# CMP316: TNUoS Arrangements for Co-located Generation Sites

Monday 16th September 2019

Workgroup 2

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# Consider the impact on existing parties

- Define “Multi-Fuel Site” in such a way as to only capture sites where generating units within one Power Station are of fuel types that fall into different “charging categories”.

- Retroactive revision of all Appendix C’s would create more work than the value that would be derived from it. Instead an identified list of existing “Multi-Fuel Sites” will be determined and these sites will have their Appendix C’s expanded to list Gensets and BMUs by Fuel Type using the new template after implementation of the consequential changes mod.

- Existing sites that choose to retrofit with another fuel type will have to modify their connection agreement to take account of this and so would be expected to have the new Appendix C and therefore the MFSTEC formula can be applied.

# Generation Backgrounds & GSR022

**The ideal state would be to align both in their treatment of co-located sites however we are no worse off by applying a charging solution before an SQSS solution.**

Peak | Year Round Shared | Year Round Not Shared

## SQSS Appendix C

- Feeds into the *Demand Security* Criterion from which the Peak component is derived.

## SQSS Appendix E

- Feeds into the *Economy* Criterion from which the Year Round component is derived.

## CUSC 14.15.7 & 14.15.8

Continue to have one scaling factor/method for each Power Station for co-located sites, continue to determine this based on the **pre-dominant Generation Plant Type**

| Generation Plant Type | Peak Security Background | Year Round Background |
|---|---|---|
| Intermittent | Fixed (0%) | Fixed (70%) |
| Nuclear & CCS | Variable | Fixed (85%) |
| Interconnectors | Fixed (0%) | Fixed (100%) |
| Hydro | Variable | Variable |
| Pumped Storage | Variable | Fixed (50%) |
| Peaking | Variable | Fixed (0%) |
| Other (Conventional) | Variable | Variable |

# Consider the Ongoing Work on Storage

## CMP280/81 and CMP319

- Impact on CMP316.
- CMP280/81 and CMP319 are all to be reviewed by CUSC Panel in September to determine whether they can go to Ofgem for a decision.

## New Definition from CMP319

"Electricity Storage" 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.

An "Electricity Storage Facility" is a facility where Electricity Storage occurs.

# A Revised Solution

Refer to the circulate Draft Modification Report for tracked changes updates

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# Potential Solution: – “Pro-Rata” ing TEC

- Apportioning TEC between different components on the site using a new “multi-fuel site” formula
- Second CMP to make Section 11 and other template changes

## Pro Rata Formula

$$MFSTECis = \frac{CAP_i}{\sum_{i=1}^{n} CAP_i} \times TEC_s$$

Where;

MFSTECis = Multi-Fuel Sites’ TEC for technology i at station s

CAPi = Capacity for technology i

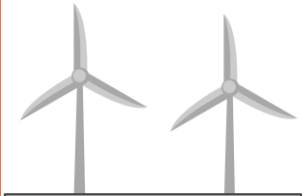
TECs = TEC of Power Station as defined in the Connection Agreement

n = number of different technologies on site

## Example of site with TEC = 500MW

500MW CCGT

$$MFSTEC_{CCGTs} = \frac{500}{600} \times 500 = 416\frac{2}{3}\ MW$$



100MW Wind

$$MFSTEC_{PVs} = \frac{100}{600} \times 500 = 83\frac{1}{3}\ MW$$

# It’s difficult to identify where a site sits using existing CUSC

| Conventional Carbon | Conventional Low-Carbon | Intermittent |
|---|---|---|
| Biomass | Hydro | Onshore Wind |
| Coal | Nuclear (all reactor types) | Offshore Wind |
| Gas | Marine | Solar PV |
| Oil & OCGTs | Tidal | |
| Electricity Storage (?) | | |
| CHP | | |

## CUSC 14.15.110

| Fuel Type |
|---|
| Biomass |
| Coal |
| Gas |
| Hydro |
| Nuclear (by reactor type) |
| Oil & OCGTs |
| Pumped Storage |
| Onshore Wind |
| Offshore Wind |
| CHP |

## CUSC 14.15.7

| Generation Plant Type | Peak Security Background | Year Round Background |
|---|---|---|
| Intermittent | Fixed (0%) | Fixed (70%) |
| Nuclear & CCS | Variable | Fixed (85%) |
| Interconnectors | Fixed (0%) | Fixed (100%) |
| Hydro | Variable | Variable |
| Pumped Storage | Variable | Fixed (50%) |
| Peaking | Variable | Fixed (0%) |
| Other (Conventional) | Variable | Variable |

## CUSC 14.15.49

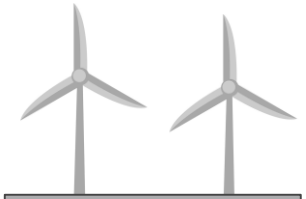
| Carbon | Low Carbon |
|---|---|
| Coal | Wind |
| Gas | Hydro (excl. Pumped Storage) |
| Biomass | Nuclear |
| Oil | Marine |
| Pumped Storage | Tidal |
| Interconnectors | |

# Calculating the wider tariff: A negative TNUoS zone

## Example of site with TEC = 500MW

500MW CCGT

$$MFSTEC_{CCGTs} = \frac{500}{600} \times 500 = 416\frac{2}{3}\ MW$$



100MW Wind

$$MFSTEC_{WINDs} = \frac{100}{600} \times 500 = 83\ \frac{1}{3}\text{MW}$$

**Conventional Carbon Generation**:

£2.74 + £2.56 × 49 % + - £6.76 × 49 %

CCGT component = £0.68/kW

£0.68/kW + Residual $MFSTEC_{CCGTs}$

**Intermittent Generation**:

£2.56 × 38 % + - £6.76

Wind component = -£5.79/kW

-£5.79/kW + Residual $MFSTEC_{WINDs}$

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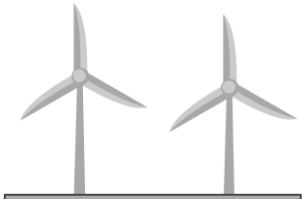
# Calculating the wider tariff: A positive TNUoS zone

## Example of site with TEC = 500MW

500MW CCGT

$$MFSTEC_{CCGTs} = \frac{500}{600} \times 500 = 416\frac{2}{3}\ MW$$



100MW Wind

$$MFSTEC_{WINDs} = \frac{100}{600} \times 500 = 83\ \frac{1}{3}\text{MW}$$

**Conventional Carbon Generation**:

£3.14 + £9.85 × 49% + £12.50 × 49%

CCGT component = £14.09/kW

£14.09/kW + Residual $MFSTEC_{CCGTs}$

**Intermittent Generation**:

£9.85 × 38% + £12.50

Wind component = £16.24/kW

£16.24/kW + Residual $MFSTEC_{WINDs}$

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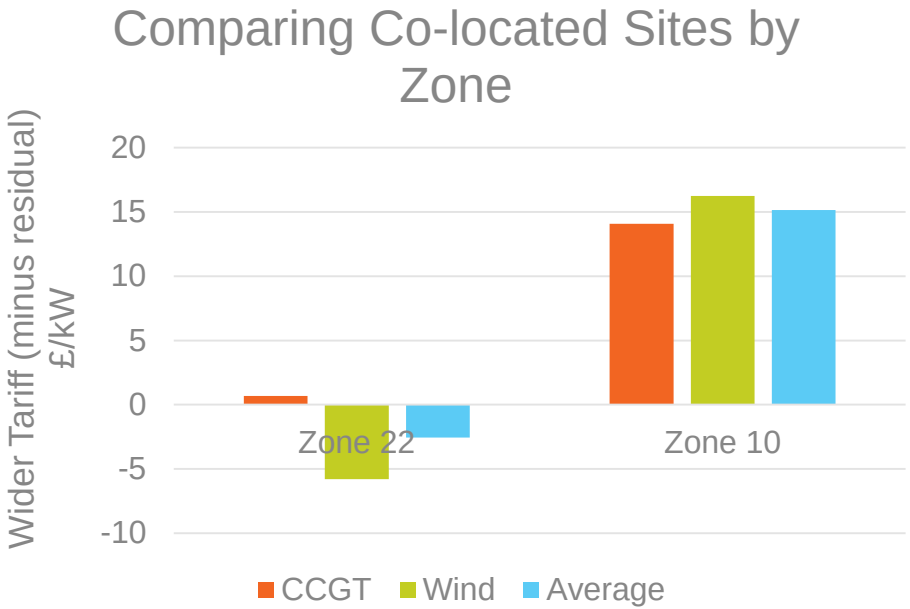
# Does the MFSTEC formula incentivise the "wrong" behaviour?

**The impact of the MFSTEC formula differs widely depending on zonal location – based on these examples we don't see it as promoting one fuel type over another or providing a misleading incentive**




**Comment**

- In Zone 22 co-locating wind with an existing CCGT would reduce the site's wider liability.
- In Zone 10 co-locating wind with an existing CCGT would increase the site's wider liability.



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# Terms of Reference

- ALFs
- LDTEC, STTEC and TEC transfer

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# Annual Load Factors (ALFs): revised solution

**Consider how the 'predominant ALF' can be determined without metered data**

ALFs are calculated per Power Station using BMU data and so if there are insufficient BMUs to split out the ALF calculation for each technology we will use data from all the BMUs on site and calculate as per the existing methodology to calculate one ALF per power station which will be applied to all the different fuel type components. A BMU must have a meter and every T connected generator must have at least one BMU.

There is a commercial incentive to have a separate BMU per fuel type but we won't mandate this in the legal text. It is worth recognising in the mod report that a co-located site with one BMU may experience higher ALFs than an technologically identical site with two.

## Revised Solution Wording for ALFs

*Annual Load Factors at a "Multi-Fuel Site" should be calculated by fuel type. This is in line with the principle of this code modification proposal to charge accordingly based on fuel types. If this is not possible because metered data is not sufficiently granular, i.e. because the Power Station is comprised of fewer BMUs than required to calculate fuel type specific ALFs, then the predominant ALF will be used for all elements*

# LDTEC, STTEC & TEC Transfer

- **Short Term TEC (CUSC 14.16.3 – 14.16.5)**
  i. Reference to 14.15.112 which will need to be updated to reflect that some Power Stations have more than one “Generation Plant Type” for the purpose of applying Generic ALFs.
  ii. Pro-rataing the additional TEC between the different Fuel Types, assume that this is to the same proportions as the existing split. i.e. apply MFSTEC to the additional TEC.

- **Limited Duration TEC (CUSC 14.16.6 – 14.16.8)**
  i. The same solution as for STTEC.

- **TEC Transfer**

# Consequential Changes as a result of CMP316

Section 11 change to introduce a new defined term into the CUSC:
*See workgroup consultation report Section 3 for revised definition.*

- For Multi-Fuel Sites, include a formula into CUSC Section 14.15 by which the Power Station's TEC is allocated across the different generating units according to fuel type, specifically;

$$MFSSTECis = \frac{CAP_i}{\sum_{i=1}^{n} CAP_i} \times TEC_s$$

Where;

MFSTECis = Multi-Fuel Sites' TEC for fuel type i at station s

CAPi = Capacity for fuel type i

TECs = TEC of Power Station as defined in the Connection Agreement

n = number of different fuel types on site

# Consequential Changes as a result of CMP316

## CUSC Schedule 2 Exhibit 1 – Bilateral Connection Agreement

**Part 1 Connection Entry Capacity**

Connection Entry Capacity (CEC) expressed as an instantaneous MW figure

| | CEC(MW) |
|---|---|
| Power Station | [ ] |
| Generating Unit | |
| Genset 1 | [ ] |
| Genset 2 | [ ] |
| Genset 3 | [ ] |
| Genset 4 | [ ] |

Sum the CEC of Gensets in the same Fuel Type i.e. Onshore Wind and report the largest total CEC here

| Fuel Type |
|---|
| [predominant fuel type] |
| Onshore Wind |
| Onshore Wind |
| Onshore Wind |
| Storage |

# Consequential Changes as a result of CMP316

## CUSC Schedule 2 Exhibit 1 – Bilateral Connection Agreement

**Part 2 Transmission Entry Capacity**

Transmission Entry Capacity (TEC) expressed in average MW taken over a half hour settlement period

No changes to Part 2

| | TEC(MW) |
|---|---|
| Power Station | [ ] |

**Part 3 BM Units comprising Power Station**

| | | Fuel Type |
|---|---|---|
| T_BMU 1 | (Associated with Genset 1) | Onshore Wind |
| T_BMU 2 | (Associated with Genset 2) | Onshore Wind |
| T_BMU 3 | (Associated with Genset 3) | Onshore Wind |
| T_BMU 4 | (Associated with Genset 4) | Storage |
| T_BMU SD-1 | (Station Demand) | n/a |
| T_BMU AD-1 | (Additional Trading Site Demand) | n/a |

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# Thank you for listening

Any Questions?

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