not appreciated the extent to which a good portion of our incomes, the embedded 'benefits', were supposedly "given" to us primarily at the whim of the larger transmission connected generators.

Triads originally emerged as a method of correcting market distortions. They permitted non-energy experts to partake in triad avoidance, by which the lights are now kept on. They enable a route to market for small players where peak-market price liquidity has always been poor. Triads signalled to those who were otherwise unable to monetise the value of their assets and/or actions through a different signalling mechanism to generate or reduce demand at peak.

This has worked very well for around forty years. It has kept the lights on and prices stable. And crucially, it has kept the cost of investing in the transmission network in check, though one could be forgiven for missing this point, given the ballooning expenditure on networks to facilitate renewables development, on and offshore.

So, we ask – what has changed? Why did those who had been in control of the incomes for embedded generators (large transmitted generators) recently change their minds so dramatically and decide that embedded generation offers little or no incremental value to the network, the system or the consumer?

Up until just a couple of years ago the government was strongly and actively encouraging embedded generation. It perceived embedded generation as part of the “solution” to a decarbonisation of the system and to countering the impacts of renewables on the grid and the power markets.

Small embedded generation units that were either renewable or specifically designed to complement renewable generation, as Green Frog’s plant are, and close to the source of demand seemed to be the answer to the evolving system requirements that balanced the need to reduce carbon and to keep the lights on at the least cost to the consumer.

Embedded generation helps to achieve all three of these aims. And crucially, it also helps to increase the diversity of operators in the UK’s energy market, thereby countering and reducing the market power of the large, dominant, transmission-network-connected generators.

Incumbent generators wield substantial power through their historical market position and their extensive lobbying activities. More importantly they also own the rules by which the “game” is played. This has been the real awakening for us as a company and for the wider energy market. Our competitors created the industry codes by which we all must abide, and they have the power to change those codes to ensure they remain structured in their favour. The result is a capacity crunch.

Whatever the outcome for Triads under these modification proposals, developers are now aware that any rule can apparently change overnight at whim of their competitors. Investors are already asking us “What next?” as we manfully try to raise funds against this nightmare backdrop of uncertainty.

As very recent CUSC signatories, we too are now able to have a say in the CUSC codes, though not the rules that determine how the CUSC is governed. Most embedded have, like us, been late in realising exactly how the process works and just how at the mercy of the large transmitted generators our entire business models are. Anyone who has not sat in the room probably remains innocent of these truths.

The banks and markets, as well as the embedded generators, incorrectly believed that the regulator was in control of the industry codes. It seems, however, that under the current rules we can only rely on Ofgem to make decision within the scope of the CUSC process –a decision that will be open to legal challenge should Ofgem dare to reject the CUSC panel’s preferred outcome.

In this market we rely on the regulator and policy makers to provide a sensible and fair fixed framework of regulations in which competition can thrive and to which the market can slowly adapt. Everyone is aware of this and the market has responded to a robust regulatory regime through leaps of growth and change in the past few years.

The whole of the energy market is watching the process and the outcome.

CUSC Panel representatives

We feel it is important to draw attention to the make-up of the CUSC panel. No members of the panel have a background in smaller/embedded generation and the majority are employed by large companies with strong interests in transmission-connected assets. In this instance two of the CUSC panel representatives not only work for the companies proposing the modifications, they actually wrote the proposals. Other panel members have raised modifying WACMs that favour their transmission-connected generators. These CUSC panel members are clearly conflicted.

Without intending to disparage the professionalism of any of the CUSC panel members personally, we do not feel confident of an unbiased hearing of the work group’s recommendations. We think it is an urgent matter that the CUSC panel make up is addressed to allow wider market participation – bankers and other industry experts would be start but additional members from more diverse backgrounds are a must to restore any confidence in the CUSC panel.

This of course applies not just to these modification proposals, but to future issues.

Investor confidence

We cannot overstate the impact that any decision suddenly and drastically to change Triads will have on investor confidence. Ofgem and government have identified the need for billions of pounds of investment in the UK's electricity industry in order to ensure security of supply, decarbonisation and to replace the existing aged and flailing generation fleet.

Green Frog Power and companies like ours have secured equity and bank funding to invest in the UK's electricity sector to help provide the electricity needs of the future. Extreme care should be taken to ensure that any changes to any of the rules that are deemed to be necessary from time to time to correct distortions in the market are done so after due consideration and on merit only, not to serve any specific sector of the market.

CMP264 and CMP265 are simply a Trojan horse by which money is moved from one pocket – that of embedded generators – to the other that of grid connected vertically integrated players – the consumer does not benefit –as we have demonstrated, he is worse off.

Level playing field

CMP264 and CMP265 were ostensibly raised on the basis of the desire for the large incumbent generators to “level the playing field” and to help raise the CM clearing price. They have used language in such a way as to suggest that embedded generators have only been successful in providing much needed investment by virtue of being the recipients of “distortionary subsidies”. In fact, we have built the type of plant that is needed today quickly and efficiently under the existing market regulations.

Those incumbents who have been less interested in adapting their business models to evolving technologies and market requirements are those that are most upset about the growth in embedded generation.

The structure of the CUSC process is by nature limited and forces evaluation into a very narrow scope. If all participants in the market were truly interested in a “level playing field” they would surely have chosen a route that was open to a wider review of the whole “playing field”, not just the part that inconvenienced themselves.

Instead, it seems they are only interested in raising the pitch up towards their own nets, while increasing the downward slopes toward their competitors’ nets. There has been no recognition of how bumpy the playing field is overall (market access, credit, liquidity etc.), indicating a real lack of desire to actually “level the playing field.

Security of supply

In the CUSC working groups we have been assured by the transmission-connected generators that “maybe” and “probably” the transmission network and security of supply would be able to cope with a sudden decrease in embedded generation at peak, without actually providing any evidence.

The workgroup has been assured that transmission-connected generation that has been laying idle will be able to meet an increase in peak demand. And for a lower price, it is claimed. While it is certainly true that these operators would be more than happy to attempt to meet the peak hours should they succeed in their aim of making embedded disappear, it is unlikely to be cheaper or more efficient if they can provide the necessary flexibility at all. Our report as prepared by leading market analysts Enappsys indicates that embedded capacity cannot be quickly replaced. Another report prepared by Enappsys suggests that even if it were quickly replaced, it is more expensive to run these large plant to meet short bursts of demand.

We have operated in this space for more than five years and have a team of people dedicated to analysing the peaking market. We are extremely concerned that removal of the behavioural driver provided by Triads will have a major impact on the system. Little regard seems to have been given to the fact the energy mix has changed so dramatically in the past five years that historical data is often invalid. Triads occur as demand soars –on cold frosty nights when there is no wind nor sun.

CCGTs, even old ones, have a higher published efficiency than smaller OCGTs or gas-fuelled reciprocating engines. It takes a long time to get a CCGT operational, however, and then a long time to stop. They are designed to base load not to start and stop many times; in fact, they have manufacturers' limits on the annual frequency of starts. Operating such plant in this mode will cause it to fail – PB Power have reported on this. So to meet frequent and short bursts of energy over peaks, it is actually much more efficient to use a less efficient but flexible engine. There is also more value for consumers from flexibility through reduced market prices.

If one factors in that these large slow-responding machines have their highest pollution emissions during their starts and stops, it starts to look a lot less palatable to rig the system so that CCGTs will be running through those peaks.

In the short term, we believe there will be significant problems with security of supply, even with the driver that Triads provide. We have provided a report published by Enappsys, in which they calculate the extent of the impact on system costs in the event of a reduction or removal of Triads. If just 10% to 20% of embedded generation chooses to remain idle through the peaks, there will be a very significant impact on security of supply. With the removal of Triads, a far higher percentage will not react to market forces at all, creating real security issues.

Capacity Market costs

One might expect CM clearing prices to increase in the absence of embedded benefits. Plant that is not already previously committed through a previously

acquired CM contract will obviously bid in at a higher price if their Triad revenues are at risk.

The Enappsys report commissioned by Green Frog Power estimates that the CM price could rise significantly without triads. But it is not *just* the clearing price that will rise for consumers. Plant that was running for the peaks will not be – in the absence of triad price signals. So market prices will need to rise to entice those (or similar) generators to generate. In this instance the consumer pays for security of supply through the CM, and also pays much higher prices to compensate for the loss of security caused by the removal of triads.

If distortions around market price access issues were addressed, liquidity would be improved. Further, if price discovery for forward peak periods was addressed, and cash-out reform was reliably implemented in full to correct any remaining distortions around appropriate and accurate signalling, then the market might see equal or even lower CM clearing prices than we are seeing now - even if Triads were completely removed.

Clearly these conditions are not yet in place – the playing field remains uneven - though we look forward to the day in which that is addressed, either by SCR (preferred) or piecemeal by endless CUSC and BSC modification proposals.

Meanwhile the government will have to revisit all its scarcity pricing models, since more than the targeted three hours of blackouts will occur, so more plant will need to be brought into the CM.

We note that bringing forward the complete cash-out reform by one year could help to address these issues. We urge Ofgem and industry to consider implementing Par1 and £6k/MWh cash out in November 2017 rather than the currently planned 2018. If it's good for consumers in 2018, it will surely be good for them in 2017. It would demonstrate to the market that Ofgem will not flinch from improving the system on behalf of consumers. We think it would also be helpful to make cash out more transparent through adjustment of the CADL and removal of the well-intentioned Reserve Scarcity Function. It is very important to ensure that

price signals are reliable, transparent and appropriately reflective of market conditions if one is to make efforts to improve the functioning of the market.

Market prices

Green Frog Power commissioned a report that demonstrated how unfeasible it is for the aged fleet of mothballed uneconomic plant to return from the scrapheap to replace embedded generation. Even under the most conservative of measures it is clear that if we have another year like 2015 (which, by many accounts, was a lucky escape in terms of security of supply risks) without the response of embedded generation, we shall see a sharp increase in the number of tight periods and a sharp increase in market prices.

The chances of unmet demand will increase dramatically if there is any additional market stress – issues with nuclear plant, for example – which will create a real risk of the lights going out. Overall, the potential for costs to consumers would rise significantly in a worst-case scenario with modest assumptions.

Higher market prices combined with lower security of supply are not a positive for consumers – especially if you live in one of the UK's' ~2.2 million homes that are electrically heated.¹

In the absence of a root and branch review of the playing field it is clear that larger generators will be the main winners, at the expense of smaller generators and consumers. It is crucial, then, that all of these elements are considered as a whole rather than in a drawn-out piece-by-piece review through continuous modification proposals within a skewed system.

In the absence of Triads, market access to small generators needs to improve significantly, something which is long overdue anyway. Brave souls can of course operate in the BM or day-ahead market, and they can hope to monetise the value

¹ <https://www.ofgem.gov.uk/ofgem-publications/98027/insightspaperonhouseholdswithelectricandothernon-gasheating-pdf>

of their fast and flexible plant in those limited sectors. However, removing Triads takes away a very important risk-management tool. Suppliers and small generators are able to hedge winter peaks well in advance of delivery using Triads as the tool to engage with each other and, in effect, lock in value.

Removing Triads increases the risk exposure for any parties who are unable to forward hedge – usually because they are not large enough and not vertically integrated. This situation gives an unfair advantage to larger players (generators and suppliers) and, as well as being a barrier to entry, increases the overall risk profile of new entrants to the electricity market and impacts competition, all of this has a clearly adverse impact on consumers.

Secure and Promote is not sufficient to address these issues, as the focus is not yet on the appropriate products. We think Ofgem should reconsider the scope of Secure and Promote when making a decision about undertaking an SCR and approving the final CUSC-modification proposal.

Grandfathering

Viridis 178 Ltd was set up by Green Frog Power Ltd as the commercial vehicle for the development of its natural gas-fuelled, fast starting peaking plant. Green Frog Power have operated in the power markets for 6 years and have focused on ancillary services, peaking markets and system balancing. Green Frog Power were first into the long-term STOR market and have been heavily engaged in the development of the Capacity Market since the beginning.

We foresaw that the deployment of large-scale solar and wind power in the UK would create a need for the development of a very specific type of power generation. We like to think that we were first here again – we build fast-starting plant that can deliver at the same rate as hydro.

We worked with manufactures of generation plant and software engineers for over two years and have now developed a power plant that can start from cold synchronise and export at full power in 40 seconds using clean natural gas. Not

only that, but it can do this repeatedly. Until now, no other power generation plant could do this – it is exactly what the UK power market needs today.

Having analysed the market by looking back at historic power prices and looking forwards at the likely impacts of solar and wind - set against decreasing supply margins, we formulated a business plan to present to our investors and banks.

In developing this business plan, we examined the Triad market as all of our plant were to be embedded in distribution networks. We had read the 2013 National Grid report into Triads and all of the consultations submitted at that time and concluded that Triads were a key structural element of the UK energy market. The behaviour that Triads engender, we felt, when set against such tight margins of supply, were the perfect tool to ensure that when the system was experiencing highest demand, embedded generators were queuing up to do their very best to 'hit' the Triads.

We presented our business case to our investors - Infrared Capital Partners - a major infrastructure fund, in June 2014 in anticipation of the 2014 CM auction. We also presented our business plan to a number of UK banks with specialist energy lending teams – including Royal Bank of Scotland, HSBC, Lombard and Lloyds.

As we progressed, the financiers sought independent energy-sector experts to advise them on our business plan, commercially and technically. The matter of Triads and their longevity was sensibly raised at this time. The advice was that whilst Triads were not de facto an enduring part of the system, they were, it was felt, such a structural part of the security of supply in the UK Energy sector that any change to them would only be introduced after a full analysis of the impacts on system security and after due consideration of what would replace them – in short an SCR process.

Given that a detailed review and consultation into Triads had just been concluded by National Grid (2014) with industry consensus that Triads worked very well it was not unreasonably concluded by ourselves and our investors that no such review was likely in the near term. And that if any such review were to be

undertaken that the SCR process was probably going to take three years or thereabouts.

Since the announcement of the two modification proposals, our bankers and the investment world has learned of a new peril – the CUSC panel and its processes. We can advise Ofgem that the whole of the energy sector is now seeking third-party advice as to how this arcane process works and what the possible impacts to their current and future lending might be.

The process of modification proposals, working groups, partial and meaningless voting, CUSC panel recommendations and Ofgem's hints to attempt to sway the outcome is fraught with risk and cliff edge outcomes. Ofgem would be advised to proceed with extreme caution before invoking either of these modification proposals as submitted (not to mention the much worse WACMS that were resuscitated by the chair after being voted against by the work group), as we believe the impact on investor confidence could be catastrophic and far reaching.

Green Frog Power have noted Ofgem's thoughts on grandfathering in their Open letter to which we are responding. We will not dwell on this overmuch, but having been the first company to build any sort of sizable new reliable plant in the UK and having completed almost 500MW of plant in the past four years we think our opinion bears consideration. Our bankers and investors reasonably expected a level of income from Triads over a period of years –their overnight removal will have major implications for the energy sector investment appetite. If Triads can be taken away overnight what else might be changed next?

As a private company Green Frog Power (and many other new entrants) rely on bank lending and project finance. We do not have the benefit of a billion-pound state-supported balance sheet. We are completely reliant on bank funding to complete our 1,000MW plan over the next two years and the banks rely on a reliable and trustworthy regulatory regime in order to lend to people like us.

The modification proposals

We do not believe that CMP264 or CMP265 better facilitate the remaining CUSC objectives. The original intent of embedded “benefits” was to exclude embedded parties from exposure to the costs of a system that they do not use. CMP264 and CMP265 each propose to charge some, but not other, recipients of embedded benefits for the cost of the transmission system that they do not use.

Under these proposals, some parties who use the transmission system would be charged and others would not. Some generators who do not use the transmission system would be charged at the same rate as generators that do use the system.

Those generators that do not use the system would distinguished between each other on the basis of an arbitrary cut-off date for first commissioning, or by virtue of having specific contractual arrangements (CM obligations). This is very clear and arbitrary discrimination.

Either of these proposals would clearly create distortions that would grow in significance if the underlying size of the residual TNUoS were not addressed in the first instance. We fail to see that an arbitrary distinction and discrimination against certain parties better facilitates the CUSC objectives and, in fact, both proposals, as they stand would cause a worsening situation compared to the CUSC objectives.

Moreover, the attempt to increase the costs of competitors’ generation through charging them for the use of assets they do not in fact use is fundamentally absurd.

A better approach would be to address the issue of spiralling residual costs through a full, top-to-bottom SCR and consideration of the appropriate mechanism for collecting from consumers in such a way that is least regressive and least distortive, while still meeting the objectives of the CUSC and the wider policy and regulatory objectives. We understand the workload Ofgem wrestle with and if more resources are needed industry would stand shoulder to shoulder to persuade government of the importance of a full review and getting a level playing field for the next 20 years as the UK power system evolves.

There has been a notable lack of evidence provided to support the modification proposers' assertions that the current system leads to inefficient dispatch or to the inefficient closure of transmission connected generators, so we are unable to comment on whether the proposals better facilitates CUSC objectives in these regards other than to say we assert that that their claims are not true.

We are also concerned that the modification proposals fail to address effectively behind-the-meter generation and DSR providers. If the fundamental method by which the transmission residual is collected is not addressed, the spiralling value will cause increasing distortions. This will result in yet another review and further dragging out of the uncertainty in an already inhospitable investment environment created by the currently proposed changes.

Though these issues have been raised regularly through the workgroup meetings, the timetable did not permit a thorough impact study. Triads have been an integral part of the power system for decades – changing them without thoroughly reviewing the impact on consumers would be short-sighted and fraught with potential risk.

Along with a lack of analysis of the impacts on security of supply and consumers' costs, there has not been sufficient time to conduct a thorough system-wide study of the value of embedded generation to the system – in other words, what is the cost-reflective value of embedded generators.

Scottish Power have honed in on a (convenient to them) ~£1.60/kW, identified in a cursory study by National Grid some years ago. In contrast, Cornwall Energy have identified, in their own more recent and study considering broader issues, that ~£32/kW was the appropriate cost-reflective level. The workgroup had no time to consider the methodology underpinning these studies nor to propose or conduct additional studies. Nonetheless, we note that £32/kW is the level closest to that which has endured over recent history and which has had the desired impact on security of supply (i.e. keeping the lights on during winter peaks). A mathematical analysis is interesting but it does not drive behaviour.

We reiterate our view that an SCR is required to address the issue of the TNUoS residual and embedded benefits appropriately and in a manner that will ensure we are not all back together in a similar workgroup in six or twelve months. We urge Ofgem to ensure that investor confidence is maintained and that any interim solution fixes Triads at a rate that will continue to drive behaviour.

The best approach would be to apply a fixed or capped level of Triads, at this winter's level for example, to all embedded generators. This would be a compromise solution that would endure through an SCR process, or indeed even without one, providing stability and consistency to the market and to investors. This would still leave the significant issue of distortions between the rewards for different types of parties whose same actions, in different ways, both reduce transmission demand. Nonetheless it would be acceptable for an interim solution.

There are further justifications for fixing the Triad payment at this winter's level, some £45 per kW, beyond the fact that such a figure reflects the status quo and is therefore the least disruptive. First it was the level that was being predicted by National Grid when they undertook their review in 2013/14. It is therefore what investors were expecting. Second it is reflective of the value of lost load to consumers, as agreed by Ofgem and BEIS.

The most important factor is a fair and stable regime. If financiers and investors do not feel that the regime is reliable then it is not fit for purpose. It is therefore important to ensure that a thorough review of the charging regime is undertaken. Meanwhile this is not the time to cut the income of generators who are keeping the lights on.

Kindest Regards,

Mark Jones
Managing Director
Green Frog Power Ltd