**Supplement to CMP316 Workgroup Report**

Includes numerical tariff calculation for the WACM

August 2022 (amended November 2022)

Supporting calculations to note

Wider tariffs by generation category:

### 

### Conventional Carbon Generators

(Biomass, CHP, Coal, Gas, Pump Storage)

**ALF**

**Peak Element**

**Year Round Shared**

**Element**

**Year Round Not Shared Element**

**Adjustment Tariff**

**ALF**

### Conventional Low Carbon Generators

(Hydro, Nuclear)

**Adjustment Tariff**

**Peak Element**

**Year Round Shared Element**

**Year Round Not Shared Element**

**ALF**

### Intermittent Generators

(Wind, Wave, Tidal)

**Year Round Shared Element**

**Year Round Not Shared Element**

**Adjustment Tariff**

**ALF**

Co-located generation site examples

Power station A has TEC of 60MW, and it consists of three BMUs/technology types. The capacity and the annual outputs (MWh) are listed below

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Maximum Capacity (MW)** | **Fuel type** | **Annual exporting (MWh)** |
| BMU1 | 50 | Wind | 135,000 |
| BMU2 | 40 | CHP | 250,000 |
| BMU3 | 15 | Battery | 35,000 |

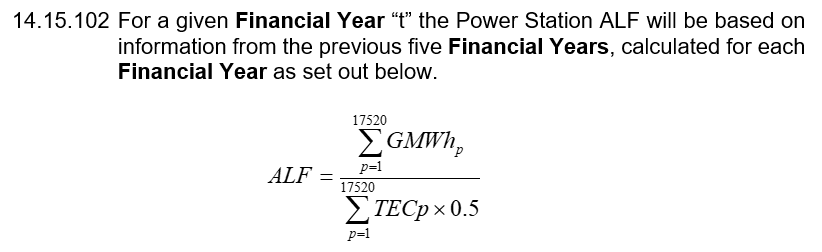
Given the following wider generation tariffs (note these are not current tariffs provided for illustration only)

|  |  |  |  |
| --- | --- | --- | --- |
| **Wider Tariffs (£/kW)** | | | |
| **Peak Security** | **Shared Year Round** | **Not Shared Year-Round** | **Adjustment** |
| 5 | 15 | 12 | 0 |

1. Baseline

As the predominant technology is wind, the power station is treated as wind.

As CUSC Section 14



The Power Station ALF will use the sum of the annual exporting MWh for each technology type.

ALF = (135000+250000+35000)/(60\*8760)=80%

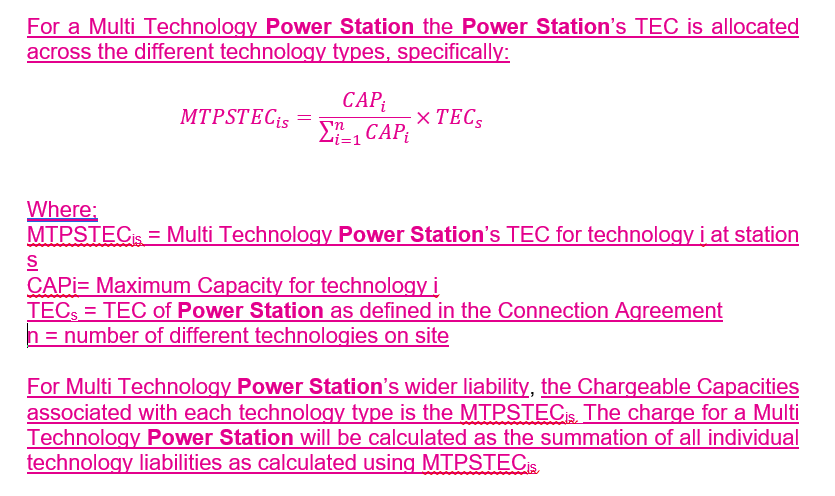
Then for the intermittent generation, its wider tariff is (15X80%+12+0=)£24/kW, and its wider charge is (24X60=) **£1,440k**

1. CMP316 Original solution

**ALFs are used to calculate a tariff for each technology type, and then these tariffs are applied by multiplying against a scaled capacity for each generation type. Note that the scaled capacities must equal the total power station capacity.**

The TEC of the power station is apportioned to each technology according to the Maximum Capacity (as defined within the Grid Code) of the relevant BMUs

As CUSC 14.18.7



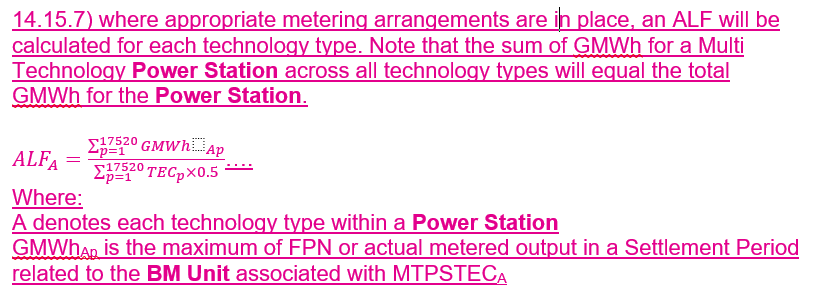
|  |  |
| --- | --- |
|  | **MTPSTEC (MW)** |
| Technology 1 (Wind) | 28.6 |
| Technology 2 (CHP) | 22.9 |
| Technology 3 (Battery) | 8.6 |

Generation charge

Given the wider generation tariffs

|  |  |  |  |
| --- | --- | --- | --- |
| **Wider Tariffs (£/kW)** | | | |
| **Peak Security** | **Shared Year Round** | **Not Shared Year-Round** | **Adjustment** |
| 5 | 15 | 12 | 0 |

As CUSC 14.15.102  

ALF1=135000/(60\*8760)=26%

ALF2= 250000/(60\*8760)=48%

ALF3=35000/(60\*8760)=7%

(Note there is some rounding in the illustration above. The sum of the technology ALFs does sum exactly to the Power Station ALF with additional decimal places)

Wider tariffs for each technology are

Wind: (15X26%+12+0=)£15.9/kW

CHP: (5+15X48%+12X48%+0=)£17.8/kW

Battery: (5+15X7%+12X7%+0=)£6.8/kW

And the wider charge for this power station is (15.9X28.6+17.8X22.9+6.8X8.6=) **£919k**

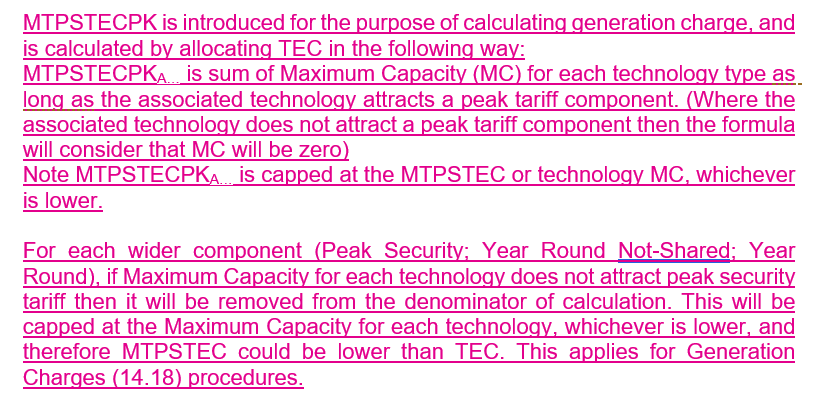
1. CMP316 WACM Solution

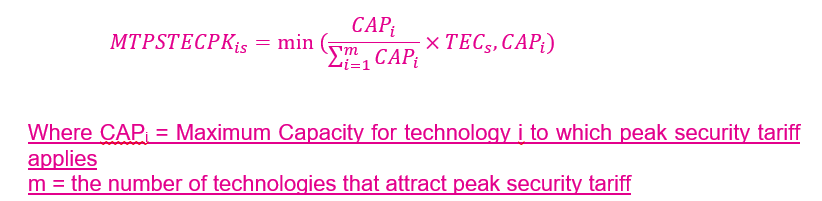
**Peak charge uses a slightly different scaled capacity (MTPSTECPK) which is zero for intermittent generation units (reflecting that for usual tariffs intermittent generation doesn’t have a peak charge), and is also capped at the max capacity for each technology. Year Round not shared uses a different ALF which is 1 unless the generation type is conventional carbon (reflecting YRNS is only usually applied by an ALF for this gen type)**

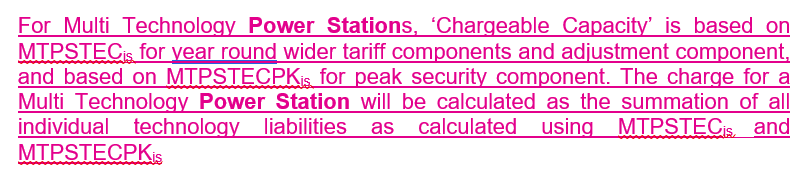
The TEC of the power station is apportioned to each technology according to the maximum capacity of the relevant BMUs –

The solution does not change the calculation of the tariffs. The tariff calculation is as the Original proposal. The charges differ by use of MTPSTECPK and the ALF calculation.

As CUSC 14.8.7 (note MTPSTECPK – used for each technology type could sum to less than the Power Station TEC but cannot higher than TEC)







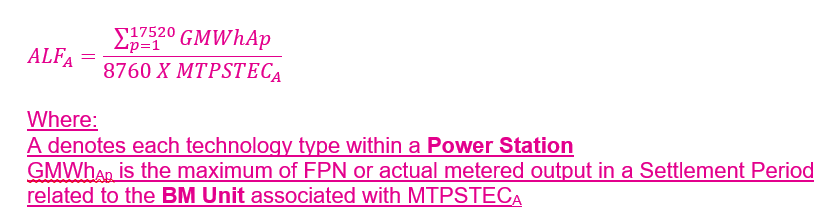
|  |  |  |
| --- | --- | --- |
|  | **MTPSTEC (MW)** | **Peak Capacity (MW) MTPSTECPK** |
| Technology 1 (Wind) | 28.6 | 0 |
| Technology 2 (CHP) | 22.9 | 40 |
| Technology 3 (Battery) | 8.6 | 15 |

Generation charge

Given the wider generation tariffs

|  |  |  |  |
| --- | --- | --- | --- |
| **Wider Tariffs (£/kW)** | | | |
| **Peak Security** | **Shared Year Round** | **Not Shared Year-Round** | **Adjustment** |
| 5 | 15 | 12 | 0 |

As CUSC 14.15.102



ALF1=135000/(28.6\*8760)=54%

ALF2= 250000/(22.9\*8760)=125%

ALF3=35000/(8.6\*8760)=47%  
(note that an ALF at technology level, for the WACM, can exceed 100% but not at TEC level)

*The Peak charge for each technology type is MTPSTECPKi x Peak Security Tariff:*

*Wind = 0 x 5 = £0*

*CHP = 40 x 5 = £200k*

*Battery = 15 x 5 = £75k*

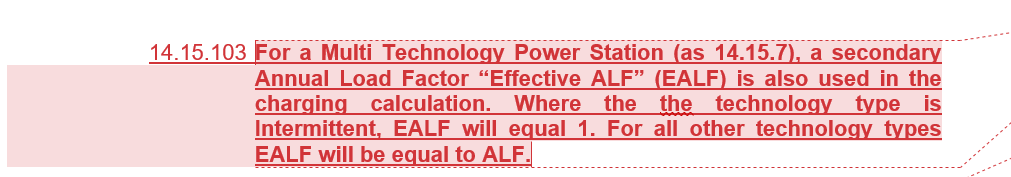
*The Year Round Shared charge for each technology type is ALF x MTPSTEC x Shared Year Round Tariff:*

*Wind = 54% x 28.6 x 15 = £230k*

*CHP = 125% x 22.9 x 15 = £427k*

*Battery = 47% x 8.6 x 15 = £60k*

The Year Round Not Shared charge is then based off a different scaled capacity.



An effective capacity is calculated which effectively calculates how much capacity each tech would be liable for if they were separate stations with full TEC.

**Intermittent and Conventional Low Carbon Effective ALF is treated as 1, Conventional Carbon is the same as the usual ALF**

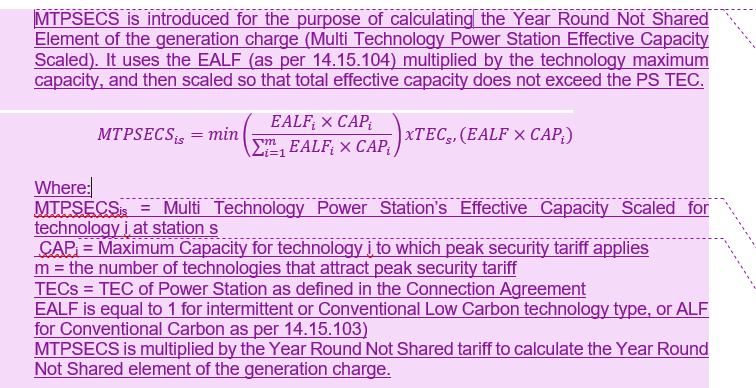
**ALFE1**=135000/(28.6\*8760)=100%

**ALFE2**= 250000/(22.9\*8760)=125%

**ALFE3**=35000/(8.6\*8760)=47%

Effective Capacity = Max Capacity x **ALF (effective)**

If installed liability exceeds TEC (which it does in this example), it is then scaled to equal TEC (Scaled Liability). This is summarised in legal text by introducing MTPSECS (Muti Technology Power Station Effective Capacity Scaled)



Effective Capacity = **ALFE** x Max Capacity:

Wind = 100% x 50 = 50MW

CHP = 125% x 40 = 49.9MW

Battery = 46% x 15 = 6.97MW

This gives a total of 107 MW, meaning that capacity needs to be scaled by 60/107:

Effective Capacity Scaled

Wind: 28.1MW

CHP 28.0MW

Battery = 3.91MW

This could also be calculated by using the summarised legal text formula e.g:

The Year Round Not Shared charge for each technology type is Scaled Liability x Not Shared Year Round Tariff:

Wind = 28.1MW x 12 = £337k

CHP = 28.0MW x 12 = £419k

Battery = 3.91MW x 12 = £21.8k

Total Charges:

Wind = 0 + 230 + 337 = £568k

CHP = 200 + 427 + 419 = £1046k

Battery = 75 + 59 + 21.8 = £157k

Total = £1771k