

Storage and how it is currently charged today on the transmission network

Purpose

The purpose of this paper is to clarify the way in which **transmission connected storage** is treated in the transmission network charging methodologies. This paper reflects the current framework methodologies, with the aim of providing information to storage providers as to how they would be charged once connected to the transmission network.

We recognise that there is considerable interest in the area of storage and note that the commercial arrangements for storage may develop in the future.

Storage

At present the only form of electricity storage, which is the conversion of electrical energy into a form of energy which can be stored, the storing of that energy and the subsequent reconversion of that energy back into electrical energy, that is formally recognised within transmission charging arrangements (as contained in section 14 of the CUSC) is Pumped Storage. This is the most mature form of storage technology and can provide multiple operational and ancillary services.

We recognise that other storage technologies are increasingly considering connection to the transmission network and that these may have different operational characteristics and other factors which may lie outside of the definition of conventional generation. This is a developing area and there are ongoing industry initiatives to clarify treatment of storage more broadly and we believe that work associated with network charging arrangements needs to be considered alongside other drivers for change as part of a holistic review. We will continue to keep this under review as technologies and understanding of the appropriate treatment of these evolve but at present if another form of storage were to connect to the transmission system **today**, it would be **treated in the same way as Pumped Storage for charging purposes**. Therefore the following sections detail how a Pumped Storage unit is charged and the same would be applied to all other storage technologies.

How is Pumped Storage charged?

Transmission Use of System Charges (TNUoS)

In line with all other generators, Pumped Storage is exposed to both generation and potentially demand Transmission Network Use of System charges (TNUoS).

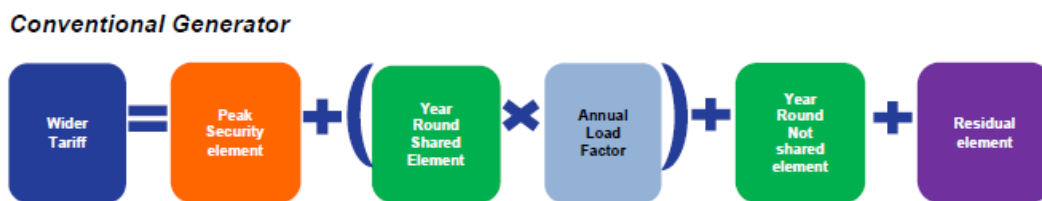
TNUoS **generation charges** are based on the following elements:

- **TEC (Transmission Entry Capacity):** TEC is the maximum transmission access purchased by a generator for a given financial year.
- **ALF (Annual Load Factor):** ALFs are generator specific, are based on a generator's output over the last 5 years and recognise the sharing of transmission infrastructure between generators. For a new generator, until a specific ALF can be calculated

based on actual output, a generic ALF is used which is based on other generators of the same technology. For a pumped storage generator this is currently 10.83% (2016/17).

- **Location:** Generators pay a wider tariff based on their location. There are 27 generation zones based on where a generator is connected to the network.

Presently, Pumped Storage is classed as a **conventional generator** (non-intermittent) within section 14 of the CUSC; consistent with treatment in the SQSS and Grid Code. This is because Pumped Storage units generate in response to market signals and therefore generate at times of peak demand (i.e. act in the same manner as conventional generation). As a conventional generator, Pumped Storage pays a wider tariff composed of the following parts.



In zones where the wider generation tariff is positive this is then multiplied by the Pumped Storage's TEC to calculate its annual charge. There are a number of zones where the wider tariff may be negative; in these zones the tariff is multiplied by the Pumped Storage's unit maximum metered output in accordance with the methodology laid out in section 14 of the CUSC, to derive a credit for that unit.

In common with other generators, Pumped Storage will also pay a local substation tariff, and depending on their connection, a local circuit tariff.

More detail on the calculation of generator TNUoS charges can be found on the following [webpage](#), under 'Generator Payment Information'. The latest TNUoS tariffs can be found [here](#).

TNUoS **demand charges** for generation customers are liable if a generator takes energy (demand) at time of Triad (information on which can be found [here](#), under 'Triads Information'). Demand charges include a locational element and a residual charge, and are specified on a demand zone basis, of which there are 14 demand zones based on DNO areas. (More general information can be found [here](#) under 'TNUoS, BSUoS and Connection Charging Information' and draft tariffs can be found in the following [location](#)). If a generator does not take demand over the Triad periods, then they are not liable for demand charges.

Balancing Services Use of System (BSUoS) charges

For Balancing Services Use of System (BSUoS) charges Storage is treated as any other Trading Unit.

Therefore, if in any settlement period a Trading Unit generates, they will pay the delivering BSUoS charge. However, if in any settlement period a Trading Unit takes demand, they will pay the offtake BSUoS charge. The BSUoS charge is calculated on a net energy basis

within a settlement period which means a storage unit can reduce BSUoS liability if it both stores and releases energy during the same settlement period.

For more information on BSUoS please visit the following [site](#).

If a storage provider is contracted for an ancillary service, they will also be treated and charged the same as any other Trading Unit (more information on this can be found in the CUSC section 4).

Next Steps

We recognise that there is a need to consider more broadly transmission charging arrangements for storage and note ongoing works such as Ofgem's call for evidence on [flexibility](#) and also an open letter regarding [embedded benefits](#), where the treatment of storage is listed as an area of interest.

We will endeavour to keep stakeholders up to date with developments in this area through both our website and also the Transmission Charging Methodologies Forum.