

Address: DIGITAL REALTY, 3, ST ANNES BOULEVARD, REDHILL, RH1 1AX
Date: 8 Apr 2019
Reference: GS-5932100
Client: Carbon Clear Limited

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Aerial Photograph Capture date: 27-May-2012
Grid Reference: 528670,151462
Site Size: 2.4105ha

Report Reference: GS-5932100
Client Reference: Redhill_



22 April 2016

Digital Realty (UK) Limited

Level 7
40 Gracechurch Street
London
London
EC3V 0BT

pcranfield@digitalrealty.com

Dear Sir / Madam

THE GREENHOUSE GAS EMISSIONS TRADING SCHEME REGULATIONS 2012 (the Regulations)- regulation 50

NOTICE OF A CIVIL PENALTY

Reference: NC13035-P3-1
Operator: Digital Realty (UK) Limited
Installation/ Site: LGW10 Backup Generators
Permit reference: UK-E-IN-13035

Following the Notice of Intent to impose a civil penalty that we sent to you on 13 November 2015 and your responses, we have now considered all aspects of the non-compliance.

The Environment Agency imposes a civil penalty of £612.71 on you for the following reason:

You carried out a regulated activity between 1 January 2013 and 23 July 2014 which was not authorised by a permit, contrary to regulation 9 of the Regulations.

The Regulations set out a formula for calculating the penalty, which includes the estimated amount of costs avoided by the operator and the estimated amount of reportable emissions from the installation in the relevant period multiplied by the carbon price. These elements are together referred to as the 'total costs avoided'. The regulator may increase the amount determined in accordance with the formula by a percentage designed to ensure that the penalty exceeds the amount of any economic benefit that the operator has obtained as a result of the non-compliance. This element is referred to as 'the punitive element'.

The maximum amount of the civil penalty to which you are liable under regulation 52 of the Regulations is £18,381.37 (being £17,506.07 for the total costs avoided and £875.30 for the punitive element).

After considering the public interest factors as detailed in our Enforcement & Sanctions Guidance, we have decided to reduce the penalty to £612.71.

The most relevant public interest factors that we have taken into account in reaching this decision are intent, foreseeability, nature of the non-compliance, financial implications, deterrent effect and attitude of the offender. The requirement for an operator to hold a permit where regulated activities are being carried out is a fundamental requirement of the EU ETS. We consider that the breach was foreseeable and that the imposition of a civil penalty will act as a deterrent to prevent you and other operators from such non-compliance in the future.

However, as a result of your failure to hold an EU ETS permit, your installation was captured by the CRC Energy Efficiency Scheme (CRC) during the period of non-compliance. The cost of purchasing and surrendering allowances to cover the electricity consumption between 1 April 2014 and 23 July 2014 within CRC would not have been incurred if you had held an EU ETS permit. We are satisfied that these CRC costs are greater than the total costs avoided by you as a result of your failure to hold an EU ETS permit. As a result of your inclusion in CRC, it is reasonable to conclude that, overall, you did not avoid costs as a result of your non-compliance and this element of the penalty has therefore been reduced to zero.

We also consider that you did not deliberately intend to avoid compliance or the costs of compliance, notified us voluntarily of the non-compliance, applied for a permit after you became aware of the non-compliance and have been co-operative with us. The punitive element of the penalty has been reduced to take account of this.

We therefore consider a penalty of £612.71 to be appropriate.

Payment of £612.71 is due on 22 June 2016. Payment details are given in the notes section overleaf.

You may appeal against this notice to the First-tier Tribunal within 28 calendar days of the date of this notice. You should refer to the Regulations and the notes section below for details of the appeal process.


In accordance with our Enforcement and Sanctions Guidance, your name, the legal requirement that you have not complied with and the amount of the penalty will be published on the GOV.UK website.

No information will be published until any appeal has been determined or the time for appealing has passed.

You may wish to seek independent legal advice.

If you wish to discuss this notice with the Environment Agency, please e-mail ethelp@environment-agency.gov.uk.

Yours faithfully



Lesley Worswick
Deputy Director Trading & Regulatory Services

Authorised to sign on behalf of the Environment Agency

c.c. bkennedy@carbon-clear.com, pcoogan@digitalrealty.com, pcranfield@digitalrealty.com, rskinner@carbon-clear.com, slemmon@carbon-clear.com.

Notes:

Appealing this notice

You are entitled to appeal against the Notice of Civil Penalty under regulation 73 of the Regulations to the First-tier Tribunal. Written notice of the appeal must be submitted to the First-tier Tribunal at the address provided below no later than 28 calendar days after the service of this notice. The Tribunal Procedure (First-tier Tribunal) (General Regulatory Chamber) Rules 2009 sets out the procedural rules relating to these appeals.

Hard copy: General Regulatory Chamber, HMCTS, PO Box 9300, Leicester, LE1 8DJ

or email: GRC@hmcts.gsi.gov.uk

The notice of appeal must include:

- the name and address of the appellant;
- the name and address of the appellant's representative (if any);
- an address where documents for the appellant may be sent or delivered;
- the name and address of any respondent;
- details of the decision to which the appeals relates;
- the result the appellant is seeking;
- the grounds on which the appellant relies; and
- a copy of any written record of that decision, and any statement of reasons for that decision that the appellant has or can reasonably obtain.

You may withdraw an appeal by notifying the First-tier Tribunal at the above address.

Payment

BACS & CHAPS PAYMENTS

All payments by BACS or CHAPS transfers should be made in GBP and should be made to the following account, using the reference codes below.

Royal Bank of Scotland PLC, London Corporate Service Centre, CPB Services 2nd Floor, 280 Bishopsgate, London EC2M 4RB

IBAN: GB23NWBK60708010022279

SWIFTBIC: NWBKGB2L

Company Name: The Environment Agency

Account Name: EA Treasury Funds

Account Number: 10022279

Sort Code: 60-70-80

Your unique payment reference code to be used in your BACS/CHAPS transfer is the Notice of Civil Penalty reference number quoted on the first page of this document.

It is essential you cite this code in your transfer to ensure we can identify the payment as yours when it arrives.

Please send your payment remittance advice to FSC-Income@environment-agency.gov.uk

CHEQUE PAYMENTS

Environment Agency, North West Region, Richard Fairclough House, Knutsford Road, Warrington, WA4 1HG Tel: 08708 506 506

All cheques should be made payable to 'the Environment Agency' and sent to The Environment Agency, Climate Change Trading and Regulatory Services, Richard Fairclough House, Knutsford Road, Warrington, WA4 1HT.

You should make your payment in GBP and mark your cheque 'account payee only'.

Please quote your Notice of Civil Penalty reference number (on the first page of this document) on the reverse of your cheque.

Certificate of Registration



This is to certify that the Environmental Management System of:

Digital Realty

Unit 3, Foxboro Business Park, St Annes Boulevard, Redhill, Surrey, RH1 1AX, United Kingdom

(This certificate is part of a multi site registration refer to certificate 4393 for additional info.)

applicable to:

Provision of data centre solutions including infrastructure, power, cooling and physical security

has been assessed and registered by NQA against the provisions of:

ISO 14001:2015

This registration is subject to the company maintaining an environmental management system, to the above standard, which will be monitored by NQA



A handwritten signature in black ink, appearing to read 'M Winger', is positioned above the title 'Managing Director'.

Managing Director



015

Certificate No.	4393/40
ISO Approval Date:	15 June 2011
Reissued:	15 December 2020
Valid Until:	3 January 2024
Prior Cycle Exp Date:	3 January 2021
EAC Code:	33

Certificate of Registration



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Managing Director



015

Certificate No.	4393/26
ISO Approval Date:	24 January 2012
Reissued:	15 December 2020
Valid Until:	3 January 2024
Prior Cycle Exp Date:	3 January 2021
EAC Code:	33



IMS System Procedures Master List

Document Number	Title	Revision Level	Date of Issue
	Document Management		
PR1001	Document Control	2	28-Aug-2015
PR1001-A	Document Maintenance Policy & Process	2.1	28-April-2014
PR1001-B	Information Classification Policy	2	26 – Aug-2015
PR1001-C	Information Classification Register	4	26-Aug-2015
	Legal		
PR1002	Legal & Other Requirements Compliance	1	01-Oct-2012
PR1002-F01	Legal Register Template	1	26-Aug-2013
	Management Review		
PR1003	Management Review	3	28-Aug-2015
	Competency/Training		
PR1004	Competence Training and Awareness	3	25- August - 2015
PR1004-F01	Tech-Ops Training Matrix	3	25- August - 2015
PR1004-F02	DLR Competencies – 6C's	1	25- August - 2015
PR3012-N	Security Access Control Training	1.0	22-May-2015
PR3012-P	Process Review & Conformation (Access Control Customers)	1.0	2-June-2015
PR3012 -Q	Process Review & Conformation (Access Control Digital)	1.0	2-June-2015
PR3012 -R	Process Review & Conformation (Access Control – Key Control)	1.0	2-June-2015
PR3014-M	Event Management Training	1.0	27-Feb-2015
PR 3012 - S	Master Key Training	1.0	21-Aug-2013
PR 2019	Environmental Compliance Training	1.0	21-July-2015
PR3012-P	Security Systems Training Record	1	27-May-2014
PR3012-T	Security System Training Sheet	1	27-May-2015
	Communication		
PR1005	Consultation and Communication	2	28/08/2015
PR3014-A	Supplier & Contractor Emergency Contact List	1	16 –Jan - 2012
PR3014 - B	Incident Reporting	1	16 –Jan - 2012
PR3014 - C	Incident Reporting to Tenants Customers	1	16 –Jan - 2012
PR3014 – D	Event Escalation & Management Procedures	1.05	17-July - 2015
PR3014 - E	Event Classification Escalation & Severity Ratings	1	16 –Jan - 2012
PR3014 - F	Event Escalation Workflow	1	16 –Jan - 2012
PR3014 - G	ENS Quick Reference	1	12 – Dec 2011
PR3014 - J	Customer Contact Form	1	
PR 3014 – K	Master Broadcast Alert	1	



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PR-3014-L	Action Bulletin		
	Non Conformance/Audit		
PR1006	Non Conformance, Customer Complaints and Preventative Action	4	19-Sept-2014
PR1007	Internal Audit	2	28-Aug-2015
PR1007-F01	Internal Audit Schedule	3	28-Aug-2015
PR1007-F02	Internal Audit Report	2	03-Apr-2014
PR1007-F03	CAR Process Flowchart	1	19-Sept-2014
PR1007-F05	CAR Template	3	13-June-2014
PR1007-F07	IMS Audit Scope	6	14-July-2015
PR1008	Action Tracking	2	28-Aug-2015
PR1008-F01	Action Tracking Register	6	14-July-2015
	Objectives and Targets		
PR1008-F02	ISO 27001 2013 Objectives and Targets Log 2015	1	18-Aug-2015
	Monitoring & Measuring		
PR1009	Monitor and Measurement	1	25-Aug-2015
	Policies		
PR1011	Environmental Policy	1.4	2-Feb-2015
PR1012	Security Policy	1.7	24-Aug-2015
PR1013	Quality Policy	1.5	2-Feb-2015
	Health, Safety and Environmental		
PR2007	Site Waste Management	3	21-May-2013
PR2001	H&S Incident Reporting	1	01-Oct-2012
PR2001-F02	Accident Investigation Report	0	14-Sept-2015
PR2006	Significant Aspects	3	28-Aug-2015
PR2006-F01	Aspects & Impacts Register	3	30-Aug-2015
PR2009	First Aid and Training	1	28-Aug-2015
PR2010	Eye Wash Station Policy	1	28-Aug-2015
PR2011	Chemical Storage Policy	0	16-May-2013
PR2012	H&S Assessment Policy	1	17-Jan-2014
PR2013	Fire Risk Assessment Policy	0	16-May-2013
PR2014	Fire Marshall Instruction	0	16-May-2013
PR2015	Environmental Organizational Health & Safety (EHO&S) Policy	1	April 2015
PR2016	Environmental Organizational Health & Safety (EHO&S) Stop Work Policy	1	30-April-2015
PR2017	EOH&S Refrigerant Management Program	1	15-April-2015
PR2018	Elevator & Vertical Lift Rescue Policy	1	18-March-2015
PR3007	Site Induction Policy	1	28-Aug-2015
PR3007-F01	Contractor Induction Template	0	10-Apr-2013
PR3007-F02	Visitor Induction Pamphlet	0	10-Apr-2013
PR3008	Spill Kit Requirements Policy	1	28-Aug-2013
PR3008-F01	Spill Response TBT	0	23-Apr-2013
PR3008-F02	Spill Response Reference Guide	0	23-Apr-2013
PR3009	Vendor Waste Management	1	01-May-2013
PR3009-A	Cardboard Policy	1	21-Sept-2015

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PR3011	Pest Control Policy	0	16-May-2015
	Customer Care		
PR3001	Customer Handbook	2.8	30-Dec-2011
PR3001-A	Customer Tour Procedures	1	29 – Feb-2012
PR3001-B	Lease Proposal Approval Process	1.1	22-Nov-2013
	Purchasing & Finance		
PR3002	Purchasing	1	28-Dec-2011
PR3002-A	Property Accounts Receivable	1	28-Dec-2011
PR3002-B	Financial Authority Policy	1	28-Dec-2011
PR3002-D	Customer Bill Back Procedures	1	28-Dec-2012
	Sub-contractor Management		
PR3003	Vendor and Contract Management Overview	1.1	7-Oct-2013
PR3003-A	Project Approval Procedures	1.2	30-July-2015
PR3003-B	Vendor Management Standards	1.1	7-Oct-2013
PR3003-C	Request for Proposal	1.1	7-Oct-2013
PR3003-D	Service Agreement Procedures	1.1	7-Oct-2013
PR3003-E	Service Agreement Instructions	1.1	7-Oct-2013
PR3003-F	Master Service Agreement	1.1	7-Oct-2013
PR3003-G	Professional Service Agreements	1.1	7-Oct-2013
	Risk & Emergency Procedures.		
PR2002-F02	Risk Assessment Methodology	1.3	August 2013
PR2002-F03	DLR Risk Map		
PR2002-F02-A	Site Risk Register	1	25-Aug-2015
PR2002-F02-B	IT Risk Register	1	25-Aug-2015
PR3014-H	Site Readiness Policy	1	1-May-2015
PR3014-I	Site Readiness Guidelines	1	1-May-2015
PR3004	Emergency Response	1	16-Jan-2012
PR3004-A	Emergency Response Business Continuity Plan	3	15-Dec-2013
PR3004-C	Emergency Action Drill Policy	1	17-Dec-2013
PR3004-D	Weather Preparedness & Notification Policy.	2	6-Dec-2014
	Technical Operations		
PR3005-A	Installation Standards	1.4	18-June-2015
PR3005-B	Period Rounds & Inspections	1	28-Dec-2011
PR3005-C	Surveys/Studies	1	10-Jan-2012
PR3005-D	Preventative Maintenance Procedures	1	12-Dec-2011
PR3005-E	Predictive Maintenance Procedures	1	13-Jan-2015
PR3005-F	Datacentre Environmental Controls	1	16-Jan-2013
PR3005-G	Fire Systems	1	21-Feb-2012
PR3005-H	Critical Facilities Management Network	1	23-Feb-2012
PR3005-M	Spares Management Policy	1	28-Aug-2015
PR3005-M-F01	TEMPLATE Spares List	0	31-Mar-2014
PR3005-M-F02	Spare Parts Property Report	2	11-May-2015
PR3006	Calibration	1	01-Oct-2012

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Data Center Solutions

Data Centre FAQ Headline Approach

Document Introduction:

This is the provisional Environment Agency working draft guide on our approach to the permitting and regulatory aspects for Data Centre within the context of the Industrial Emissions Directive (IED) and Environmental Permitting Regulations for 1.1A Combustion Activities ‘Chapter II’ sites aggregated to >50MWth input.

This FAQ may also have relevance for Data Centres which come under the MCPD specified generators. i.e. plant which is less than aggregated 50MWth but which falls under the Tranche A or Tranche B criteria for generating power (unless ‘excluded generator’ due to <50hours testing per year).

This document is not presently an official release but forms the basis for discussion of a common methodology and liaison with individual operators and their industry association.

Accepting this working draft as a framework for our approach in applying EPR/IED to Data Centres it must be recognised that this is not a legal document intending to create or modify the law as stated in statute; so ultimately data centre permitting and day to day regulation must necessarily be on a site specific basis.

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1.1 What is a Data Centre?

Data centres are buildings and associated infrastructure which provide security and reliability in storing digital data on servers. The operation includes: protected and anonymous managed facility to a recognised standard (e.g. ISO27001); conditioning and temperature control for server rooms; protection for business customers against exterior risks (such as flooding, theft, climate and weather); continuity for electrical power supply using multiple grid connections, uninterruptable power supplies (UPS e.g. batteries or Diesel rotatory DR-UPS) and fuel oil powered generators as standby plant. Data centres tend to be located on strategic data networks or business hubs. Data centres can be independent companies within the data centre service market or ‘sole enterprises’ such as banks, which provide the service for themselves.

There are many resilience configurations of installed standby generators providing for the electrical load demand of the site (building and IT). Usually this is referred to using ‘n’ where n is the specified MWelec rate delivered by a generator unit required by the customer or standard. Configurations may be for example simply n (i.e. n generators no spare), n+1 (i.e. 1 spare generator), 2n (twice as many generators as load suggests), 2n + 1. It is also noted that often IT customers build resilience into the original n specified, that is n itself includes additional spare load headroom. In this text for illustrative purposes 2n is the exemplar.

1.2 Bullet point key aspects of data centre permitting

We are permitting the combustion activity not the Data Centre operation itself. The summary headlines for the standby plant in a data centre role (i.e. any boilers used by sole enterprises are obviously treated as normal under EPR if >1MWth) are:

1. We accept that oil fired diesel generators are presently the default technology for standby generators in data centres. However the permit application still requires a BAT discussion detailing the choice of engine, the particular configuration and plant sizing meeting the standby arrangement (e.g. 2n).
2. Standby engine capacities are added together in MWthermal input at the quoted standby rating, being usually 110% of the continuous rating (if >=50MWth the site then needs an EA 1.1A Combustion Activity EPR permit)
3. If precise MWth figures are unavailable and spec sheets or face-plates are unclear, the calculation for MWth derived from MVA output is based on: power factor 0.8 and an assumed poor conversion efficiency of 0.35 for MWth to MWelec e.g. $3\text{MVA} = (3 \times 0.8) / 0.35 = 6.86\text{MWth}$.
4. The sum of generator plant capacities is based only on MWthermal inputs of all plant regardless of the standby configuration. MWelec output constraints such as realistic customer load or other practical output limiting factors do not constitute a limit to the MWth input as defined in the EA's guide RGN02.
5. Proximity of data centres with a company campus, adjacent, neighbouring or close-by buildings in urban locations (e.g. within a common trading estate but only separated by a road width or notional distance) may constitute a single site for determining the boundary of the installation as 'same site – same operator' as per RGN02 – see the details in the text
6. Permits will include a maximum 500 hour 'emergency/standby operational limit' for any or all the plant producing on-site power under the limits of the combustion activity; and thereby emission limit values ELVs to air (and thus engine emissions monitoring) are not required within the permit.
7. Emergency hours' operation includes those unplanned hours required to come off grid to make emergency repair of electrical infrastructure associated but occurring only within the data centre itself.
8. Each individual generator with its own discharge stack, can be maintained, tested and used in a planned way for up to 500 hours per calendar year each without ELVs (and hence no monitoring) under IED/MCPD. Though clearly the EA expects planned testing and generator operations to be organised to minimise occasions and durations (subject to client requirements). Ideally a target should seek to keep individual generator testing to below 50 hours/annum each as required for MCPD specified generator exclusion.
9. In summary 7, & 8 means the whole or part site can only operate as emergency plant up to 500 hours as an absolute limit for grid backup issues; but that individual plant (at any load) with its own stack (or a stack with multiple plant) with justification can be operated for up to 500 hours (ideally <50) each as part of its non-emergency role under maintenance and testing.
10. For the purposes of determining operating hours, data centre diesel generators are regarded as having a minimal start-up or shut-down times. Operational hours start on the first fuel ignition.
11. Data Centre permits (unless they apply and justify it in a permit application) will expressly have a limit on the activity to exclude voluntary 'elective power operation' such as demand side response (i.e. on-site use) or grid operating reserve (STOR) (i.e. off-site export of electricity) and Frequency Control by Demand Management (FCDM) for grid support. This is

- primarily to differentiate data centres from ‘diesel arrays or MCPD specified generators’ that voluntarily operate within the balancing market, and importantly a clear way to demonstrate minimisation of emissions to air as ‘Emergency plant’.
12. The default engine specification as a minimum for new plant to minimise the impacts of emissions to air (NOx) is 2g TA-Luft (or equivalent standard). A detailed cost benefit analysis (CBA) is otherwise needed justifying worse emission such as 4g TA-Luft plant or for example a justification under FCDM.
 13. CBA for improved exhaust emissions, dispersion and mitigations from the plant is expected for the maintenance/testing and the emergency standby roles. We would be looking for improvements particularly if Local Air Quality (LAQ) modelling (under H1) indicates anything other than an insignificant contribution to short term local air quality for the ‘planned’ maintenance emissions of the plant.
 14. Retrofit abatement techniques for existing installations for engine emissions such as selective non-catalytic or catalytic reduction (SNCR or SCR) would not normally be expected for standby plant to mitigate the emissions for standby/emergency operation. BAT might include improved flue gas dispersion (e.g. stack modifications, increased height) or improved low NOx engine management controls or possibly fuel choice.
 15. Operations and management procedures should reflect the outcomes of the air quality modelling by minimising the duration of testing, phasing engines into subgroups, avoiding whole site tests and planning off-grid maintenance days and most importantly times/days to avoid adding to “at risk” high ambient pollutant background levels.
 16. When AQ modelling the emissions from the engines, the certified technical standard provided by the manufacturer should be used (i.e. likely worst case emissions). However any ‘fit for purpose’ monitoring of the actual emissions from installed plant will be considered as evidence of the likely real impacts as part of the permitting decision process.
 17. The groundwater monitoring of fuel storage tanks and distribution pipework using GW boreholes is risk based for the site condition report (SCR) and IED 5-yearly monitoring. Should GW monitoring be required for underground tanks and/or the SCR, the boreholes should be positioned for whole site surveillance (for the SCR) rather than as a very local control immediately around the buried fuel oil tanks (i.e. not be just an addition to double skinned tanks already protected by leak detection and hence ignoring distribution pipework etc).
 18. 10-yearly soil sampling under IED is normally not needed but still needs some justification.
 19. The permit application must assess and provide evidence of actual reliability data for the local electricity grid distribution (including data centre internal electrical design) for the EA to judge the realistic likelihood of the plant needing to operate for prolonged periods in an emergency mode (especially if emissions model so as to exceed short term air quality standards).
 20. Optimising grid reliability within the site as part of general BAT to minimise emergency operating hours is required – evaluation is needed within the permit application on the Tier reliability standard under ISO27001 and Uptime.
 21. Reporting of standby engine operational run hours and discussion of any electrical outages (planned or grid failures regardless of duration) required annually.
 22. Assuming AQ modelling, based on operating scenarios, indicates a local air quality risk then notification to the EA of unplanned (and pre-notification of planned) continuous grid outage exceeding 18 hours LAQM (or the otherwise assessed short term interval from modelling) is likely required under a permit schedule 5 notification.

23. The notification requirement stated in the permit should also indicate the actual number of generators that need to be operating above which the local air quality is at risk e.g. ‘notification of continuous emergency operation exceeding 18hours with 5 or more engines operating together is required’ (i.e. model shows 4 or less engines unlikely to breach LAQ)
24. Assuming AQ modelling, based on emergency outage operating scenarios, indicates a very significant risk to local air quality and identified receptors, the EA will ask the operator to have a written AQ outage action plan to manage the issue for prolonged emergency running of the plant (including sensitive receptors list and mitigations, assessments and impacts evaluation against modelled risk conditions i.e. occurrence at periods of most concern in the year, possibly ambient air monitoring surveillance at very sensitive receptors). An AQ outage action plan is also likely required for sites which might operate in conjunction with other neighbouring large sites during an outage i.e. data centre hubs.
25. Due to the emphasis of the permit on electrical (and cooling) systems it is noted that the EA considers the F-Gas regulations as falling under the remit of the EPR permit (for notifications and management) where F-gases (or potentially any polluting potential substance) are used directly under the combustion aspects of the permitted activity (e.g. switchgear). It is important to notify the EA of any significant releases. Other uses of F-gases e.g. for server room cooling are not strictly under the EA permit but are regulated by the EA generally so it may still be prudent to make the EA aware of your F-gas releases.
26. The permit application should detail the likely quantities of waste engine oil generated annually - EWC 13 02 waste oils following servicing for example. Although unlikely to be huge, the Pollution inventory has a reporting threshold of 1 tonne for non-hazardous waste but technically no lower thresholds for hazardous waste oil.
27. The permit application is for the combustion plant and associated environmental concerns and not for the Data Centre itself. The applicant should be aware that the permitting process and application is accessible to the public so should have regard to ‘Commercial in Confidence’ and Critical National Infrastructure. In the first instance discuss particular concerns directly with the EA and/or exclude such priority information from the application but indicate that such is ‘available on request’.

1.3 Aggregation of the installed Generators

1.3.1 RGN02 – the EA’s official guide on aggregation

The aggregated net thermal input load required for an EA combustion 1.1A permit is 50MWth input as defined by the IED Chapter II. The aggregation is not on MWelec output or MVA. The specific guidance related to the nub of the issue regarding IED Chapter II (50MWth) aggregation is at <https://www.gov.uk/government/publications/rgn-2-understanding-the-meaning-of-regulated-facility>

It applies to all plant above 1MWth input even those which may be regarded as ‘standby’ – so this includes those provided units in addition to customer load demands as a (2n), (n+1) or 2(n+1) data centre site. Generator set power rating is the standby figure (i.e. normally 110% thermal input of continuous rating) and summed as MWth input and then used as per RGN02.

If precise MWth input figures are unavailable, the calculation for MWth derived from MVA output is based on: power factor 0.8 and an assumed poor conversion efficiency of 0.35 for MWth to MWelec e.g. 3MVA = $(3*0.8)/0.35 = 6.86\text{MWth}$. More detail may be required if the aggregation falls marginally very close to the 50MWth.

1.3.2 Data Centres with additional combustion plant other than standby plant

If the operator has additional combustion plant other than standby generators such as boilers or possibly diesel fire pumps then those above 1MWth input need to be included in the aggregation as well. This is more likely to apply for Lone Business or Pure Enterprise locations.

Boilers or power plant which operate for regular supply of hot water, power or heating will be treated and assessed differently within the permitting because they would not be emergency (i.e. >500 hours use) and there is sufficient information and legislation for the setting of monitoring, emission limits and BAT.

ELVs would be set by the medium combustion plant directive - MCPD or our best available techniques (BAT) benchmarking.

Plant below 1MWth does not usually need to be included (or regulated) on the EA permit as combustion plant emissions. It is however useful to mention such plant during the permit application process so that consideration as to it potentially being a ‘Directly associated activity’ can be made (e.g. sharing a link to a common fuel storage tank)

1.3.3 Thermal Load Output constraints to the installed plant – RGN02

Primary legislation is clear that for combustion plant, it is the input thermal not output electrical that draws plant into the legislation for a permit. RGN02 outlines how the EA approaches the issues associated with operators wishing to de-rate plant, provide fuel flow physical constraints so as to fall below the IED 1.1A EA permit 50MWth threshold and thus avoid a permit for the site as a whole.

It should be borne in mind in the context of diesel arrays and aggregated combustion plant generally the medium combustion plant directive will fill the ‘regulatory gap’ in the range 1-50MWth for such plant in the near future starting Dec 2018 anyway.

It is not for the EA to audit system’s physical design constraints or QA software to determine an alternative to the simple figures on the faceplate on engine plant input. MWelec output constraints such a realistic customer load or other practical output limiting factors do not constitute a limit to the MWth input as defined in RGN02. In RGN02 mention is made of physical (e.g. an orifice restriction plate in a fuel line) or

software constraints (*meaning a separate instrumented metering control system with locked-out limits on fuel across the site*): these can only be permanent and immediately verifiable by a regulatory officer as if equivalent of a faceplate value on the input to the plant.

1.3.4 Who needs a permit – ‘the same operator’

The primary legislation states permits are required for a ‘common operator on a common site’ as per RGN02. Operator definition is clear at <https://www.gov.uk/guidance/legal-operator-and-competence-requirements-environmental-permits>

The same company operating under different names (such as might occur when takeovers of adjacent data centres) are at risk of being the ‘same operator’.

It is possible that within a data centre and within particular phases, the ownership of the associated standby plant might technically rest with the customer not the data centre. For the purposes of the permit it is the operator not owner of the plant that is important.

If the Data centre is providing solely floor space and the ownership, management and operation of the standby plant rests wholly and completely with the IT/server ‘external customer’ then the EA will take a view on a case by case basis of the permitting options such as single small MWth best excluded from a permit altogether (later to become a MCPD plant) or aggregate it into a single ‘multi-operator’ permit.

1.3.5 Who needs a permit – ‘the same site’

We would clearly regard a company’s individual campus or obvious standalone boundary as a single site. If the electrical plant within a common site boundary or building is managed by a single operator (i.e. it is not the customer ownership of the individual phase within a site that is important) or controlled by a common legal entity, the plant is included in the MW summation.

For data centres the ‘same site’ with reference to RGN02 and several premises located over an area within a commercial/urban environment is aggregated on the assessment of Proximity, Coherence and Management Systems below:-

Proximity: there is no simple distance but is a site specific decision based on a reasonable interpretation and argument. For combustion activities in the urban/commercial environment ‘proximity’ may be considered as immediately adjacent to (with or without fencing demarking individual buildings on a campus); or broadly seen as a road width (up to around 100m segment*) and/or uninterrupted line of sight between buildings (plan view up to around 250m*). Outlier buildings, some distance apart, can be connected by other sites closer together on the basis of ‘linking’ chains of proximity (i.e. all buildings do not need to be in ‘proximity’ with each other). The role of permitting is ultimately to prevent or minimise pollution and harm to human health, so for air quality, consideration of proximity can take account that premises share sensitive receptors or could reasonably have adverse joint impacts or conversely are so far apart as to not have in-combination effects. A final factor may be that individual buildings/premises’ short term process contributions (PC) do screen out as insignificant under our H1 guide at <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit#screening-for-protected-conservation-areas>

* 100m and 250m – these guidance scales are derived from 2008/50/EC EU directive on ambient air Annex III for the siting of sampling points and used as our indicative means to link common sources & receptors for ambient air quality impacts in the urban environment.

Coherence: This is the way identified sites work together and their links. Aspects related to data centres might include:

1. Direct and dedicated power link between buildings to share standby generator capacity
2. sharing physical resources like fuel tanks
3. combined generator maintenance/test regimes (e.g. engine emissions at each location are not independent because they are tested as a group set or conversely whole buildings are tested separately because of staff availability or risk management)
4. the operator has a practical concern (or indeed actually take account of in planning and testing for), that each individual building may need to operate altogether due to a common but localised grid outage cause (i.e. managing a shared HV feed or common outage risk even if perhaps statistically unlikely)
5. ownership or management of the land/estate itself by the operator.

Management Systems: Those buildings/data centres using the similar operator procedures, management system, sharing of staffing, and corporate ownership or company. Common management system such that there is the opportunity to minimise the combined impacts of locations which are in proximity.

Note1: Ultimately this will be a site specific judgement which will consider and balance the above 3 issues; and broadly the closer the proximity the less coherence is needed. Conversely the greater the physical separation the more coherence and management link is needed.

Note2: Remember once you have decided that there is one operator for a set of data centres buildings within a 'same site' locale, the aggregation is for that plant as a total regardless that each building or individual data hall is below 50MWth. Thus an operator managing two buildings separated physically by a road each of only 26 MWth input does need a permit for the 'same site same, operator' at 52MWth.

1.3.6 Data Centre clusters (different operators) on a shared HV supply within a locale

Completely different operators and probably competitors (isolated buildings, different legal entities) within the same notional site area within the urban environment but each below the 50MWth threshold do not normally aggregate on to a single 'multi-operator' 50MWth permit (as this is usually applied for and determined on the basis of operators co-operating for the 'same-site' permitting purposes). However the EA will take a view on a case by case basis.

There is a case for aggregating separate sites if they are adjacent or closely located and there is a "technical connection" between them. "Technical connection" essentially means that they are operated or controlled by the same entity, possibly share the same power supply, operational management, network connectivity etc. Sites will be handled on a case by case basis and factors like substation connectivity can be taken into account (if served by different substations the likelihood of a simultaneous outage is reduced).

The aggregation that the EA derives cannot treat the HV grid supply to a series of different sites as being the defining requirement and 'technical connection' as this could lead to many sites widely dispersed being drawn into a common permit; or equally the determination of a single permit being limited because there are already 'too many' data centres on an HV link. There would also then be a query as to how far does the 132kV, 11kV or 33kV hierarchy go. The HV cannot be considered as a technical connection between sites alone since this could lead to multi-operator permits (when such are actually competitors) and the operators themselves do not have control of the HV link.

However practically the EA does need to have some appreciation that clusters of separate and independent data centres (some with permits) could all need to operate due to a significant outage event or indeed tend to similar testing and maintenance regimes see 1.15 Air Quality Emergency Action Plan (for grid outages)

1.3.7 Site expansion and when to permit

Legally a permit should be applied for and held prior to operating and installing at or above the 50MWth input threshold.

All else being equal it is better to apply for and have completed the air quality (AQ) model for planned site expansion and have a permit in place before installing extra engines.

Site expansion includes fitting out new phases, acquisitions, but also physically procuring a site building on adjacent land as under 1.3.5 Who needs a permit – ‘the same site’ above.

The onus is on operators to apply for permitting and decide what level of MWelec activity they want to the permit to cover. The cost of permitting is presently in steps (called ‘complexities’) relating to the MWth capacity (50-99MWth costs less than >100MWth) under the OPRA charging scheme within the EA. Operators have to balance the additional cost of permitting for future capacity (which has the benefit of certainty) against permitting costs to vary the permit as they grow in MWth installed. In the latter case there is the possibility that additional permitting may be problematic so this has to be factored in as a business risk. Permitting requirements should not limit sustainable growth. However, there will be more sensitivity where air quality is already an issue – e.g in AQMZ – air quality management zones.

1.3.8 Temporary Containerised plant

Generally if the site needs to bring on temporary plant as a substitute for generators within the permit, for example due to a critical engine failure, then this does not need to be factored into the permit or application (i.e. assuming a short term increase in testing or pollution emissions rates). This is because by and large the MWth is not being increased (only substituted).

It is advised to let the local regulating officer that such is needed particularly for a) changes in emission point and noise that might attract public concern during start-up b) fuel oil and refilling needs to consider changes to site risks. Ideally use of temporary plant should be an agreed procedure as part of the operating techniques.

NB As a guide to bringing on temporary combustion plant Under RGN02 Appendix 1&2 Note 1.1.8: Temporary Combustion Plant. Only units which are permanently situated and operated on the site should be included in the aggregation. Equipment brought in during shutdowns, compression ignition generator sets, air compressors, reciprocating engine vehicles etc would not be included in the aggregation, nor would heaters brought in during cold spells or to temporarily replace units under repair.

1.4 Permit operational or emergency time limits (500 hours).

1.4.1 500 hours emergency Industrial Emissions Directive (IED) under 1.1A

500 hours is an emergency mode of operation for gas turbines and gas engines included in the Industrial Emissions Directive (IED) under 1.1A combustion Chapter III Annex V. It defines the operational hours above which the Annex V emissions limit values need to apply “for emergency use that operate less than 500 operating hours per year”. There are many practical reasons for this 500 hours threshold: the difficulty in predicting operations; measuring and monitoring emissions for short durations; abatement systems are less effective, difficulty in defining stable emissions based on load interval and the allowance to switch to an alternate fuel (e.g. oil when normally using gas) in an emergency.

Technically emergency 500 hours is not a limit applying to Chapter II sites plant under IED under which permits are granted for data centres, however we use the above reasoning to apply it to combustion 1.1A Chapter II sites and as such Data Centres too.

The EA takes the view that generation plant at a Data Centre used solely for back-up and emergency standby for potential grid outages (and on-site power failures) constitutes an emergency 500 hour plant under EPR/IED and MCPD too. This allows us to evaluate the likely air quality impacts of needing to improbably operate a Data Centre in an emergency i.e. given the reliability of grid networks nationally.

A permit determination could theoretically limit the total operational hours to those below which pollution would not occur to the local area and this could technically be less than 500 hours. So 500 hours for emergency plant is a default ceiling limit if exhaust emission limit values (ELVs) are not set. The 500 hours limit could technically be adjusted to reflect the company’s maximum requirements of the offered guarantees of grid supply duration (e.g. 5 days, or 17 hours of fuel oil storage etc).

The whole or part site plant can only operate as emergency plant up to 500 hours in total per year as an absolute limit for grid outages. Although the EA permit is issued on this basis practically sites will be in communication with the regulatory officer assessing the impacts of the emergency operation and wishing to extend or reduce the 500 hours duration.

1.4.2 How is a 500 hour notional emergency limit accounted for?

Technically under MCPD definitions, as a guide, each individual generator with its own discharge stack, can ‘operate’ for testing or emergency for up to 500 hours per calendar year (as rolling average over a 5 or 3 year period Article 6 (3 & 8)) each without ELVs under IED/MCPD.

MCPD Article 3 (22) defines operating hours based on ‘a combustion plant’ & Article 4 Aggregation defines combustion plant based on common stacks. If a set of generators is provided within a shared common discharge stack then individual or any combination of the set of generators used in parallel can be maintained and tested without ELVs under IED/MCPD up to 500 hours per year usage of the stack.

The EA considers it unlikely that individual emergency generators would ever need to be tested and/or then be used in an emergency for 500 hours per year. However there is a definitions deficiency in the wording of applicable legislation in that the EA data centre permits are issued as a Chapter II 1.1A >50MWth aggregated site under which there is technically no definition of a 500 hours emergency (Chapter III Annex V ‘emergency’ hours applies to the LCP common stack using gas turbines).

The whole or part site plant can only operate as emergency plant up to 500 hours per year as an absolute limit for grid outages.

Maintenance and testing hours for generators does not reduce pro-rata the available 500 hours of emergency running for whole or part site grid outage. This is because the EA wishes to address the following three issues in considering the best management of the impacts to air quality:-

- a) prevent significant air quality concerns in potentially allowing sequential use of (part) plant operating in an emergency with its own independent 500 hours to power the whole site i.e. for example prevent 500 hours emergency for half of a 2n arrangement, and then another 500 hours for the other half of the 2n
- b) minimise the size of the largest peaks of exhaust emissions to air during maintenance/testing by encouraging the fewest number of engines operating in parallel. (i.e. 3 engines each for one hour over a 3 hour period rather than all 3 engines for 1 hour)
- c) data centres may have so many generators that testing or maintenance operations even for 1 hour each over a year could quickly use up all a 500 (emergency) hours limit for the site.

Theoretically the site can run the set of single/multiple engines in series or parallel for planned test operations for more than a gross total of 500 site running hours over the year (provided this was an EA approved & modelled management procedure, covered in the permit determination, with minimisation of impacts to air quality).

For the purposes of determining operating hours, data centre diesel generators are not regarded as having a start-up or shut-down time; and so the start of fuel ignition starts the clock. This includes the shorter periods of plant 'overlap' when redundant plant is started for reliability before final customer load is reached and the generator is backed-off and then stopped.

The administrative complications and burden of recording run hours and checking against a notional 500 site wide emergency hour limit with shared common stacks, emergency or test operation, parallel generation with part-plant part-load could be unduly onerous - *the EA is content to use the engine management logging schemes provided by the engine/systems supplier as the reporting of run hours on each engine over the year.*

Any planned prolonged maintenance or repair of electrical systems on site such as switch gear or transformers requiring the generators to be used should be planned and managed to minimise the standby operation impacts for local air quality. Prolonged planned maintenance requiring more than the permit assessed number of standby plant likely impacting derived notification duration (such as the 18hour limit for a proportion of the installed plant) should be pre-notified to the EA under schedule 5. Again planned use does not constitute emergency hours per se. see 1.4.5 below.

Once permitted a data centre practically need only really report each engine's run hours annually and notify us of powering the site on outage and/or for prolonged periods using more than the predetermined number of engines.

If the data centre plant is offering into a non-emergency role like STOR, Triad, demand side response or market reserve as well as the standby operation, then this is not regarded as solely a 500 hour emergency site. The site would then need to make added justification according to DECC "Developing Best Available Techniques for combustion plants operating in the balancing market". A data centre in STOR etc would effectively need to meet the additional DEFRA requirements of diesel arrays as 'Specified Generators' under MCPD but importantly would also adversely influence the EA's ability to assert the 'unlikelihood' for grid outage at full power operation as being very low.

1.4.3 Energy Efficiency Directive (EED) and the 1500hours qualifying plant

The EED exempts “those peak load and back-up electricity generating installations which are planned to operate under 1,500 operating hours per year as a rolling average over a period of five years”. So is unlikely to apply to data centre generators (but Defra should be verifying such qualifying plant). It is also for this reason that a time limit of 1500hours if not 500 hours would be needed in the permit.

1.4.4 MCPD and specified generators, 500 hours and ELVs

If the Data Centre is less than an aggregated 50MWth input but does still have plant >1MWth then it still falls under the EPR 2018 Medium Combustion Plant Directive requiring an MCPD permit. However providing the plant is likely to operate less than 500 hours no emission controls and limits would apply.

However if the Data Centre plant (aggregated >1MWth but less than 50MWth) operates not only as a standby but meets the criteria for a ‘specified generator’ (tranche A or B) because in essence the plant is not used only for <50 hours of testing but generates electricity (i.e. balancing market, STOR, Triad, FFR or elective demand side response i.e. other than the 500 hour standby role) it will need an EPR MCPD permit that will have emission limits and a requirement for monitoring and possibly SCR abatement.

NB If the site is operating within the criteria of ‘specified generators’ then there is no de minimis on the MWth input of each generator – so can go below 1MWth individually (providing a site total \geq 1MWth)

1.4.5 Grid outage hours – Data centre operation hours limit?

It is recognised that the EA cannot practically put time limits on the duration of grid outages and blackouts under emergency operation for Data Centres.

It is however important that the EA can track and compare any poor performance and reliability of the grid connection and can manage impacts of prolonged engine operation due to electrical failings within the site. Thus it is likely that the annual commentary of all durations for any external grid outage or ‘within site’ infrastructure failures will be expected.

AQ modelling looks primarily for any local air quality exceedances of ambient hourly averages – 18 breaches within a 12 month period. Large numbers of Diesel generators operating in unison are likely to cause breaches to the Air Quality Standard Regulations 2010 (see <http://www.legislation.gov.uk/ukxi/2000/928/contents/made>) implementing EU limit values in ambient air. The permit application must provide evidence and actual reliability data for the local grid distribution and data centre internal electrical design for us to assess the actual likelihood of the plant needing to operate for prolonged periods in an emergency mode (if ambient quality breaches are predicted).

There would also be a particular requirement of immediate notification if standby operations start to exceed the notional risk level assessed as part of the air impacts modelling i.e. usually 18 hours continuously at full load or minimum number of generators. The 18hour LAQM limit for (pre)notification for a site-wide grid outage applies for that minimum number of generators at which a possible AQ breach may occur.

It is possible in the event of a large number of manageable site outages (due to poor grid reliability) and depending on the basis of BAT to minimise operational running hours that the EA may consider the need for the site to provide increased electrical system reliability e.g. dual grid connections, ISO27001 Tier 3 or 4 sites would be likely to meet this consideration.

Annual reports should include a discussion on Grid reliability and maintenance hours running.

1.5 Maintenance, testing, grid outages

The permit application should consider the known managed hours of operation for maintenance and testing (e.g. each engine 1 hour per month). It should also justify separately the likely impacts of operating to support a grid outage.

It would be expected that the maintenance and test hours are managed to avoid potential air quality impacts especially if the site is within an urban area which has designated a local air quality management zone LAQMZ.

Ideally a target should seek to keep individual generator testing (at any load) to below 50 hours/annum each.

1.5.1 Scheduling Plan for testing:

The important thing is that the best times to minimise impacts to do maintenance testing form the schedule. It is one way of demonstrating good practice within operational constraints (which may include Service Level Agreements, other commercial constraints, change freezes, out of hours' noise levels, other impacts on neighbours, etc). For data centres the primary concerns relate to short term emissions with local air quality impact rather than long term base load test emissions (although this could be a factor for the largest data centres). This should be reflected in the maintenance test plan.

- a) Choose times to minimise overall air quality impact potentially taking into account the additive effects of other emission sources, and the existing level of ambient air quality breaches and air quality affected by meteorological conditions
- b) Test firing could be scheduled to avoid sensitive times (rush hour). 5 year air quality trends will inform this. In some areas with existing air quality issues test firing may lead to breaches. In this case the priority is to avoid the peaks and seek the least worst option.
- c) Scope for splitting test runs so that not all generators fire at once – test firing in batches.
- d) Scope for coordinating test firing between adjacent sites
- e) It may be useful, much like reducing fuel use, to have NO_x or particulate mass emissions for the testing regime (mass emission rate at the test load) as a whole as a metric. This could be used to drive improvements in reduction in overall testing regime mass emissions.
- f) Does the choice of fuel potentially reduce the emissions.

The NO_x or particulate impacts of plant testing (accepting potential adverse impacts of other issues like noise) may reduce at weekends, very early morning, night-time or in the summer. This is especially likely to apply to whole site (full load) tests needing the majority of the combustion plant to run.

Operations and management procedures should reflect the outcomes of the air quality modelling by minimising the duration of testing, phasing engines into subgroups, avoiding whole site tests and planning off-grid maintenance days and times to avoid adding to “at risk” high ambient pollutant backgrounds levels.

1.6 F-Gas Legislation

Due to the emphasis of the permit on electrical (and cooling) systems it is noted that the EA considers the F-Gas regulations as falling under the remit of the EPR permit (for notifications and management) where F-gases (or potentially any polluting potential substance) are used directly under the combustion aspects of the permitted activity (e.g. switchgear).

It is important to notify the EA of any significant releases. Other uses of F-gases e.g. for server room cooling are not strictly under the permit but are regulated by the EA generally so it may still be prudent to make the EA aware of your fugitive F-gas releases.

1.7 STOR, Triad, FFR, frequency response FCDM

It should be noted that under the Medium Combustion Plant regulations these modes of operation over and above a purely grid standby role (defined by <50 hours testing per generator) are in essence qualifying generation for the plant as ‘specified generators’. This section effectively outlines the additional data centre permit requirements, for chapter 2 aggregated to >50MWth, embracing the aspects of obtaining an MCDP specified generator bespoke permit.

Clearly a data centre’s combustion plant could be permitted to operate in the above modes (short term operating reserve STOR, fast frequency response FFR, frequency demand management FCDM, Triad) in addition to grid standby. The application would need to justify the impacts to local air quality. It should be borne in mind however that such offerings are considered as different to emergency operation in the context of data centres. This is because in addition to any Data Centre BAT, there is also the “DECC, now BIES, BAT for the Balancing Market” and MCPD expectations which the site needs to address, and importantly there is clearly the potential that:-

- The site may be more at risk of a grid outage if electricity export systems are in place
- The site must necessarily account/model that any grid outage will be extended by an elective STOR like operation within the same period.
- STOR, FCDM operation tends to be at the peak times for risk of LAQM impacts

There is clearly some justification to want STOR, FFR, FCDM or DSR and then offer to discount these hours by not doing the planned maintenance test runs or whole plant tests that would otherwise be carried out. Clearly the difference for STOR etc (compared to planned testing) is not being able to choose the better air quality window and also minimising the durations.

1.7.1 Frequency Control by Demand Management (FCDM) & FFR

Frequency Control by Demand Management (FCDM) - a demand side response (DSR) type mode using diesel Rotary-UPS or generators. The DRUPS or generators operate automatically for a short time (perhaps 10 minutes – but durations are subject to justification within the permitting process) when there is a dip/deviation in grid frequency; this occurs depending on the grid provision to the site but may be about 6 to 12 times a year. A question arises regarding options, if requested under contract by the UKPowernetworks, to provide an additional running time (perhaps another 20 minutes or more) in such events to ease the local grid loads. This mode may cause difficulties in justifying an emergency role 1.1A permit:-

- 1) We expect that Data Centre BAT is to do everything to reduce emissions and impacts (maintenance, tests, stacks, grid reliability, action plan, engine standards, DRUPS frequency response run times etc) especially given the >50MWth size and NOx mass emission rates. So unnecessarily running more than needed for Data Centre reliability testing is not BAT nor an emergency.
- 2) Negating a planned test to compensation (i.e. within the same month) does not match well to planning and controllability to avoid the worst time of day of the original event. One could argue the EA could then look to putting permit conditions to fix the total of your annual test hours knowing the site is in an FCDM scheme (e.g. for each FCDM choice, a month’s testing should stop, even if customers are expecting it)

- 3) Broadly DEFRA is considering proposals that diesel arrays, especially those not meeting an engine emission standard, aren't the right thing for anything other than genuine backup i.e. looking like fuel oil diesel arrays may not be BAT even for STOR (or a DSR equivalent) too.
- 4) **A risk is that elective FCDM now looks more like an equivalent unplanned full load grid outage scenario which the EA accepted as being very unlikely and infrequent (which the permit application provided evidence for).** {e.g. single 15minute outage in 5 years but minor frequency dips looks ok; but operating such that 12 minor frequency dips are electively each extended to over twice as long as the single longest emergency outage doesn't look so good}
- 5) Possibly each extra extension (at site load even though less than 1 hour) could push an average hourly exceedance that wouldn't otherwise be an issue (because the peak is so high even for a shorter than 1 hour duration). There is a concern about how many FCDM events and how long they can be under BAT, do we start thinking about a mass emission limit?
- 6) If you were likely to have 18 (possibly minus the local number already predicted because it's in a local AQ zone) FCDM events in the year and there was a reasonable chance each would cause an additional breach of hourly mean AQ because you've run longer than necessary then the EA could legally not grant the permit.
- 7) Looking more like a 'dirty diesel' array, one needs to consider that local planning for these would not be to locate them in central urban area or LAQMZ within already AQ focused concerns now. The EA doesn't want data centres to be a backdoor to diesel arrays or STOR as MCPD specified generators.
- 8) There would be likely separate BAT for diesel arrays (engine spec, stacks) in a STOR/DSR mode under MCPD/DEFRA – thus the EA might look more closely at the spec of current generator plant already installed and expect an accelerated upgrade programme i.e. the FCDM mode is less like an emergency 500 hour permit.
- 9) BAT for specified generators to meet the MCPD NOx ELV is to install SCR.
- 10) Monitoring of emission in these modes may be expected.

We would advise that it is very unlikely operators could provide sufficient Impacts and BAT justification for FCDM and would be extremely difficult to extend more than the data centre operational requirements for DRUPs or specified generators. However

- A. The operator can ask for an additional FCDM or specified generator role but the application would need to be very clear about the justifications and mitigations. You would definitely need to model the emissions on top for a) planned maintenance testing and b) outage scenarios to demonstrate few 'planned' and unlikely AQ breaches.
- B. The EA can imagine the operator justifying a contract up to a definite limit of 'm' such FCDM support events with an individual maximum duration 't' and total duration 'T' of all BUT with a qualification and use of the main conclusions from an emergency outage AQMP to assess if any particular FCDM can be accepted and for how long – thereby refusing to extend a brown out because AQ was at too much risk. The permit might then limit to m, t and T; and need you to document/report them to us to audit.

1.8 Management Standards 9001, 14001, 18001 and 27001 etc

The EA expects the site's management system to embrace aspects of environmental impacts this would include the non-combustion related requirements for the protection of groundwater (i.e. fuel oil storage regulations), noise, dust and odour.

Standards like ISO27001:2003 IT Security techniques; TIA-568 Telecommunication industry Association Commercial Building Wiring and TIA-942 for Data Centres (which defines Tier reliability) are apt for the data centre industry. These should form a BAT justifications for minimising generator operations due to grid reliability.

1.9 Engine Emission Standards

It is generally accepted that the BAT for data centre back-up generation is presently a set of diesel generators – this allows for an on-site store of fuel for reliability and a scalable provision of MWelec. However the permit application still requires a BAT discussion detailing the choice of engine, the particular configuration and plant sizing meeting the standby arrangement (e.g. 2n).

The EA would expect that combustion plant for new Data Centres generators would be to the latest emission standards for standby plant unless otherwise justified under BAT. The minimum appropriate is the 'TA-Luft 2g' or Tier II USEPA with guaranteed emissions: this has requirements for 2000mg/m³ NO_x; 650 mg/m³ for CO; particulates and dust 130 mg/m³ and 150 mg/m³ for hydrocarbons (all at reference conditions and 5% O₂).

Legacy plant may have worse emissions than the TA-Luft 2g for various reasons: sourced from a supplier 'outside a regulatory regime', containerised road going engines, older rental models, 'TA-Luft 4g'. Without a BAT and CBA justification this plant may need to be upgraded and improved to reduce the impacts of maintenance and testing operation of the engines, and the worst of emergency operations.

1.9.1 Retrofitting abatement

It is likely that the retro fitting of emissions abatement will be unsuitable for standby emergency plant but depending on the site the application may have to address the potential use of SCR, EGR and certainly modern Engine Control systems (injection retardation and increased compression pressure).

1.9.2 Stacks

Data Centres usually have very low profile sites and as such can have short, below roof level emission stacks. This can impact on the efficiency of dispersion of emissions. It is appropriate to consider BAT for the adequate dispersion of exhaust emissions as part of the permit application:

1. Increased stack height
2. Vertical ports
3. Increased distances from buildings to be above roof line
4. Common windshield combining several individual flues

Stack design and modifications (if retrospective) for improved emission dispersion is reasonable; and permitting would require a BAT cost benefit justification why such modifications are disproportionate.

CBA for improved exhaust emissions, dispersion and mitigations from the plant is expected for the maintenance/testing and the emergency standby roles. We would be looking for improvements particularly if LAQM modelling (under H1) indicates anything other than an insignificant contribution to short term local air quality for the 'planned' maintenance emissions of the plant.

Retrofit abatement techniques for existing installations for engine emissions such as selective non-catalytic or catalytic reduction (SNCR or SCR) would not normally be expected for standby plant to mitigate the emissions for standby/emergency operation. BAT might include improved flue gas dispersion (e.g. stack modifications, increased height) or improved low NO_x engine management controls.

1.10 Other Issues

1.10.1 Commercial in Confidence (CinC) and National Security

You can find guidance on national security and confidentiality in ‘Core Environmental Permitting Guidance’ published by Defra and available at <https://www.gov.uk/government/publications/environmental-permitting-guidance-core-guidance--2>

The National permitting service (NPS) of the EA has dedicated internal processes for looking at these issues specifically “Environmental Permitting: dealing with claims for national security 201_08” and “Dealing with claims for confidentiality 202_08”. The operator can write to NPS to claim CinC or to inform us that an application to the Secretary of State has been made for National Security.

The permit application is for the combustion plant and associated environmental concerns and not for the Data Centre itself. The applicant should be aware that the application is accessible to the public on our ‘Citizen Space, immediately after the duly-making stage, so the operator should have regard to ‘Commercial in Confidence’ and separately National security.

However the EA permits many industrial sectors that include “National Critical Infrastructure” NCI including power stations, chemical sites (COMAH) and incinerators which are also required to consider CinC and National Security. Generally we have few requests for exclusions of information from the public domain during the permitting process. Being classified as “National Critical Infrastructure” does not automatically mean the application falls under our guidance for national security or CinC.

In practice we do not generally require information that would be considered CinC – we have a test for determining this and it based on our guidance and legislation; an example might relate to a novel technology proposal linked to the combustion plant being permitted. During any pre-application you can be advised of what we require or not to be included in a permit application.

Generally we would consider any information available through the internet i.e. search engines or your website, or already covered in Local Authority planning applications or company details etc. would not be CinC.

The Environmental Information Regulations (EU 2003/4/CE) mean the EA cannot exclude from public access anything relating to emissions.

Our general guidance outlining what we need for an environmental permit is associated with the application forms see <https://www.gov.uk/government/collections/environmental-permit-application-forms-for-a-new-bespoke-permit>

Broadly this includes items like Company name; site address; non technical summary; site installation boundary; a plan of the emission points (i.e. the standby generator exhaust) and the MWth; plan showing the locations of the fuel tanks (especially where underground tanks); Groundwater sampling points if needed; Details about the EMS and pollution prevention measures related to the permit i.e. pollution notification procedures, waste handling, AQ action plan, fuel procedures related to the permit i.e. waste engine oils, test regime and reporting and containment.

We don’t generally need to include a plan of the emission points or fuel tanks in the permit itself.

We are unlikely to need the following information in an application:

1. Site drawings of detailed Data Centre infrastructure like halls, electrical circuits, transformers, security,
2. Contact details of site staff

3. Data Centre Site specific operating procedures which don't relate to the permitted combustion process.

We recommend any detailed drawings or select information contained in specialist reports e.g. noise or air quality assessments will need to be reviewed by the operator prior to submission to the EA – if you identify areas for concern, in the first instance discuss these directly with the NPS. If in doubt you may exclude such information from the application but indicate that it is 'available on request'; if the information is critical to the application NPS can make that request or formally issue a notice to gain access to it.

Remember that after permit issue annual reports, hours run for the generators, pollution incidents (e.g. reported fuel spill), the permit, the determination document, EA enforcement and inspection reports will be publically viewable.

1.10.1.1 Freedom of Information

We are an open and transparent organisation and take our responsibilities to provide information under the Freedom of Information Act (FOIA) and the associated Environmental Information Regulations (EIR) seriously.

These responsibilities include providing access to the information in response to a request, normally within 20 working days. The legislation applies to all the information we hold, whether created by the Environment Agency, received from third parties or even held by a third party on our behalf.

The provision of information is subject to a number of exemptions set out in the legislation. These include, for example, national security and public safety, commercial confidentiality.

1.10.2 Pollution Inventory Reporting

There is an annual reporting requirement to detail the mass emissions from the permitted activity see <https://www.gov.uk/government/collections/pollution-inventory-reporting>. This is not technically an EPR permit requirement but because of permitting this becomes a requirement from associated legislation.

This includes emissions to air, controlled water, land and wastes. Broadly it is unlikely that even the largest data centre would emit enough CO₂, NO_x, CO, particulates etc to hit the reporting thresholds e.g. 100,000kg NO_x. Most often exhaust emissions would be below reporting threshold (BRT).

PI does include the reporting of wastes generated from the permitted activity – so quantities of used engine oil would be included.

1.10.3 Wastes

The permit application should detail the likely quantities of waste engine oil (probably classed as hazardous) generated annually - EWC 13 02 waste oils following servicing for example.

Although unlikely to be huge Pollution Inventory has the below reporting threshold (BRT) as 1 tonne for non-hazardous waste and technically no BRT for hazardous waste oil.

1.10.4 Expanding the Data Centre's on-site provision

The permit will need to be varied if additional plant is added to the site which wasn't included in the original permit application. This is particularly relevant for data centres expanding in phases.

It is best to apply for the permit to include the likely future expansion of the site (Data Centres tend to be developed in phases as they expand and attract customers).

1.10.5 Site Condition Report (SCR) and baseline monitoring for the ground

Permit applications require a detailed report of the status of the land on which the permit boundary is determined. See <https://www.gov.uk/government/publications/environmental-permitting-h5-site-condition-report>

SCRs can use due diligence investigations and historic assessments. However depending on risks and what may have happened on site during the ongoing operations (i.e. retrospectively) there may be a requirement to conduct a baseline soil and groundwater investigation (i.e. including installation of ground water GW monitoring boreholes etc).

We would not normally expect IED ongoing 10-yearly periodic soil sampling though technically this still needs to be based upon a 'systematic appraisal of the risk of contamination'

The groundwater monitoring of fuel storage tanks and distribution pipework using GW boreholes is risk based to satisfy the site condition report (SCR) and IED ongoing 5-yearly monitoring requirements.

Should GW monitoring be required for underground tanks and/or the SCR, the boreholes should generally be positioned for whole site surveillance (for the SCR) rather than as a very local control measure immediately around the buried fuel oil tanks (i.e. not be just an addition to double skinned tanks already protected by leak detection and hence ignoring distribution pipework etc).

We would expect GW periodic monitoring for below ground fuel tanks, unless a very clear BAT argument is provided – this should include discussion on fuel distribution pipework and day tanks across the whole site.

For operating sites we will accept proposals for the retrospective GW borehole position in respect of risks to utility inputs to the site i.e. nearness to HV cabling and transformers.

1.10.6 Noise

Generally same rules acceptable for planning though clearly noise control is a BAT issue within the permit application. See <https://www.gov.uk/government/publications/environmental-permitting-h3-part-2-noise-assessment-and-control>

1.11 Fuel Storage

Depending on the location and risk to groundwater there may be a requirement to install groundwater monitoring as part of the SCR and IED.

1.11.1 Above ground fuel storage

If the oil storage is above ground the oil storage regulations apply and are covered by permit conditions as a directly associated activity (DAA). Bunding and management control for deliveries are expected in the permit application.

1.11.2 Below ground and in building (basement) fuel storage

Oil storage regulations don't apply but we still expect BAT.

- Leak detection (pipes and tanks)

- Bunding and procedures at the filling points
- Spill procedure and kits
- Double skinned for tanks and minimisation of underground pipework i.e. maximising inspectability for leaks.

1.12 Air Impacts Modelling

The air quality impacts need to be modelled to justify permitting the operation (testing and grid outage). Refer to web guide on risk assessment for emissions to air:

<https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit>

and the requirements for AQ submission:

<https://www.gov.uk/guidance/environmental-permitting-air-dispersion-modelling-reports>

1.12.1 Scenario modelling of the impacts of the emissions to air is largely split into:

1. Maintenance Schedule Model - the predictable, managed testing and maintenance activity for the standby plant (including some scope for changes and flexibility), and then
2. Outage Model - the unpredictable emergency grid outage any time during the year requiring the maximum plant to operate for the required outage duration i.e. 'likely maximum' specified by the company.
3. Non-emergency Elective Power Model - If the site is seeking a STOR, DRS or FCDM mode too then this needs to be modelled separately but in addition to 1. & 2.

The impacts of each is largely treated separately during the permitting determination.

One of the issues is the potential of having to rely on the engines' certified emission 'worst case' parameters and then needing to justify that practically the emissions and hence impacts would be expected to lower.

Three approaches delivering a more accurate and AQ impacts assessment model:

1. Simply use the certified technical standard provided by the manufacturer (as has been the case for other sites) – worst case and confirms basic BAT for the engine design.
2. Using the certified technical standard as above but provide some evidence or justification as to the realistic (hopefully lower) emission values as practically measured on site across many units (which have already been installed). Such monitoring clearly would need to be fit for purpose (e.g. calibrated Testo used for maintenance testing but correct O₂ standardisation etc)
3. Site specific values only and not referring to the engine certified specification; we need extensive field testing to a high standard for the majority of the plant deployed e.g. MCERTS & CEN.

1.12.2 Maintenance Schedule Model

The aim of the maintenance schedule model is to get the most accurate assessment of the worst case emissions of what can be controlled by the operator. However it is unrealistic to model the full installed capacity (e.g. 2n) for an outage test; at the very least the absolute maximum specified output load is needed i.e. n of 2n for example is required.

If however the operator can provide justification that the maximum realistic load is best represented in taking account of the customers' built in resilience into the original 'n' specified then this too can be factored in i.e. that n itself includes additional spare load headroom which can be reasonable discounted.

Maintenance and testing would include the 15minute or 1 hour testing of individual plant (on load or tick-over); the site black-out tests simulating a grid outage; any predictable planned electrical infrastructure maintenance needing the generators to cover for the grid.

If most of the time generators are tested at reduced load because a set 'shares' the actual demand load across a resilience configuration and may well not be at the optimum emissions-load operation e.g. 25% load, the model should provide some evidence of emission rates at this load rather than simply assume a pro-rata reduction of the emissions at 100% load.

The main impacts issue for modelling is the likely short term ambient air quality standard for hourly mean NO_x. The significant risk is the allowance of up to 18 hourly exceedances in a calendar year and the data centres modelled contribution. **All else being equal the EA considers the receptor at which an exceedance notionally impacts to be any within a representative area (of at least 250 m x 250 m indicated by the EU Air Quality Directive 2008/50/EC); and not that a single specific receptor needs to have all 18 occurrences alone, or indeed that the receptor notionally needs to be a specific DEFRA monitoring station.**

We would expect the controllable maintenance schedule to cause/model no or minimal numbers of individual hourly mean NO_x exceedances. We would need clear justifications and BAT review if maintenance was predicted to risk causing 18 or more hourly exceedances (wherever that may be) and especially if the same single receptor was implicated.

1.12.3 Outage Model

Unpredictable grid outages includes any unplanned electrical infrastructure failures within the data centre itself (i.e. the grid is still operational). Outages are unlikely to last long, in many cases seconds or minutes rather than hours. Due to the possibility of dual grid connections and multiple HV ring mains within the data centre it is possible that there would be a hierarchy of probabilities and potential grid-outages and the number of engines needed. The air modelling of unpredictable grid outages should include the worst case scenario (i.e. the largest number of engines operating for the longest time) but can include an assessment of the 'more likely' part-site outage.

We do need to clarify in modelling that the actual stack arrangement is considered e.g. horizontal, height and proximity to building.

If AQ modelling, based on emergency outage operating scenarios, indicates a very significant risk to local air quality and identified receptor, we will require the operator to have a written action plan to manage the issue for prolonged emergency running of the plant (including sensitive receptors list and mitigations, assessments and impacts evaluation against modelled risk conditions i.e. occurrence at periods of most concern in the year, possibly ambient air monitoring surveillance at very sensitive receptors) see 1.15 Air Quality Emergency Action Plan (for grid outages)

Optimising grid reliability within the site as part of general BAT to minimise emergency operating hours is required – evaluation is needed within the permit application on the Tier reliability standard under ISO27001 and Uptime.

Reporting of standby engine operational maintenance hours and discussion of any electrical outages (planned or grid failures regardless of duration) required annually as normal.

Assuming AQ modelling, based on operating scenarios, indicates a local air quality risk then notification to the EA of unplanned (and pre-notification of planned) continuous grid outage exceeding 18 hours LAQM (or the otherwise assessed short term interval from modelling) is likely required under the permit schedule 5 condition.

The permit application must assess and provide evidence of actual reliability data for the local electricity grid distribution (including data centre internal electrical design) for us to judge the realistic likelihood of the plant needing to operate for prolonged periods in an emergency mode (especially if emissions model to exceed short term air quality standards).

1.12.4 Non-emergency Elective power Model

The EA assumes that the operator is going to make a permit application as a data centre as an absolute requirement for what the permit is primarily needed for; and then seek to add the additional secondary capability to operate a DRS, FCDM or possibly STOR. It is best to make the permit application absolutely clear that the STOR, DRS, FCDM mode is a separate request and ensure that AQ modelling allows this assessment to be made. *Clearly if the primary role is for example a STOR diesel array then a Data Centre FAQ is not the most applicable.*

Model the practical and predictable addition of such an elective mode (assuming addition STOR type BAT improvements/upgrades have been applied for engine emissions etc) on to the maintenance test regime and then separately the outage model. If there are procedures advanced by the operator to 'offset' test hours then this can be included (30 minutes of FCDM traded for the 30 minutes of testing that month) but the permit will likely include constraints on operations to those offered and modelled.

1.13 Regulation and auditing of a Data Centre Permit

Data centre operation is unlikely to be a high priority under environmental risk/impact and especially regarding planned formal audits. The EA has an internal combustion sector plan which is geared to large plant (LCPs) under Chapter III of the IED. This doesn't mention the data centre regime in detail. Once permitted the site should get an inspection within 2 months of permit issue.

If during permit determination there are site specific inadequacies (particularly EMS or fuel storage) then an improvement condition might be signed off after an audit.

It is possible that planned audits might likely look at:

1. The most important data centre specific audit would be maintenance/testing run hours procedure so as to minimise impacts to local air
2. Oil storage regs
3. Hazardous waste control (i.e. waste engine oils)
4. EMS (including SCR maintenance) and reporting requirements (annual report and operating hours, possibly Pollution inventory)
5. If the site happens to have a groundwater abstraction borehole it is possible that the reporting and metering of this might be carried out (though not an EPR combustion permit requirement) by the installations officer (to reduce the workload on the EA 'abstractions' team).
6. The EA does think about energy efficiency audits but because data centres are for emergency with very low levels of fuel usage (and the permit isn't really intended to double regulate with the EU-ETS and CCA overall for the site wide energy usage as a Data Centre) it's unlikely the EA would worry about this.

It is possible that pollution incident related audits (i.e. those likely need to notify under permit schedule 5) might look at:

7. Oil spills etc
8. F-gas releases
9. Noise complaints
10. Electrical infrastructure maintenance plans to minimise data centre (non-grid) outages (i.e. if the site is having a lot of local grid trips)

All this can be pre-planned as part of an officer's compliance assessment plan 'CAP' for the year. It's more likely that such as any formal audit is actually carried out, it would occur during the annual site inspection more as 'general topics to discuss' rather than be an extra formal audit day in the year.

Overall the official line is at:

<https://www.gov.uk/guidance/how-youll-be-regulated-environmental-permits>

and of course <https://www.gov.uk/government/publications/combustion-activities-additional-guidance>

1.14 Annual reporting requirement in the permit:

The annual report for Data Centres is mainly a summary of how the year was managed; and is best focused on the BAT type aspects on minimising emissions impacts:

- 1) Confirming the run hours per engine and how this is apportioned to testing and outage (and possibly elective power operations); any part-site/whole site blackout test and their scheduling with regards to the AQ modelling – is maintenance testing changing significantly to what was modelled?
- 2) Grid and internal electrics reliability issues (are you getting more brown outs and asking Grid to investigate their kit?)
- 3) Re-iterate any in-year notifications of grid outages and hence any need to operate in anger; and total plant emergency hours run (how close to the 18hours?)
- 4) Advising of future plans i.e. need to run due to servicing the switch gear, new phases being planned, reconfiguration of generators e.g. 2n going to an n+1 etc
- 5) Procedure reviews related to the permit
- 6) Confirming no incidents (oil spills, F-gas releases etc)
- 7) General aspects of fuel and energy efficiency

It should be borne in mind that the Annual report is available to the public (not least to reassure them that the site is operating appropriately) so if any details are sensitive then simply keep records on site and only refer to them in the annual report; the regulatory officer can then best review the details during an inspection.

1.14.1 Permit conditions for 4-yearly reviews of 1.2.1 Energy Efficiency; 1.3.1 Efficient use of raw materials; 1.4.2 Avoidance, recovery and disposal of wastes produced by the activities

An EA IED permit includes some standard conditions and the general requirement for the 4-yearly permit review requirements for

- 1.2.1 Energy Efficiency;
- 1.3.1 Efficient use of raw materials; and
- 1.4.2 Avoidance, recovery and disposal of wastes produced by the activities

These are not reviews of the data centre operation but apply solely to the combustion plant activity. Broadly these standard permit conditions are more suited to power operations normally consuming lots of fuel for the generation of energy such as LCPs and power stations.

These can be covered for data centres within a discussion for these topics within an annual report generally; and are unlikely to be a separate focus for regulation.

The EA does not have any informed view (i.e. defined BAT) on the choice of switchgear, room air conditioning design, server rack power demands and so on, that would come under Data Centre best practice. However clearly efficient Data Centres, minimising their overall energy demand is best practice under various routes other than EPR i.e. the CCA or perhaps general standards like 9001, 14001 and 50001.

Such efficiencies may likely reduce emergency generation requirement and hence plant emissions (by needing less engine fuel and tests etc) throughout the year. This might have a marginal impact on wastes (used engine oil) and raw materials (new engine oil) or water abstractions too.

1.15 Air Quality Emergency Action Plan (for grid outages)

Assuming AQ modelling, based on emergency outage operating scenarios, indicates a very significant risk to local air quality and identified receptors, the EA will ask the operator to have a written AQ outage action plan to manage the issue for prolonged emergency running of the plant (including sensitive receptors list and mitigations, assessments and impacts evaluation against modelled risk conditions i.e. occurrence at periods of most concern in the year, possibly ambient air monitoring surveillance at very sensitive receptors). An AQ outage action plan is also likely required for sites which might operate in conjunction with other neighbouring large sites during an outage i.e. data centre hubs.

The approach of an AQAP has yet to be formally tested during the permitting process. The following has also yet to be formally discussed with operators or the association. The guide is a provisional approach as a general set of principles.

Air Quality Management Plan in Response to a power outage or blackout.

This is the quick guide on the development of an Air Quality Management Plan AQMP for a site with a large number of emergency diesel generators; and when more than a critical number of generators and DRUPs would be needed for the power loss event that could ultimately impact air quality.

The improvement condition (IC) wording usually included in EA permitting for at risk sites might be “The operator shall develop and submit for approval a site specific AQMP which identifies the emergency operating conditions when Local Air Quality may be adversely impacted by emissions to air from the installation.”

The identified harm to human health risks will be based on AQ modelling which is routinely required for EPR permitting.

It is important to note that any planned maintenance works or testing of the installed generators should already be selected based on the details identified AQ modelling and embraced by the AQMP plan e.g. whole site tests select to minimise impacts.

In essence in evaluating the risk impacts of an outage a ‘bad time for an outage’ should agree with the periods already avoided as being ‘bad times’ to conduct engine tests.

Background

Some buildings and facilities require standalone emergency generating power to important critical infrastructure such as Data Centres, Air Traffic Control, Grid Peak & Black Start, Hospitals. The generators are usually diesel powered with their own fuel stored on site. If the peak load is sufficiently large a significant number of the installed generators and diesel rotary UPS will be needed to start-up and sustain electrical output until the incoming power has been reliably restored.

AQ models may indicate there will be likely occasions and scenarios during the year which could be impacted adversely on acute exposure to human health and/or national and local ambient air quality standards.

NO_x and NO₂ mass emission rates for the various engine types/standards and dispersion specifics (stacks etc) installed at the site would be minimised under BAT reviews during any permitting or local planning procedures. There is then a point at which further cost-benefit analysis (CBA) is unreasonable for an extremely unlikely grid outages and site power losses. Ultimately the site's total ongoing release at the time of an outage cannot be reduced further but may still be of concern; this action plan details the assessment and mitigations in the event of a power outage for the largest sites.

The development of an AQMP is considered BAT by the EA after all reasonable prior physical controls (primary and possibly secondary abatement measures) have been deployed to bring schedulable generator maintenance and testing emission impacts to acceptable levels but which whole site operation is still a concern.

Acute Exposure Guidance Level (AEGl) for causing discomfort in the general population in ambient air is 940ug/m³. Significant concern for public health and non-reversible damage for an 8-hour period starts at around 12600ug/m³.

Ambient Air Quality hourly mean objective limit is 200ug/m³ (with less than 18 hourly exceedances in a year).

The plan itself is site specific

The plan, as a minimum, will identify a range of emergency scenarios detailing which plant will be operating and their emissions to air of NO_x.

The plan will include the ongoing management of the emergency event – monitoring the likely harm to sensitive receptors as the event progresses using the above scenarios and the actual values for the relevant parameters. The plant will identify trigger points in advance of AQ breaches for sensitive receptors and appropriate on site and off site action to minimise harm.

The plan will include the notification of the EA and Local Authority at the appropriate trigger points during the event.

Following an emergency event the operator will make a report detailing the health impact and reviewing the effectiveness of the plan

Overview of the Process:

The operator, to develop an air quality response plan needs to assess risks, evaluate and then mitigate the impacts to sensitive receptors and ambient air quality as a result of a significant electrical supply outage to the facility. The plan would consider factors like meteorological conditions, date, time and outage duration with respect to NO_x short term acute exposure and hourly mean ambient air concentration standards. The plan should be developed in conjunction with the Local Authority and its Local Air Quality Management (LAQM) process and in extreme their "Major Incident Procedures".

So look at plausible outage scenarios Combustion plant, emissions of NO₂/NO_x, duration of operation, met conditions, background concentration and in-combination effects, sensitive receptors and the potential exposure to acute, hourly and more than 18 hours of the NO₂ AQ standard.

Installed Factors

1. Number of generators actually operating (or equivalent if part load) compared to critical number.
2. Site partitioned and only a localised group of engines is operating
3. DRUPs or generators (operational mode pre-emptive of the outage i.e. frequency dips) or a mix
4. Stacks and location of emissions for the operating generators
5. Proximity to similar outage generators operating on the same basis by other sites

Outage Occurrence

1. Time
2. Date/season
3. Meteorology/weather
4. Wind direction
5. Prior weather conditions (e.g. prolonged temperature inversion)
6. Local air quality warnings for pollen or already ambient AQ exceedances (of the 18) etc.

Receptor

1. Those receptors identified during the air quality modelling process
2. Acute Exposure
3. General populace
4. Specific Sensitive receptors which are linked to the metrological conditions (wind direction)

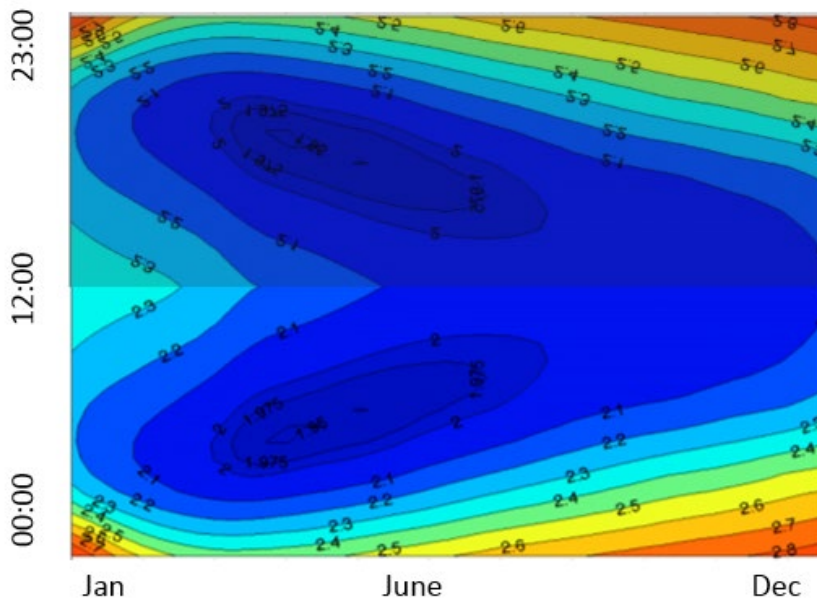
Additional Considerations

1. Extent of outage across the locale for smaller generators, other data centres
2. Likely duration (<18hours, or does 1 hour cause an issue)
3. How are the receptors affected by the outage (e.g. sent home from school, go in doors or come out side, flood lighting stops play)
4. Are there any flexibilities within the site to change/alternate which generators are operating so as to be furthest from receptors (might only apply to larger sites or with particularly close receptors)
5. Outage cause: is the air quality likely to be made worse for other reasons e.g. outage cause by an on-going local fire?

An example approach would be to characterise the circumstances of the event into “No risk”; “Low risk”; “Moderate risk” and “Probable Risk. A simple risk flow diagram may be more suitable.

Factors	No Risk	Low Risk	Moderate Risk	Probable Risk
Initial Event Characteristics	1. Mar-Aug 2. 8pm-6am 3. Any day	1. Mar-Aug 2. 4pm-8pm 3. Weekday 4. Part load site lower risk	1. Mar-Aug (4pm-8pm) 2. Sept-Oct 3. Ambient air quality warnings 4. Full load site greater risk	1. Nov-Feb 2. Weekday 3. Any time 4. Weekends at lower risk if good weather conditions.
Whole site planned testing or planned works	Ok anytime	Ok anytime	Ok only at weekends	Definitely No.
Duration of concern of Ambient Air Quality	No issue	No issue unless extremely long and likely to start overlapping with moderate risk criteria	>24 hours risks a rolling 18 hour window	Any >18 hour event
Duration of concern for Sensitive Receptors (acute)	No issue	No issue	No issue	1 hour at evening rush hour (4pm-7pm) 4 hours otherwise
Initial ACTION	Notify EA of outage as required by permit. Add to tally of outage total hours	Notify EA of outage as required by permit. Add to tally of outage total hours Keep under review that events don't move to Moderate risk	Notify EA and Local Authority of outage and implementing AQMP. Need more detailed review Consider precautionary visit to receptors	Notify EA and Local Authority of outage and implementing AQMP Follow detailed action list Need more detailed review and visit to receptors

Or you might convert the AQ model predicted environment concentration (PEC) directly into a risk map for date and time (if meteorological conditions are less critical) if that is key criteria. And use the information to total up an increasing risk parameter (red hour = 3 points, orange = 2; yellow = 1; blue = 0) to selection actions and the outage duration develops.



Probable Risk - Action List

1. Start the incident diary – note start time of outage
2. Identify likely duration of outage initially (check with UK Power Networks, normal repair times for works internally and externally, how critical is the fault)
3. Refer to sensitive receptor list based on the specific circumstances
4. Assess how geographically extensive the outage is.
5. Assess the occasion and exacerbating factors (weather)
6. Report your Outage Impacts Risk Assessment to EA; initially the permitting officer and if unavailable the EA National Customer Help Line.
 - a. Depending on your AQMP notification, the EA may declare the outage a Pollution Incident requiring an attendance at the site.
7. Also report to Local Authority your Outage Impacts Risk Assessment
8. Visit receptors at regular intervals – how bad does the air appear
9. In conjunction with the Environment Agency and Local Authority provide advice directly to receptors to reduce their exposure
 - a. Move and/or stay indoors
 - b. Close windows
 - c. Lower physical exertions
 - d. In extreme case consider moving to alternate location (i.e. shut the facility)
10. Update on changing circumstances (receptor risk – school closed anyway, traffic significantly reduced than normal)

Certificate of Registration



This is to certify that the Energy Management System of:

Digital Realty

Unit 3, Foxboro Business Park, St Annes Boulevard, Redhill, Surrey, RH1 1AX, United Kingdom

(This certificate is part of a multi site registration refer to certificate 62527 for additional info.)

applicable to:

Provision of data centre solutions including infrastructure, power, cooling and physical security

has been assessed and registered by NQA against the provisions of:

ISO 50001:2018

This registration is subject to the company maintaining an energy management system, to the above standard, which will be monitored by NQA.



A handwritten signature in black ink, appearing to read 'M. Winger', is positioned above the title 'Managing Director'.

Managing Director

Certificate No.	62527/13
ISO Approval Date:	30 November 2015
Reissued:	8 July 2021
Valid Until:	21 August 2024
EAC Code:	33



0015

Certificate of Registration



This is to certify that the Energy Management System of:

Digital Realty

Unit 2, Foxboro Business Park, St Annes Boulevard, Redhill, RH1 1AX, United Kingdom

(This certificate is part of a multi site registration refer to certificate 62527 for additional info.)

applicable to:

Provision of data centre solutions including infrastructure, power, cooling and physical security

has been assessed and registered by NQA against the provisions of:

ISO 50001:2018

This registration is subject to the company maintaining an energy management system, to the above standard, which will be monitored by NQA.



Managing Director



0015

Certificate No.	62527/18
ISO Approval Date:	30 November 2015
Reissued:	8 July 2021
Valid Until:	21 August 2024
EAC Code:	33

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

Agreement Identifier: DATC/T00003 v8

TU Identifier: DATC/T00003

THIS AGREEMENT is made on the <Date to be inserted>

BETWEEN:

- (1) the Environment Agency (“the Administrator”); and
- (2) the operator set out in Schedule 2 (“the Operator”)

RECITALS

- (A) Section 30 of and Schedule 6 to the Finance Act 2000 (“the Act”) make provision for a tax known as the climate change levy (“the Levy”). The Levy is charged on the supply of taxable commodities as defined in paragraph 3 of Schedule 6 to the Finance Act 2000.
- (B) Paragraphs 42(1)(ba) and 42(1)(c) of Schedule 6 to the Act provide that the amount payable by way of the Levy shall be discounted from the full rate where the supply is a reduced-rate supply. A reduced-rate supply is a taxable supply supplied to a facility specified in a certificate given by the Administrator to the Commissioners for Her Majesty’s Revenue and Customs as a facility which is covered by a climate change agreement for a period specified in the certificate in accordance with paragraphs 42 to 52F of Schedule 6 to the Act.
- (C) A climate change agreement is defined in paragraph 46 of Schedule 6 to the Act. It may consist of a combination of agreements that falls within paragraph 48. A combination of agreements falls within paragraph 48 if a number of conditions are satisfied. The first condition is that the combination of agreements is a combination of an umbrella agreement and an agreement that, in relation to the umbrella agreement, is an underlying agreement.
- (D) This agreement is an underlying agreement in relation to an umbrella agreement, entered into for the purposes of the reduced rate of Levy. It is not intended to give rise to contractual obligations between the parties.
- (E) The facility or facilities set out in Schedule 4 to this agreement are a facility or facilities to which an agreement applies.
- (F) The Operator is a representative of each facility to which this agreement applies, as defined in paragraph 47(2) of Schedule 6.

AGREED TERMS

IT IS AGREED as follows:

1. INTERPRETATION

1.1 In this Agreement, unless the context otherwise requires:

“account” means the account in the Register of a sector association or an operator;

“agreement” means an umbrella agreement or an underlying agreement;

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“base year” in respect of a target unit which does not include a greenfield facility means a 12 month period agreed between an operator and the administrator, ending prior to the date of an underlying agreement, for which data is supplied by an operator to the administrator prior to the operator entering into the underlying agreement;

“base year” in respect of a target unit which does include a greenfield facility means the 12 month period starting on the date of an underlying agreement”;

“buy-out fee” means the fee calculated in accordance with Rule 7;

“certification period” means, any of the following periods:

- (a) 1st April 2013 to 30th June 2015;
- (b) 1st July 2015 to 30th June 2017;
- (c) 1st July 2017 to 30th June 2019;
- (d) 1st July 2019 to 30th June 2021; or
- (e) 1st July 2021 to 31st March 2023;

“charges” means charges due to the Administrator under the charging scheme;

“charging scheme” means the Climate Change Agreements Charges Scheme 2012 made by the Administrator or any replacement or revision of that charging scheme;

“emissions” means the total emissions in tCO₂ equivalent for a target period;

“EU ETS Directive” means Directive 2003/87/EC of the European Parliament and of the Council establishing a scheme for greenhouse gas emissions allowance trading within the Community and amending Council Directive 96/61/EC, as amended from time to time;¹

“facility” means a facility within the meaning of paragraph 50(2) to (6) of Schedule 6 to the Act;

“facility number” means the unique identification number of a facility set out in schedule 6 of this Agreement;

“greenfield facility” means a facility which started to carry out the process by virtue of which it is a facility within the meaning of paragraph 50 of Schedule 6 during the 12 month period ending on the date the operator applies for the facility to be covered by an agreement”

“Novem ratio target” has the meaning set out in the technical annex;

¹ *OJ No L 275, 25.10.03, p 32. The Directive was amended by European Parliament and Council Directives 2004/101/EC (OJ No. L 338, 13.11.2004, p 18), 2008/101/EC (OJ No L 8, 13.1.2009, p 3) and 2009/29/EC (OJ No L 140, 5.6.2009, p 63), and by Regulation (EC) No 219/2009 of the European Parliament and of the Council (OJ No L 87, 31.3.2009, p 109).

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“operator” means, as the context requires, either:

- a) the party to this Agreement other than the Administrator; or
- b) a party to an underlying agreement other than the Administrator;

“personal information” means:

- a) the address of the registered office of the sector association or operator;
- b) the name, address and email address of:
 - i) in the case of a sector association, a person who can be contacted in respect of the sector association;
 - ii) in the case of an Operator, the responsible person; and
- c) the name, address and email address of a person who can be contacted in respect of the facility or each facility covered by an agreement;

“the Register” means the electronic system established and operated by the Administrator for the administration of agreements;

“the Regulations” means the Climate Change Agreements (Administration) Regulations 2012 S.I. 2012/1976;

“responsible person” means an individual who is legally authorised by the Operator to enter as the Operator’s agent into an underlying agreement, to agree any amendments to an underlying agreement, and to accept service of notices on behalf of the Operator;

“Rule or Rules” means the Rules for the Operation of Climate Change Agreements or any of them set out in Schedule 1 to this Agreement as varied from time to time;

“Schedule 6” means Schedule 6 to the Finance Act 2000;

“sector” means the sector consisting of facilities which are covered by the same umbrella agreement;

“sector association” means the sector association set out in Schedule 3;

“sector commitment” means the commitment set out in Schedule 5 of the umbrella agreement, as varied from time to time;

“surplus” means the amount by which the emissions have fallen below the target for any target period;

“target” means the percentage improvement in energy efficiency or carbon efficiency from the base year applicable to the target unit, set out in Schedule 6 to this Agreement, as varied from time to time;

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“target period 1” means the target period from 1st January 2013 to 31st December 2014;

“target period 2” means the target period from 1st January 2015 to 31st December 2016;

“target period 3” means the target period from 1st January 2017 to 31st December 2018;

“target period 4” means the target period from 1st January 2019 to 31st December 2020.

“target unit” means the facility or group of facilities to which this Agreement applies;

“tCO₂ equivalent” means tonnes of carbon dioxide equivalent;

“technical annex” means the technical annex dated 6 March 2013 and published by the Administrator or the Secretary of State, available via the Administrator’s website;

“throughput” means the measure of production, or factor related to production, used to determine the relationship between the amount of energy used by the target unit and the levels of activity of the target unit, as set out in Schedule 6 of this agreement;

“the Tribunal” means the First-tier Tribunal established under the Tribunal Courts and Enforcement Act 2007²;

“umbrella agreement” means an agreement that is an umbrella agreement for the purposes of paragraph 48 of Schedule 6 to the Act;

“underlying agreement” means, as the context requires, either:

- a) this Agreement; or
- b) an agreement that is an underlying agreement for the purposes of paragraph 48 of Schedule 6 to the Act.

1.2 Other words and expressions used in this Agreement have the same meaning as they bear in Schedule 6 to the Finance Act 2000 or the Regulations.

² Appeals are assigned to the General Regulatory Chamber of the First-tier Tribunal by virtue of article 3(a) of the First-tier Tribunal and Upper Tribunal (Chambers) Order 2010 (S.I. 2010/2655). The Tribunal Procedure (First-tier Tribunal) (General Regulatory Chamber) Rules 2009 (S.I. 2009/1976) sets out procedural rules relating to such appeals.

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2. FACILITIES TO WHICH THIS AGREEMENT APPLIES

2.1 This Agreement applies to the facility or facilities set out in Schedule 5 to this Agreement which carry out some or all of the activities set out in Schedule 4 to this Agreement.

3. TARGET

3.1 The target is set out in Schedule 6 to this Agreement, as varied from time to time.

3.2 Whether the target has been met must be determined in accordance with Rule 6.

3.3 The Secretary of State may carry out a review of the sector commitment during 2016 for the target periods 1st January 2017 to 31st December 2018 and 1st January 2019 to 31st December 2020. The target may be varied to take account of the review in accordance with the procedure set out in Rule 12.

3.4 The target may also be varied in accordance with Rules 6, 9, 10 and 11.

4. THE RULES

4.1 Schedule 1 to this Agreement which sets out the Rules for the operation of Climate Change Agreements has effect.

4.2 The Operator agrees to comply with the Rules.

5. DURATION AND TERMINATION OF THIS AGREEMENT

5.1 Subject to clause 5.2 below, this Agreement comes into force on 1 April 2013 or the date on which it is made, if later, and ends on 31 March 2023.

5.2 This Agreement may be terminated before 31 March 2023:

5.2.1 at any time by a notice served by the Operator giving at least 20 working days notice served on the Administrator; or

5.2.2 in accordance with the Regulations.

6. VARIATION OF AGREEMENT

6.1 Subject to clauses, 6.2 and 6.3 below, this Agreement may be varied at any time if agreed between the Administrator and the Operator.

6.2 The facilities to which this Agreement applies may be varied in accordance with Rules 9 and 10.

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- 6.3 This Agreement may be varied by the Administrator at any time to take account of changes to the terms specified in the Regulations.

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7. AUTHORITY

7.1 The Operator warrants that it has the power to enter into this Agreement and is authorised and has obtained all necessary approvals to enter into this Agreement on behalf of the included facilities and the responsible person warrants that he or she is authorised to sign this Agreement on behalf of the operator.

Signed on behalf of
the Environment Agency



Karl Sydney
Operations Manager (Energy
Efficiency)

Signed by the responsible person on behalf
of the Operator

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Mark Daly
VP, CUSTOMER OPERATIONS, EMEA

mdaly@digitalrealty.com

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SCHEDULE 1

RULES FOR THE OPERATION OF CLIMATE CHANGE AGREEMENTS

1. OBLIGATIONS OF A SECTOR ASSOCIATION AND OF AN OPERATOR

1.1 An Operator and a Sector Association must:

- 1.1.1 supply such information to the Administrator as the Administrator may request in connection with an agreement, by the date specified in the request;
- 1.1.2 notify the Administrator of any changes to its personal information within 20 working days of the change;
- 1.1.3 co-operate with any person appointed by the Administrator to undertake an independent audit of information provided to the Administrator; and
- 1.1.4 comply with the provisions of the charging scheme. If a charge remains unpaid after the date on which it is due, it may be recovered by the Administrator as a civil debt.

2. OBLIGATIONS OF A SECTOR ASSOCIATION

2.1 Following the setting of the sector commitment by the Secretary of State, or following a variation of the sector commitment under Rule 12.1, a Sector Association must distribute the sector commitment between each target unit under the umbrella agreement.

3. OBLIGATIONS OF AN OPERATOR

3.1 An Operator must:

- 3.1.1 notify the Administrator and the Sector Association within 20 working days of the date when the Operator has reason to believe that a facility covered by an underlying agreement may not be eligible for inclusion in the underlying agreement;
- 3.1.2 notify the Administrator within 20 working days of becoming aware of any structural change or other change set out in the technical annex which may give rise to a variation to the target in accordance with Rule 11;
- 3.1.3 notify the Administrator within 20 working days of discovering any error in the data provided to the Administrator for the base year;
- 3.1.4 provide to the Administrator on or before 1st May following the end of a target period such information as has been requested by the

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Administrator in order to determine whether progress towards meeting the target is, or is likely to be, taken to be satisfactory;

- 3.1.5 provide any other information requested at any time by the Administrator by the date specified in the request to enable the Administrator to determine that:
 - (a) the target has been met; or
 - (b) the Operator is complying with the terms of the underlying agreement;
 - 3.1.6 notify the Administrator within 5 working days of the Operator or a facility in a target unit becoming a firm in difficulty, within the meaning of the European Commission Guidelines on State Aid for Rescuing and Restructuring Firms in Difficulty (2004/C 244/02);
 - 3.1.7 provide the responsible person with full authority to carry out his or her functions, including authorisation to accept on behalf of the Operator the service of any notice; and
 - 3.1.8 provide a current UK postal address and an operational email address of the responsible person for service of any notice.
- 3.2 If the Administrator enters into an underlying agreement before a target has been agreed, conditional upon the Operator providing sufficient information within a specified period in order to set the target for the target unit, the Operator must supply any data requested by the Administrator within the period specified by the Administrator on energy use and throughput of the target unit.

4. OPERATION OF THE REGISTER

- 4.1 Subject to Rules 4.2 and 4.3, to the extent possible, a Sector Association and an Operator must communicate with the Administrator using the Register.
- 4.2 Until a Sector Association and an Operator have been notified by the Administrator that the Operator is able to operate an account on its own behalf, an Operator must provide all information to the Sector Association to comply with the obligations of an Operator under an underlying agreement. The Sector Association must then operate the register on behalf of the Operator to provide the information to the Administrator.
- 4.3 After receiving notification from the Administrator that an Operator is able to operate an account on its own behalf, an Operator must notify the Administrator if it wishes to access its account directly to comply with its obligations under an underlying agreement. If an Operator makes such notification, the Operator must then operate the Register on its own behalf in order to comply with its obligations under an underlying agreement. If an Operator does not make such notification, the Operator must continue to provide all information to the Sector Association to comply with the obligations of an Operator under an underlying agreement and

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the Sector Association must continue to operate the register on behalf of the Operator to provide information to the Administrator.

5. CERTIFICATION OF A FACILITY

5.1 The Administrator must certify that a facility is covered by an agreement from the signing of an underlying agreement to the end of the certification period in which the underlying agreement is signed.

5.2 The Administrator must certify that a facility is covered by an agreement for any certification period other than the certification period in which the underlying agreement is signed, where it appears to the Administrator that progress made in the immediately preceding certification period, whether under the underlying agreement or under any previous underlying agreement, towards meeting targets set for the target unit is, or is likely to be, satisfactory.

5.3 For the purposes of this Rule, progress made in the immediately preceding certification period towards meeting targets set for the target unit is, or is likely to be satisfactory only where condition 1 and condition 2 are satisfied.

5.4 Condition 1 is that:

5.4.1 the target set for the target unit for the relevant target period is met, in accordance with Rule 6; or

5.4.2 if the target set for the target unit has not been met, the target unit has paid the buy-out fee in accordance with Rule 7.

5.5 Condition 2 is that obligations imposed under or by virtue of regulations made for the purpose of implementing the EU ETS Directive have been complied with in respect of each facility comprising the target unit.

5.6 If:

5.6.1 a target unit has failed to meet its target in accordance with Rule 6 and the Operator has failed to pay the buy-out fee in accordance with Rule 7;

5.6.2 obligations imposed under or by virtue of regulations made for the purpose of implementing the EU ETS Directive have not been complied with in respect of any facility in a target unit; or

5.6.3 the underlying agreement or umbrella agreement is terminated in accordance with Regulation 17(1)(2), or (3) or Regulation 18,

the Administrator must not certify that the facility or facilities comprising the target unit are covered by an agreement or, where a certificate has been issued, the Administrator must vary the certificate in accordance with paragraph 45 of Schedule 6.

5.7 If:

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5.7.1 a facility is not or ceases to be eligible for inclusion in an agreement; or

5.7.2 a facility is excluded from an underlying agreement under Rule 10;

the Administrator must not certify that the facility is covered by an agreement or, where a certificate has been issued, the Administrator must vary the certificate in accordance with paragraph 45 of Schedule 6.

5.8 If the information supplied to the Administrator is insufficient to determine whether:

5.8.1 the target for the target period has been met; or

5.8.2 obligations imposed under or by virtue of regulations made for the purpose of implementing the EU ETS Directive have been complied with in respect of each facility comprising the target unit;

the Administrator may refuse to certify that the facility or facilities are covered by an agreement or, where a certificate has been issued, the Administrator may vary that certificate in accordance with paragraph 45 of Schedule 6.

5.9 Subject to Rule 5.10, if the Administrator does not certify a facility or varies a certificate that has been issued, the Administrator must serve a decision notice on the Sector Association and the Operator of the facility setting out the reasons for the decision, unless a notice of termination has already been served.

5.10 The Administrator is not required to serve a decision notice where a facility has been certified under this Rule and it is subsequently discovered that the target unit for the relevant target period had not been met because of an error in the information originally supplied to the Administrator provided that:

5.10.1 the Sector Association and the Operator have satisfied the Administrator that the error was unintentional; and

5.10.2 the Operator has paid any buy-out fee in accordance with Rule 7.

6. MEETING THE TARGET

6.1 A target unit meets its target for the purpose of Rule 5 if it meets or exceeds the percentage improvement in energy efficiency or carbon efficiency from the base year set out in Schedule 6 to the underlying agreement.

6.2 The Administrator must determine whether the target has been met in accordance with the principles, methodologies and procedures set out in the technical annex.

6.3 An Operator must notify the Administrator on or before 31st January in the year following the end of a target period of any circumstances which may give rise to an adjustment to the target for the previous target period, as set out in the technical annex.

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6.4 If an Operator makes a notification under Rule 6.3, the Administrator may adjust the previous target in accordance with the principles, methodologies and calculations set out in the technical annex and must serve a notice on the Operator, setting out:

6.4.1 whether or not it had decided to vary the target; and

6.4.2 any revised target (as varied) for the target unit.

7. BUY-OUT MECHANISM

7.1 If the administrator finds that the target unit has failed to meet its targets:

7.1.1 at any time in the period beginning with 1st May in the year following the end of a target period and ending immediately before the first day of the next certification period; or

7.1.2 at any other time,

the obligation to make progress towards meeting targets may instead be satisfied by the payment to the administrator of a fee in accordance with Rule 7.2.

7.2 If Rule 7.1 applies, the administrator must serve a notice on the Operator containing the following information:

7.2.1 that the target unit has failed to meet its target;

7.2.2 the fee to be paid, calculated in accordance with Rule 7.3 or Rule 7.4;

7.2.3 the date by which the fee must be paid, determined in accordance with Rule 7.5 or Rule 7.6;

7.2.4 to whom the fee must be paid;

7.2.5 how the fee is to be paid; and

7.2.6 that failure to pay the fee in accordance with the notice will result in the issue of a variation certificate in accordance with paragraph 45 of Schedule 6.

7.3 If Rule 7.1.1 applies, the amount of the fee is:

$$A \times (W - S)$$

Where:

(a) A is £12 where the finding is of a failure to meet a target for target period 1 (1st January 2013 – 31st December 2014) or target period 2 (1st January 2015 – 31st December 2016), or £14 where the finding is of a failure to meet a target for

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target period 3 (1st January 2017 – 31st December 2018) or target period 4 (1st January 2019 – 31st December 2020);

(b) W in units of tCO₂ equivalent represents the amount by which the emissions for the target period exceed the target and

(c) S in units of tCO₂ equivalent represents any surplus.

7.4 If Rule 7.1.2 applies, the amount of the fee is:

$$A \times W$$

Where:

(a) A is £12 where the finding is of a failure to meet a target for target period 1 (1st January 2013 – 31st December 2014) or target period 2 (1st January 2015 – 31st December 2016), or £14 where the finding is of a failure to meet a target for target period 3 (1st January 2017 – 31st December 2018) or target period 4 (1st January 2019 – 31st December 2020);

(b) W in units of tCO₂ equivalent represents the amount by which the emissions for the target period exceed the target.

7.5 If Rule 7.1.1 applies, the fee must be paid on or before 1st July in the year in which the target unit is found to have failed to meet its targets.

7.6 If Rule 7.1.2 applies, the fee must be paid within 30 working days beginning with the date of the notice.

7.7 Payment of the fee is deemed to have been made when the person to whom the fee must be paid as specified in the notice receives full cleared funds.

7.8 For the purposes of calculating the buy-out fee under this Rule and for calculating the amount of any surplus, the Administrator must calculate the difference between the target for the target period and the actual performance achieved during the target period, where the target and the actual performance achieved are expressed in the same units, and convert any difference between the two into a quantity of carbon dioxide equivalent, expressed in units of tCO₂ equivalent, using the principles, methodologies and calculations set out in the technical annex.

8. SURPLUS

8.1 If a facility is excluded from a target unit, the Operator must determine how any surplus should be distributed between the facilities that have been excluded from the target unit and the facilities remaining in the target unit and must notify the Administrator of the redistribution within 20 working days of the facility being excluded from the target unit.

8.2 If an Operator fails to notify the Administrator of the redistribution in accordance with Rule 8.1 any surplus remains with the facilities remaining in the target unit.

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- 8.3 If facilities join a target unit, any surplus attributable to those joining facilities may be used by the target unit as a whole.

9. VARIATION BY INCLUSION OF ADDITIONAL FACILITIES

- 9.1 A facility which is not already included in another umbrella agreement is eligible at any time to be considered for inclusion in an umbrella agreement where:

9.1.1 it is a facility within the meaning of paragraph 50 of Schedule 6; and

9.1.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement.

- 9.2 A facility which is not already included in another underlying agreement is eligible at any time to be considered for inclusion in an underlying agreement where:

9.2.1 it is a facility within the meaning of paragraph 50 of Schedule 6;

9.2.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement; and

9.2.3 it has the same operator as the operator of the underlying agreement under which it will be included, as set out in the technical annex.

- 9.3 A facility which is already included in another underlying agreement is eligible to be considered for inclusion in a different underlying agreement on or before 30 September 2013 where:

9.3.1 it is a facility within the meaning of paragraph 50 of Schedule 6;

9.3.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement; and

9.3.3 it has the same operator as the operator of the underlying agreement under which it will be included, as set out in the technical annex.

- 9.4 A facility which is already included in another underlying agreement is eligible to be considered for inclusion in a different underlying agreement on or after 1 October 2013 where:

9.4.1 it is a facility within the meaning of paragraph 50 of Schedule 6;

9.4.2 it is a facility undertaking the activities set out in Schedule 3 to an umbrella agreement;

9.4.3 it has the same operator as the operator of the underlying agreement under which it will be included, as set out in the technical annex; and

9.4.4 there has been a change of operator of the facility.

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- 9.5 An additional facility cannot be added to an umbrella agreement or an underlying agreement:
- 9.5.1 during the final target period under the umbrella agreement or the underlying agreement; or
 - 9.5.2 during the last two months of a target period.
- 9.6 The administrator may vary the target of a target unit to take account of the inclusion of additional facilities following the principles, methodologies and calculations set out in the technical annex.
- 9.7 If a Sector Association wishes to add an additional facility to an umbrella agreement or an Operator wishes to add an additional facility to an underlying agreement the Sector Association or the Operator must notify the Administrator not less than two months before the commencement of the next target period setting out:
- 9.7.1 the name of the Operator of the facility;
 - 9.7.2 the address of the facility;
 - 9.7.3 a description of the facility;
 - 9.7.4 such information as will enable the Administrator to reach a decision on establishing eligibility of the facility, as requested by the Administrator; and
 - 9.7.5 such information as will enable the Administrator to determine the revised target for the target unit, as requested by the Administrator.
- 9.8 If the Administrator receives a notification under Rule 9.4, the Administrator must serve a notice on the Operator, copied to the Sector Association:
- 9.8.1 consenting to include the additional facility in an umbrella agreement or an underlying agreement and setting out whether or not it has decided to vary the target, and if so, the revised target (as varied) for the target unit;
 - 9.8.2 refusing consent to include the facility in an umbrella agreement or an underlying agreement, giving reasons for the decision; or
 - 9.8.3 requesting such further information as is required in order to establish eligibility of the facility or reach a decision on the target for the facility.

10. VARIATION BY EXCLUSION OF FACILITIES

- 10.1 If a Sector Association or an Operator wishes to exclude a facility, or part of it, from an umbrella agreement or an underlying agreement, it must notify the Administrator of the proposed exclusion, setting out:

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- 10.1.1 the name of the Operator of the facility;
- 10.1.2 the facility number, or a description of the part that is to be excluded; and
- 10.1.3 the reason for the exclusion.

10.2 If:

- 10.2.1 a Sector Association or an Operator has notified the Administrator that it wishes to exclude a facility under Rule 10.1; or
- 10.2.2 the Administrator has terminated an agreement so far as it relates to an individual facility under Regulation 17(4),

the Administrator may vary the target to take account of the exclusion or termination following the principles, methodologies and calculations set out in the technical annex, and may request such information from the Sector Association or the Operator as it requires in order to determine the revised target.

10.3 If the Administrator decides to vary or not to vary the target under Rule 10.2, it must serve a notice on the Operator, copied to the Sector Association, setting out whether or not it has decided to vary the target, and if so the revised target (as varied) for the target unit.

11. VARIATION OF TARGETS IN OTHER CIRCUMSTANCES

11.1 The Administrator may vary the target to take account of:

- 11.1.1 any structural changes or other changes to the target unit which the Operator must notify to the Administrator under Rule 3.1.2;
- 11.1.2 any errors in the data provided to the Administrator for the base year; or
- 11.1.3 in respect of a target unit which has a Novem ratio target, the removal of a product produced in the target period which was produced in the base year.

following the principles, methodologies and calculations set out in the technical annex.

11.2 The Administrator may request any information of a Sector Association or an Operator as it requires in order to determine the revised target under Rule 11.1.

11.3 If the Administrator decides to vary or not to vary a target under Rule 11.1, it must serve a notice on the Operator, copied to the Sector Association, setting out:

- 11.3.1 whether or not it has decided to vary the target; and
- 11.3.2 any revised target (as varied) for the target unit.

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

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12. VARIATION OF SECTOR COMMITMENT FOLLOWING A REVIEW

- 12.1 The sector commitment may be reviewed by the Secretary of State during 2016 for the target periods from 1 January 2017 to 31 December 2018 and from 1 January 2019 to 31 December 2020.
- 12.2 If the Sector Association and the Secretary of State agree on a variation to the sector commitment following a review, the Secretary of State may issue a direction to the Administrator that the sector commitment must be varied and then the Administrator must serve a variation notice on the Sector Association.
- 12.3 The variation notice must state:
- 12.3.1 the agreed variation; and
 - 12.3.2 the date from which the agreed variation will take effect.
- 12.4 The Sector Association must, within 20 working days of receipt of a variation notice, serve notice on the Administrator setting out the proposed distribution of the revised sector commitment between each target unit under the umbrella agreement.
- 12.5 The Administrator must:
- 12.5.1 agree to the proposed distribution and vary the targets of each target unit accordingly;
 - 12.5.2 request further information in relation to the proposed distribution; or
 - 12.5.3 refuse the proposed distribution and propose an alternative distribution, giving reasons for the decision.
- 12.6 If the Sector Association and the Secretary of State fail to agree on a variation of the sector commitment, either party may refer any dispute as to matters of fact to an adjudicator for adjudication, in accordance with the procedure set out in guidance published by the Secretary of State.
- 12.7 The adjudicator must, on the basis of representations provided to the adjudicator and any additional information considered necessary by the adjudicator, make a finding on the disputed questions of fact and notify the parties of that finding.
- 12.8 The adjudicator's finding on a disputed question of fact shall be binding on the parties but it shall be for the Secretary of State and the Sector Association to agree, in the light of that finding, what variations to the sector commitment are required.
- 12.9 If the Secretary of State and the Sector Association fail to agree on the variation to the sector commitment, the Administrator may terminate the agreement in accordance with Regulation 18.

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13. RIGHT OF APPEAL

13.1 If the Administrator:

13.1.1 decides not to certify a facility or to vary a certificate which has been issued;

13.1.2 serves a notice imposing a buy-out fee under Rule 7 upon determining that a target unit has failed to meet its target; or

13.1.3 decides to vary or not to vary the target for a target unit,

the Operator may appeal to the Tribunal against the decision.

13.2 In respect of an Operator which enters into an agreement after 1 April 2013, the Operator may appeal to the Tribunal against the target that has been set for the target unit by the Administrator.

13.3 For the purposes of Rule 13.2, the date on which notice of the decision is deemed to have been sent to the Operator is the later of the date the agreement is entered into or the date the Administrator sends notice to the Operator of the target for the target unit.

13.4 The grounds on which an Operator may appeal under Rule 13.1 and 13.2 are:

13.4.1 that the decision was based on an error of fact;

13.4.2 that the decision was wrong in law;

13.4.3 that the decision was unreasonable;

13.4.4 any other reason.

13.5 The bringing of an appeal suspends the effect of the decision pending final determination by the Tribunal of the appeal or its withdrawal.

13.6 On determining an appeal under these Rules the Tribunal must either:

13.6.1 affirm the decision;

13.6.2 quash the decision; or

13.6.3 vary the decision.

14. RECORDS AND INFORMATION

14.1 A Sector Association and an Operator must retain records of all information required to be supplied to the Administrator under these Rules.

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

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14.2 In particular, an Operator must retain:

14.2.1 sufficient records to allow the Administrator to verify whether a target unit has met its target, including sufficient records to allow the accurate verification of throughput and annual consumption of energy of a target unit; and

14.2.2 records of energy saving actions and measures implemented during each target period.

14.3 A Sector Association and an Operator must make all records which it is required to retain under these Rules available for inspection by the Administrator or a person appointed by the Administrator and must provide copies of such records in response to a request by the date specified in the request.

14.4 All records required to be retained under these Rules must be retained throughout the duration of an agreement and for a period of four years following the termination of an agreement.

15. PUBLICATION AND DISCLOSURE OF INFORMATION

15.1 The Administrator must publish such information as required under the Regulations.

15.2 In respect of the disclosure of information other than disclosure of information required to be published under the Regulations, information supplied by a Sector Association or an Operator to the Administrator or the Secretary of State, to any agent of the Administrator or the Secretary of State, or to any person appointed by the Administrator or Secretary of State to carry out an independent audit, may be disclosed without the consent of the Sector Association or Operator, where such disclosure is:

15.2.1 by the Administrator to the Secretary of State, for any purpose connected with the functions of the Secretary of State;

15.2.2 by the Secretary of State to the Administrator, for any purpose connected with the functions of the Administrator;

15.2.3 to a relevant authority, for any purpose connected with the functions of the relevant authority;

15.2.4 to any person appointed by the Administrator or the Secretary of State to carry out an independent audit;

15.2.5 to an adjudicator appointed under these Rules;

15.2.6 to any person appointed by the Administrator or the Secretary of State to act as agent, consultant, adviser or contractor to the Administrator or the Secretary of State, in connection with the functions of the Administrator or the Secretary of State;

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

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15.2.7 necessary for the purpose of or in connection with any legal proceedings, including the obtaining of legal advice;

15.2.8 required to comply with any Act of Parliament or subordinate legislation made under an Act of Parliament, including requests made under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004; or

15.2.9 required to meet any obligation to the European Union.

15.3 A relevant authority referred to in this Rule means:

15.3.1 either House of Parliament including any committee of either or both Houses;

15.3.2 any Government department;

15.3.3 the European Commission;

15.3.4 the Committee on Climate Change;

15.3.5 the Commissioners of Her Majesty's Revenue and Customs;

15.3.6 a person or body prescribed by or appointed under Part I of the Environmental Protection Act 1990 or regulations made under section 2 of the Pollution Prevention and Control Act 1999 or any corresponding legislation for Northern Ireland;

15.3.7 any regulator appointed under section 54 of the Competition Act 1998; or

15.3.8 any other public body, regulatory agency or government advisory body, where in the absolute discretion of the Administrator or the Secretary of State, as appropriate, the Administrator or Secretary of State considers that it would be obliged to disclose such information in response to a request for information under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004, if such a request were made.

16. COLLECTION OF CHARGES

16.1 A Sector Association may request the consent of the Administrator to collect charges due from Operators to the Administrator in respect of facilities under the charging scheme.

16.2 If a Sector Association wishes to collect charges due from an Operator to the Administrator under the charging scheme, the Sector Association may serve a notice in writing on the Administrator by the last working day in February in the calendar year in which the charges fall due.

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Agreement Dated: <Date to be inserted>

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- 16.3 A notice served under Rule 16.2 must specify the facilities in respect of which the Sector Association intends to collect charges, being not fewer than 50% of the facilities covered by an umbrella agreement.
- 16.4 Following receipt of the notice, the Administrator must:
- 16.4.1 consent to the Sector Association collecting charges; or
 - 16.4.2 refuse consent to the Sector Association collecting charges, giving reasons for the decision.
- 16.5 If the Administrator consents to the Sector Association collecting charges the Sector Association must:
- 16.5.1 itemise charges separately in any invoices that it issues in respect of charges;
 - 16.5.2 collect and remit all charges collected to the Administrator without deduction or set off by the last working day in September in each year;
 - 16.5.3 prepare an annual report to the Administrator by the last working day in October in the year in which it has collected charges setting out which Operators it has collected charges from and which Operators have failed to pay charges due to the Sector Association.
- 16.6 A Sector Association must not actively pursue any outstanding charges after the last working day in September in any year in which they fall due. If a Sector Association receives charges after this date the Sector Association must accept the payment and remit this to the Environment Agency along with information identifying the Operator making the payment.
- 16.7 If a Sector Association fails to comply with any of its obligations under this Rule the Administrator may serve a notice on the Sector Association that consent to the Sector Association continuing to collect charges is withdrawn at the expiry of 20 working days from the date of the notice.

17. SERVICE OF NOTICES

- 17.1 Any notice served under these Rules must be in writing and may be served by sending it by post or electronically.
- 17.2 The address for the service of all notices on the Administrator is:

Postal: Environment Agency
Lutra House
Dodd Way, Off Seedlee Road
Walton Summit, Bamber Bridge,
Preston, Lancs
PR5 8BX

Electronic: CCA-operations@environment-agency.gov.uk

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Agreement Dated: <Date to be inserted>

Agreement Identifier: DATC/T00003 v8

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- 17.3 The address for the service of all notices on the Sector Association is the address of the person set out in Schedule 2 to the umbrella agreement.
- 17.4 The address for the service of all notices on the Operator is the address of the responsible person.

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

Agreement Identifier: DATC/T00003 v8

TU Identifier: DATC/T00003

SCHEDULE 2

THE OPERATOR

Digital Realty (UK) Limited (Companies House: 05813740)

Whose address for service of all notices under this Agreement is

By post:

Level 7

40 Gracechurch Street

London

EC3V 0BT

England

Administrative contact

Mr David Smith

Electronically:

djsmith@digitalrealty.com

SCHEDULE 3

THE SECTOR ASSOCIATION

Information Technology Telecommunications and Electronics Association (techUK)

Whose address for service of all notices under this Agreement is

By post:

10 St Bride Street

London

EC4A 4AD

England

Sector Contact

Ms. Emma Fryer

Electronically:

emma.fryer@techuk.org

THE UMBRELLA AGREEMENT

The Agreement dated 21 Sep 2017 made between the Administrator and the Sector Association.

SCHEDULE 4

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

Agreement Identifier: DATC/T00003 v8

TU Identifier: DATC/T00003

ACTIVITIES UNDERTAKEN BY A FACILITY FALLING WITHIN THE SECTOR

The business activity is the leasing or licensing of a data facility which is being used as a data centre.

'data facility' means a room, or rooms sharing the same electricity supply circuit, occupied mainly or exclusively by computer equipment which is enabled to transfer data electronically, and where in respect of the room or rooms—

- (a) the temperature and humidity is regulated in connection with the operation of the computer equipment;
- (b) the electricity supply is at least 200kW; and
- (c) electricity is supplied by a back-up electricity supply when the mains supply is interrupted.

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

Agreement Identifier: DATC/T00003 v8

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SCHEDULE 5

FACILITIES TO WHICH THIS AGREEMENT APPLIES

Facility Identifier	Site Name & Address	EU ETS Identification
DATC/F00004	Phoenix House, Cressex Coronation Road, Cressex Industrial Park, High Wycombe , HP12 3TA , England	UK-E-IN-13038
DATC/F00005	Unit 3, Redhill 3 St. Anne's Boulevard Redhill, Surrey , RH1 1AX , England	UK-E-IN-13035
DATC/F00006	Reynolds House, Manchester Phoenix Way, Birley Fields , Manchester , M15 5RN , England	
DATC/F00007	Fountain Court, Chessington Cox Lane, Chessington , Surrey , KT9 1SJ , England	UK-E-IN-13314
DATC/F00008	Unit B, ProLogis Park Greenland Way, Croydon , London , CR0 4TD , England	UK-E-IN-13036
DATC/F00009	The Chess Building, Watford Caxton Way, Watford , Hertfordshire , WD18 8UA , England	UK-E-IN-13040
DATC/F00010	Unit 21, Goldsworth Park Trading Estate Kestral Way, Woking , Surrey , GU21 3BA , England	UK-E-IN-13037
DATC/F00142	Crawley Unit 1, Power Avenue, Manor Royal, Crawley, RH10 9BE, England	UK-E-IN-13302

PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

Agreement Identifier: DATC/T00003 v8

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PROPOSED UNDERLYING CLIMATE CHANGE AGREEMENT FOR THE DATA CENTRES SECTOR

Agreement Dated: <Date to be inserted>

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TU Identifier: DATC/T00003

SCHEDULE 6

TARGET UNIT TARGETS

Target Unit Identifier	Target Period	Target Type	Throughput Unit	Baseline Throughput	Primary Energy Consumption Unit	Baseline Energy	Numerical target (Percentage reduction from base year)
DATC/T00003	TP1 (1 Jan 2013 to 31 Dec 2014)	Relative	IT energy (MWh)	232,409.018	kWh	475,495,199.795	2,025.022 (1.022%)
	TP2 (1 Jan 2015 to 31 Dec 2016)	Relative	IT energy (MWh)	232,409.018	kWh	475,416,490.335	1,871.342 (8.519%)
	TP3 (1 Jan 2017 to 31 Dec 2018)	Relative	IT energy (MWh)	265,562.138	kWh	523,790,096.729	1,704.977 (13.557%)
	TP4 (1 Jan 2019 to 31 Dec 2020)	Relative	IT energy (MWh)	265,562.138	kWh	523,790,096.729	1,680.668 (14.790%)

To provide assent, please email your acceptance referencing your target unit identifier and agreement identifier in the subject line confirming you would like to proceed with inclusion within the scheme. Please note that this assent must be sent from the following email address:

mdaly@digitalrealty.com

To: cca-targetunit@environment-agency.gov.uk

Please ensure you send your email assent within 20 working days of this email. Failure to do so could risk us terminating this agreement.

If you require any clarification of the above, please contact your sector association.

Yours faithfully



CCA Team

c.c. Recipients:

Emma Fryer - emma.fryer@techuk.org

Mark Daly - mdaly@digitalrealty.com

David Smith - djsmith@digitalrealty.com

Julie Gartside - cca@slrconsulting.com

22 May 2019
CCA Register Ref: DATC/T00003-GEN-8

Digital Realty (UK) Limited (Companies House: 05813740)
TU Identifier: DATC/T00003

Level 7
40 Gracechurch Street
London
EC3V 0BT
England
mdaly@digitalrealty.com

**CLIMATE CHANGE AGREEMENTS SCHEME
UNDERLYING AGREEMENT ACTIVATED**

Dear Mark Daly

We are writing to inform Digital Realty (UK) Limited (Companies House: 05813740) (“you”) that your underlying agreement (“the agreement”) for the Climate Change Agreement scheme (“the scheme”) has been activated. This will now allow your target unit and the facilities listed within your agreement to qualify for the Climate Change Levy discount under Part IV of Schedule 6 to the Finance Act 2000 (as amended). The details below confirm the target unit and agreement to which this letter relates.

Target Unit: DATC/T00003 – Digital Realty (UK) Limited (Companies House:
05813740)
Level 7
40 Gracechurch Street
London
EC3V 0BT
England

Agreement Identifier: DATC/T00003 v8

We will notify HMRC that this agreement has been activated for your target unit and the facilities named within it. You will be required to contact your energy supplier and notify them of this agreement to obtain your discount from the Climate Change Levy.

If you require any clarification of the above, please contact your sector association.

Yours faithfully



CCA Team

c.c. Recipients:

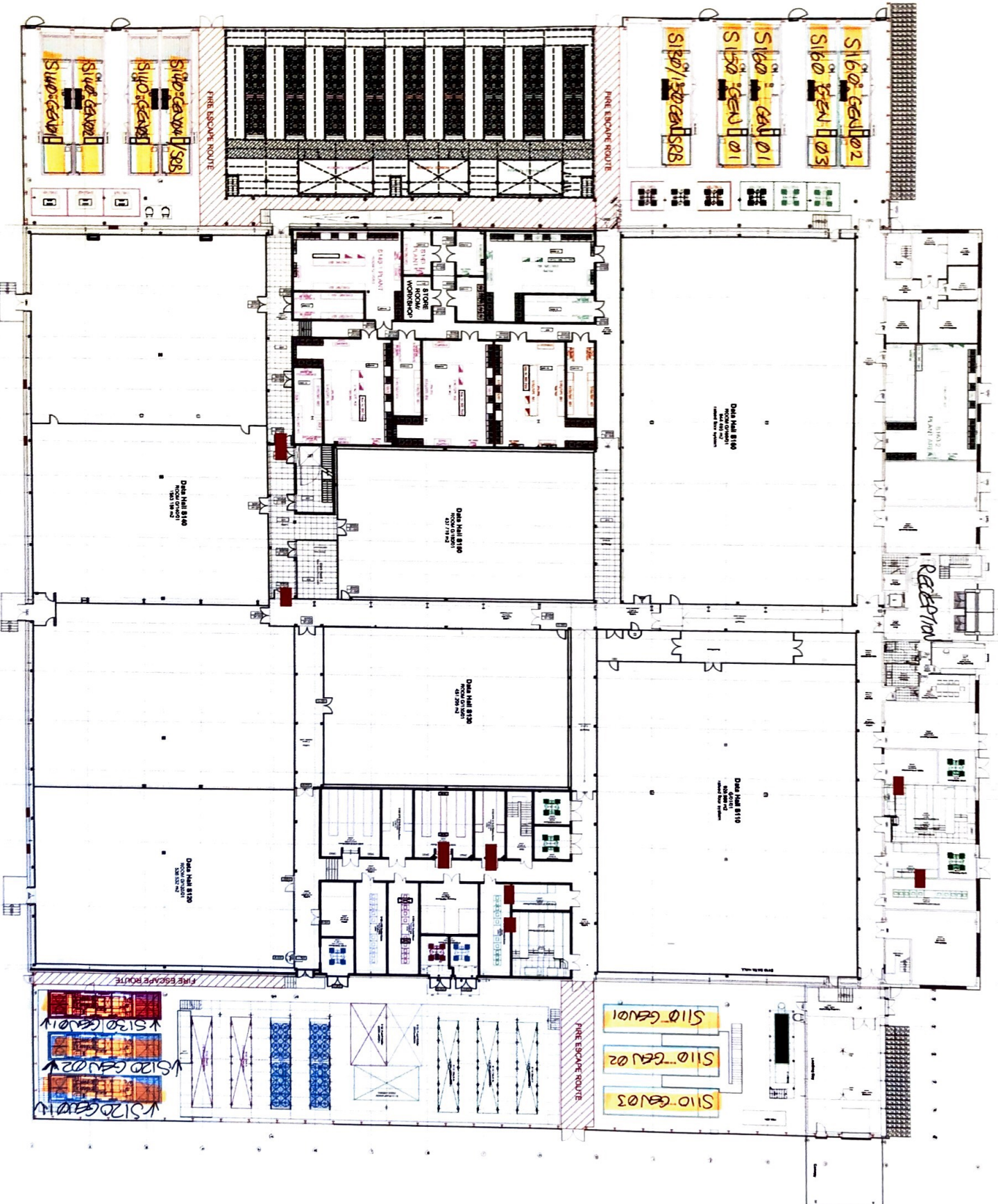
Emma Fryer - emma.fryer@techuk.org

Mark Daly - mdaly@digitalrealty.com

David Smith - djsmith@digitalrealty.com

Julie Gartside - cca@slrconsulting.com

FRONT OF BUILDING



DATE: 10/10/2010
 DRAWN BY: [Name]
 CHECKED BY: [Name]

PLAN SET

- Legend and
- Notes:
- 1. All dimensions and wall thicknesses are in millimeters unless otherwise specified.
- 2. All dimensions are to the centerline of walls unless otherwise specified.
- 3. All dimensions are to the face of walls unless otherwise specified.
- 4. All dimensions are to the centerline of columns unless otherwise specified.
- 5. All dimensions are to the centerline of beams unless otherwise specified.
- 6. All dimensions are to the centerline of slabs unless otherwise specified.
- 7. All dimensions are to the centerline of stairs unless otherwise specified.
- 8. All dimensions are to the centerline of ramps unless otherwise specified.
- 9. All dimensions are to the centerline of escalators unless otherwise specified.
- 10. All dimensions are to the centerline of lifts unless otherwise specified.
- 11. All dimensions are to the centerline of lifts unless otherwise specified.
- 12. All dimensions are to the centerline of lifts unless otherwise specified.
- 13. All dimensions are to the centerline of lifts unless otherwise specified.
- 14. All dimensions are to the centerline of lifts unless otherwise specified.
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- 16. All dimensions are to the centerline of lifts unless otherwise specified.
- 17. All dimensions are to the centerline of lifts unless otherwise specified.
- 18. All dimensions are to the centerline of lifts unless otherwise specified.
- 19. All dimensions are to the centerline of lifts unless otherwise specified.
- 20. All dimensions are to the centerline of lifts unless otherwise specified.



FOR INFORMATION

GENERAL CONTRACTOR: [Name]
 ARCHITECT: [Name]
 ENGINEER: [Name]
 DATE: [Date]