

ENERTECHNOS

Response to Call for Evidence on Facilitating Energy Efficiency in the Electricity System
Department for Business, Energy and Industrial Strategy

Question 7: Are there potential benefits from combining energy efficiency and flexibility? How can we maximise these benefits?

Enertechnos recognises the importance of energy efficiency and believes that in combination with flexibility it has the potential to play a vital role in helping the government achieve its net zero emissions target.

However, we believe this approach neglects a fundamental part of the equation in reducing energy bills and carbon emissions (cited by BEIS as the two intended outcomes) – efficiency in our transmission and distribution system.

When considering energy efficiency and flexibility in terms of the ongoing energy transformation and introduction of new technologies – heat pumps, electric vehicles, and home-generation etc. – it is vital that government takes a system-wide approach to the way it addresses efficiency and incorporates the transmission and distribution system as a priority. This should come alongside a focus on end-point efficiency and demand reduction. Government, Ofgem and distribution network operators (DNOs) must turn to losses – **a form of inefficiency which represents 1.5 per cent of the UK's total carbon emissions.**

According to BEIS, **in 2017/18 power lost in the transmission and distribution systems totalled 26,663 GWh¹, enough to power nearly seven million homes, wasting almost £1.3 billion** (£1,291,022,460 based on the 'societal cost of losses' set by Ofgem at £48.42/MWh – not taking into account the cost of measures taken to reduce losses).

Both the transmission and distribution networks operate using alternating current (AC). Over long distances, the current (amps) loses sync with the voltage (volts). This leads to a portion of the generated power being converted into 'reactive power' which means less usable energy comes out of the cable at the end. The result is that more energy must be generated to service the same demand – increasing costs and emissions.

As we move towards a flexible energy system, and energy moves two ways, losses will only multiply. Any discussion of the relationship between energy efficiency and flexibility must consider this element of inefficiency seriously.

Further, as we connect new sources of generation and new technologies, we must ensure the cabling used in this infrastructure is as efficient as possible. This should also be a primary consideration for DNOs replacement programmes which see around 2 per cent of cabling replaced annually.

Given the long typical lifetime of an underground cable of 40 to 50 years, it is critical that the cable installed now is fit for the future and provides sufficient capacity to avoid costly network reinforcement down the line.

Aside from the government's net zero policy ambitions, customers also bear the cost of energy losses. Network charges form around 25 per cent of the average household dual fuel bill and include the cost of generated energy which is lost during distribution. Put simply, this means customers pay for electricity which never reaches their homes. Instead of simply focusing on energy efficiency in homes and businesses, improving network cabling efficiency has the potential to significantly decrease consumer bills.

¹ Department for Business, Energy and Industrial Strategy, Digest of UK Energy Statistics, 2019

To help address the issue of energy losses, Enertechnos has developed an innovative technology – the Capacitive Transfer System ('CTS') – which provides a cost-effective solution to replacing existing cabling and deploying new infrastructure while providing significant system benefits through reduced losses. A CTS-enabled cable balances reactance and capacitance, which results in lower voltage drop and lower losses compared to traditional electrical cables available on the market. A case study of an island connection 60km away from the grid produced by Enertechnos shows using the CTS would reduce the project's capital CO2 footprint by 965 tonnes, use 17 per cent less copper and deliver up to 70 per cent more power.

Enertechnos welcomes the government's ambition to use efficiency to "help avoid or reduce the need to build new generation and reinforce electricity networks". However, facilitating energy efficiency must include support for improving efficiency of the transmission and distribution networks. We believe government and Ofgem should ensure the correct policies and incentive framework are in place to ensure DNOs make this a priority in new infrastructure and replacement programmes. Enertechnos will be responding to Ofgem's RIIO-ED2 Consultation to outline what this should look like.