

The Association for  
Decentralised Energy



**ade**

Bringing Energy  
Together

Combined Heat & Power  
District Heating & Cooling  
Demand Side Services

Security of supply policy:  
Risks to energy intensive industries  
and local generation?

## Context

In most cases, embedded benefits are not 'benefits', but a recognition that distribution-connected generators and export from storage do not use the transmission network, and so should not pay for its use.

However, as transmission network costs have increased significantly over the last 10 years the level of benefits for not using the transmission network has risen concurrently, and some have raised concerns about whether the benefits reflect the avoided costs of distributed generation and storage.

DECC issued a consultation on 1 March 2016 announcing further changes to the Capacity Market. In the document, DECC said there may be merit in concerns that diesel engines have unfair advantages in the Capacity Market due to how they are treated in the energy market, impacting the competitiveness of new large scale gas power station projects. DECC said Ofgem is therefore reviewing whether it would be in consumers' interests to change the charging arrangements for distributed-connected generators and that the regulator will set out its conclusions and a proposed way forward in the summer.

As a result of this announcement, Cornwall Energy was commissioned by the Association for Decentralised Energy (ADE) to review the level of embedded benefits that are currently available to generation and storage that connects directly to the distribution network and to better understand what impacts different approaches would have on the electricity market and on energy consumers.

The ADE is the UK's leading decentralised energy advocate, focused on creating a more cost effective, efficient and user-orientated energy system. The Association has more than 100 members, from industrial manufacturers to energy service providers to local authorities. The ADE's members have particular expertise in combined heat and power, district heating networks and demand side energy services, including demand response.

This document provides an overview of Cornwall Energy's findings and an overview of the key issues.



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## Do local generators use the transmission network?

Local generators and storage connect to the energy system using distribution networks. These networks are the local A and B roads of the electricity network system. In contrast, larger generators connect to the system through the transmission network, which represent the equivalent of the motorway.

UK electricity networks charge based on their 'use of system', with the aim of distributing costs fairly to the market participants who increase network costs. Transmission network charges for demand users is based on their use of the transmission network during three half hour periods of peak demand in the year. If a distributed generator or storage provider exports at these periods, their generation reduces the demand on that particular distribution network, and therefore reduces the demand on the transmission network.

From the perspective of the transmission network, reductions in demand and increases

in generation on the distribution network have exactly the same impact. Cornwall Energy's report argues that any changes to transmission network charges should treat both demand and distributed generation equally or it risks sending different, asymmetrical price signals for the same result – a unit of reduced transmission network demand.

A change in this approach would be akin to charging drivers for the use of a toll road even when they took alternative routes.

Cornwall Energy instead recommends improving the cost reflectivity of the triad and charge generators in DNO areas that export on the transmission network and when that export leads to an increase in transmission network costs.

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## Removing the Embedded Benefit

There would be four significant likely outcomes if the Embedded Benefit were to be removed as a result of Ofgem's review.

The first impact is on industrial manufacturers, many of which generate their own electricity using combined heat and power (CHP). The changes being considered by the review could result in an increase of £170m in energy costs to industrial manufacturers who generate their own power. Some manufacturers could see their energy costs go up by nearly £3m a year, creating uncertainty at a fragile time for the UK industrial economy.

The second impact is on the Capacity Market. Cornwall Energy found the Embedded Benefit's removal would have increased the 2015 Capacity Market price by £4.70/kW, leading to increased consumer costs of £214m. However, despite the increased consumer cost, removing the Embedded Benefit in either the 2015 or 2016 auction would not increase the likelihood of large gas power stations winning the Capacity Market auction.

The third impact would be on the wider local energy market, including energy storage providers, wind farms, hospitals and other technologies and customers. While there is a focus at the moment on distributed diesel engines, these made up less than 1 GW in the two most recent Capacity Market auctions. In contrast, there is more than 18 GW of distributed generation in the UK, all of which will be affected by this review.

The fourth impact would be on the wholesale market. Cornwall Energy's analysis found that its removal would increase peak wholesale power prices between £0.63/MWh and £2.84/MWh, increasing consumer costs between £10m and £45m a year.

In addition, end consumers face further costs due to an increase in the cost of National Grid balancing the system, higher levels of reinforcement at both the transmission and distribution network level, and higher cost of capital as a result of increased risk.



## Is the 'embedded benefit' fair?

Cornwall Energy's review found that distribution-connected generators are being fairly rewarded for the costs that they avoid on behalf of network operators, when both transmission and distribution level embedded benefits are considered.

Cornwall found the benefits of distributed generation are undervalued in the distribution network Common Distribution Charging Methodology (CDCM), increasing the level of benefits by between £7.4/kW and £16.6/kW. This undervaluing highlights the importance that any reduction in transmission-level benefits, without concurrent increases in distribution benefits, would result in network charging becoming less cost reflective overall.

Cornwall Energy also found that some transmission network embedded benefits are overvalued, but that this overvaluing is not from the benefit itself, but a result of how the transmission charges they avoid are calculated.

The level of the Transmission Use of System (TNUoS) charge has consistently grown over the last eight years and will grow by 53% over the next 5 years to £3.8 billion a year. Cornwall Energy analysis suggests that the current level of the TNUoS triad charge is overvaluing the costs of the transmission network for both demand users and embedded generation.

Cornwall Energy also found the actual costs savings of distributed generators is much higher than the estimates put forward by National Grid in various documents over the last five years.

In total, Cornwall Energy estimates that an appropriate TNUoS Triad charge would be £32.3/kW, a reduction from the 2015-16 rate of £45.80/kW, and that both demand and distributed generation should receive TRIAD benefits which reflect the full value of this charge. The findings are set out below:

- Under one of its scenarios, National Grid plans to spend £8.8 billion over the next 15 years to upgrade transmission network infrastructure. The average yearly cost across all the schemes is £18.5/kW on a 2015-16 price basis.
- As investment in embedded generation and storage is a long term decision and they offset demand over the life of their connection, Cornwall Energy found embedded generation should not only benefit from offsetting short term costs but long term costs as well. They estimate these elements to equate to c£13.8/kW in 2016-17.
- National Grid recovers its long term infrastructure costs over each year, based on annual peak demand, when the costs should be distributed evenly over a longer-term timeframe, reflecting the long-term nature of energy investments. Cornwall Energy's analysis concludes the current approach overstates the value of the triad charge, and therefore the triad benefit, by approximately £9.2/kW in 2016-17.
- A number of the elements that make up the target revenue for Transmission Network Use of System (TNUoS) are fixed in nature, yet are recovered from a demand-based charge. Cornwall Energy's analysis suggests that these components of cost overstates the value of the triad charge by approximately £4.4/kW.

**IN TOTAL, CORNWALL ENERGY ESTIMATES THAT AN APPROPRIATE TNUoS TRIAD CHARGE WOULD BE £32.3/KW, A REDUCTION FROM THE 2015-16 RATE OF £45.80/KW**

Cornwall Energy also reviewed the Capacity Market Supplier Charge (CMSC). This charge recovers the costs of the Capacity Market and is also an embedded benefit to any generator that exports between 4pm and 7pm on weekdays, November to February. The value for the CMSC is minimal at present but is expected to rise to around £17.5/kW in 2018-19 for a generator that exports 90% of its capacity during the CMSC period.

Cornwall Energy concludes that the CMSC is potentially rewarding embedded generators twice, both through the Capacity Market if they are successful within the tender and then again through the avoidance of the CMSC. The principle of awarding generation twice for offering the same service potentially distorts the price at which embedded generation may bid into the Capacity Market and the resultant clearing price and this is an area that needs further review.

## The review process

Network charging is a complicated and integrated area, with knock-on effects across the energy system. Any review should not be taken lightly or suddenly, but must instead be careful, holistic and systematic. National Grid are currently reviewing charging arrangements and there are further important interactions with other related areas, such as the Flexibility and Non-Traditional Business Model agendas and European grid code development, all of which require a joined up approach.

The decision to review the Embedded Benefit comes unexpectedly. This issue has been consulted on twice in recent years, most recently just two years ago, without any changes. To rush through changes now would be a short-term response to a complicated, long term issue, and could cause significant harm to industrial manufacturers, a wide range of distributed generators, and long-term storage ambitions.

We are therefore concerned that the current timetable states Ofgem will set out a proposed way forward by this summer. Any changes to network charging will impact all distributed generators and storage and must therefore be approached very carefully.

While setting out a review process and scope early on will be important for industry transparency, the review should not try to set out any proposals or recommendations to meet political timetables, such as the 2016 Capacity Market auction.

**NETWORK CHARGING IS A COMPLEX ISSUE. ANY CHANGES WILL IMPACT ALL DISTRIBUTED GENERATORS AND STORAGE AND MUST THEREFORE BE APPROACHED VERY CAREFULLY.**

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