The Proposer also modelled the impacts of the potential options summarised below. Using ESO's TNUoS forecast for 2023/24, with ALF set at 9%, they forecasted impacts across all zones and derived average values. CMP393 averaged at £1.42/kW. Option 1 averaged at £1.47/kW, and Option 2 averaged at £1.98/kW. Options 3 and 4 averaged at £2.02/kW, and Option 5 averaged at £2.47/kW.

Potential alternative solutions discussed prior to Workgroup Consultation

1. ***Floor Storage ALF at zero***

Draft tariff: peak + (Storage ALF floored at zero x year round shared) + (Storage ALF floored at zero x year round not shared) + Adjustment Element.

As discussed above, several Workgroup members queried the value of negative Storage ALFs. Negative ALFs, they argued, would introduce demand considerations into a generation tariff. They therefore proposed flooring Storage ALFs at zero. Flooring Storage ALF at zero would avoid negative non-shared and shared numbers.

2. ***Apply storage ALF to non-shared element only***

Draft tariff: peak + (ALF x year round shared) + (Storage ALF x year round not shared) + Adjustment Element.

A Workgroup member suggested that using Storage ALF as the solution across all storage would create a differential in the treatment of storage between the north and south. The workgroup noted that the revised TNUoS tariff would reduce incentives for storage to locate in areas dominated by synchronous generation, while increasing incentives for storage to locate in areas dominated by non-synchronous generation.

The Workgroup member therefore suggested a potential alternative: using the baseline methodology for year round shared, and using the proposed Storage ALF for year round not shared.

The year-round shared component of the Conventional Carbon tariff refers to areas dominated by synchronous power, which are mostly located in the south. The year-round not-shared element refers to areas dominated by non-synchronous power, which are mostly located in the north. Under Option 2, Storage ALF would only apply in zones where non-synchronous generation predominates. This would prevent the code modification from reducing the current incentive for storage to locate in the south, in areas dominated by synchronous plant.

The Proposer noted that the intention of CMP393 is for all storage to be more accurately represented in the methodology, regardless of location. CMP393 proposes to fix an inaccuracy in the TNUoS methodology for all storage, by taking imports and exports into account. In the view of the Proposer, this change would make the TNUoS methodology more cost-reflective, as it would better reflect storage's impact on the NETS; it would reduce barriers to competition, as storage TNUoS charges would be more closely related to storage behaviour; and it would ensure the TNUoS

methodology better reflects changes in licensee business, given that more storage is connecting to the NETS. The Proposer observed that applying Storage ALF to the non-shared element only, and so allocating Storage ALF differentially according to location, would arguably reduce these benefits. Even so, in the view of the Proposer this option would improve on current arrangements.

3. Apply storage ALF to non-shared element only and floor at zero

Draft tariff: peak + (ALF x year round shared) + (Storage ALF floored at zero x year round not shared) + Adjustment Element.

This approach combines Options 1 and 2. The Workgroup's debates about these approaches are outlined above.

4. Remove non-shared element for storage

Draft tariff: peak + (ALF x year round shared) + Adjustment Element.

This alternative would have the same end result as Option 3. It would achieve this end result by simply removing the non-shared element for storage, rather than by using a Storage ALF floored at zero.

This option would reduce the complexity of implementation for ESO. Option 3 would result in a need to calculate two ALFs for all storage operators. Option four would reduce this administrative complexity.

5. Split out ALF into demand and generation components within the year-round not-shared element

Draft tariff: peak + (ALF x year round shared) + (ALF x year round not shared) – (Storage Demand ALF x year round not shared) + Adjustment Element.

Rather than using a unified Storage ALF, this approach would use a separate demand ALF and generation ALF for storage. This approach to ALF would apply only in the year-round not shared element of the TNUoS tariff. The end result would be likely to be the same as in Option 2 (i.e., applying storage ALF to non-shared element only).

In discussions of this option, a Workgroup member noted that final demand tariffs are based only on peak demand. Final demand has a similar effect on flows to storage demand, but it is subject to different charges and a different charging basis (peak + year round x triad demand floored at zero). By contrast, the proposed solution and the potential alternative solutions would take storage demand into account only in the year-round part of the tariff. The Workgroup member suggested that CMP393 therefore risks creating a distortion between different types of demand. They proposed that a key challenge with CMP393 and the potential alternative solutions is to ensure that there is no undue discrimination between final demand and storage demand.

The Proposer accepted that the modification would result in different treatments of final demand and storage demand. They also pointed out that current arrangements already treat storage demand and final demand differently, in that they do not recognize storage demand at all. They argued that while the proposed changes would

not result in a fully consistent regulatory treatment of storage demand and final demand, they would improve on the status quo.

The work group noted that any of these solutions may have an impact on CMP405, which seeks to address locational demand TNUoS signals for storage.

6. Classification

Any of the options above within a new Generation Classification for storage

Rather than creating an additional tariff within Conventional Carbon, this option would create a new Storage generation classification. The proposed name of this generation classification is **Storage Generators (energy storage).**

Storage has a history of being identified as a subset of generation in the UK. The Government has committed to enshrining storage as a subset of generation in legislation, when parliamentary time allows. They also commit to allowing 'flexibility for treating storage differently to other forms of generation where it is appropriate to do so'.[1] A Generation Classification for storage would be consistent with this legislative direction of travel, recognising energy storage as a distinct type of energy asset capable of both importing and exporting.

Effect of CMP393 and potential options of potential alternative solutions on year-round locational signal

CMP393 uses an aggregated 'Storage ALF'. For all types of storage this is likely to be slightly negative, principally driven by round-trip efficiency. For a perfectly efficient storage facility, the ALF would be zero. Effectively then, by applying Storage ALF to the year-round element of the TNUoS tariff, CMP393 would remove the year-round locational signal for storage. Workgroup members reflected on the justification for this change, considering the principles behind ALFs and the year-round elements.

A Workgroup member highlighted that the original principle behind ALFs was to quantify the likelihood of generation exporting power at the same time, constraining networks and thus requiring reinforcement. Some Workgroup members argued that storage importing is lowering that likelihood, meaning the proposed solution is consistent with the original principle behind ALFs. As set out in Project TransmiT, the year-round element of the TNUoS tariff is multiplied by ALF to provide 'a proxy of the impact an individual generator has on the costs of a system when investment is planned to manage constraint costs. Plant that operates more frequently would pay charges reflecting their increased likelihood of triggering (or avoiding) constraint costs'.[2]

The year-round locational signal is broken into two parts: shared and not-shared. In areas where there is a high degree of 'Conventional Carbon' generation, the shared signal is high. In areas where there is a high degree of 'Intermittent' generation, the

[1] Energy Security Bill Factsheet: Defining electricity storage', *GOV.UK,* <bit.ly/3KlyeeA>.
[2] *Project TransmiT,* p. 13.

not-shared signal is high. In the view of some Workgroup members, the key characteristic of ‘conventional carbon’ generation is not carbon emissions, but dispatchability. This generation type (coal, gas, etc) can be bid down to manage constraints caused by a lack of network capacity and low-carbon flexibility to accommodate inflexible (primarily wind) generation.

In areas where intermittent renewable generation has replaced dispatchable fossil-fuelled generation, the non-shared element is high. In part, this is because there are limited opportunities to balance system flows by turning down fossil generation. In these circumstances, storage demand and final demand have an important role to play in managing boundary flows by increasing demand at times of high intermittent generation output.

A key challenge with CMP393 would be to ensure that there is no undue discrimination between final demand and storage demand. Final demand has a similar effect on flows to storage demand, but is subject to different charges and a different charging basis (peak + year round x triad demand floored at zero). The Proposer acknowledges this imperfection but observes that the proposed changes improve on the status quo, in which storage demand is not recognised at all.

If CMP393 is implemented, then in some areas there would be a negative non-locational charge. Workgroup members suggested that in order to implement CMP393, there would need to be a good understanding of what system conditions would lead to this negative charge, and whether it would be appropriate to continue to apply the negative non-locational charge to storage. This was addressed by the introduction of flooring the ALF at zero when the Proposer amended their solution following the Workgroup Consultation.