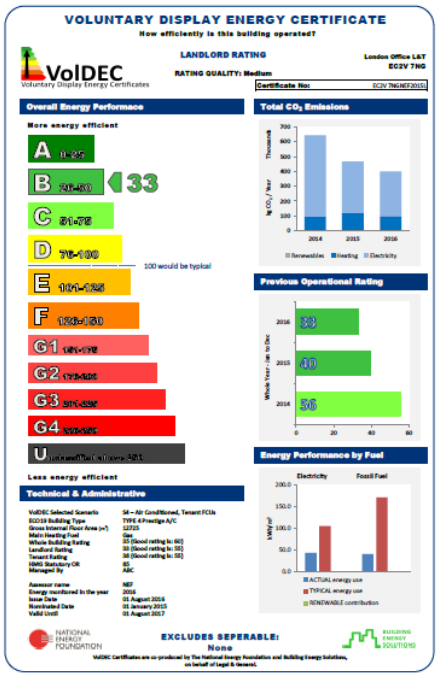
VolDEC
Voluntary Display Energy Certificates

Benchmarking energy performance of buildings to improve efficiency

carbon descent
Delivering a Sustainable Future

Building Energy Solutions
Energy Management, Research & Training Consultancy

VOLDEC HELP MANUAL



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Developed by:

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Version Control

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VOLDEC HELP MANUAL

1. WHAT ARE VOLDECS?

VolDECs (Voluntary Display Energy Certificates) are a new and innovative voluntary operational energy performance rating scheme for non-domestic buildings. Initially designed for commercial office buildings these are now being developed for other sectors. This is a not-for-profit scheme and the ratings are based on relatively simple data, making them inexpensive and quick to produce.

VolDECs have been developed as commercial office buildings don't have an appropriate means of measuring and highlighting energy performance in a relatively simple and consistent way. In particular, there are issues associated with the landlord and tenant energy split and the lack of relevant benchmarks to enable performance to be measured and compared sensibly and consistently.

1.1 Our VolDEC approach

Our new approach separates tenant energy use from that of the landlord and the common parts of the building (with the data being displayed either individually or on the same certificate). This provides property owners and operators with cost-effective, user-friendly energy ratings for areas of a building that they control or manage, and are able to improve.

Whole Building (Landlord only) VolDEC

Landlord-Tenant VolDEC

1.2 VolDEC methodology

Based on mandatory Display Energy Certificate (DEC) methodology and making use of relatively simple data, the scheme allows energy managers to easily and inexpensively

identify the energy performance of their building(s) relative to other buildings they operate or others in the same sector. VolDECs also use more granular benchmarks than statutory DECs to give a more robust rating for performance.

1.3 The VolDEC story so far

The VolDEC story so far has been summarised in a paper and presentation 'The Development of a Voluntary DEC Rating Scheme' that the team presented at the CIBSE Technical Symposium in 2015. This began with a whole building certificate and then expanded to provide a Landlord –Tenant split assessment.

Since then, VolDECs have been further developed to:

- Provide an environmental certificate covering waste and water
- Added a wide range of benchmarks for different building types
- Provide a certificate for the Landlord performance in shopping centres and car parks
- A new platform to allow client input online
- Expansion of VolDEC to now include most main non-domestic building types
- Automatic checks on the input data to provide WARNINGS to the client where data may be poor quality

Our not-for-profit VolDEC scheme has been developed by a working partnership between the National Energy Foundation and Phil Jones of Building Energy Solutions. NEF's role was subsequently taken on by Carbon Descent who developed the web platform.

2. WHY VOLDECS

2.1 The need for VolDECs

There's a growing need across all sectors for those responsible for buildings to monitor and manage their energy use better – whether it's driven by the commercial bottom line, the 'push' of government legislation and initiatives, the desire to combat climate change, or the comfort and productivity of occupants.

Evaluating a building's energy performance enables you to manage energy use better and to identify and prioritise opportunities for energy-related improvements – whether they're capital investment, occupant education or building modifications.

2.2 The challenge

It can often be a challenge to understand how much energy a building is using. However, the old adage: "If you don't measure it, you can't manage it" applies – but many people responsible for buildings often don't know what to measure, how to measure it, how often it should be measured or how to interpret the data.

The first stage of a prioritised energy efficiency plan is to assemble some simple key data and information. The aim of VolDECs is to use this information to compare the performance of a building, or buildings either across a portfolio, or against published UK benchmarks for the same type. VolDECs also track the performance of a building against itself over the last three years.

Comparing buildings with each other and also with others of a similar design or use is another benefit of VolDECs; and energy managers are able to identify potential opportunities for energy efficiency improvement and to prioritise further, more detailed investigations.

2.3 Display Energy Certificates

In 2010 the Government decided not to mandate Display Energy Certificates (DECs) in commercial buildings. VolDECs address this shortcoming by offering a voluntary scheme that's free from Government constraints and will hopefully gain the full backing of the industry. The scheme recognises the potential for:

- Gaining a deeper analysis and a better understanding of building energy performance
- Improving benchmarking standards that will benefit the whole sector

Statutory DECs provide a good starting point, but they have their shortcomings. Our VolDEC methodology aims to address these shortcomings, including the lack of flexibility in available benchmarks and the inability to split out performance. VolDECs also address issues that many buildings are stuck at a G rating with no clear direction on how to improve performance.

2.4 Our Aims

Our aims with VolDECs are to:

- Establish a consistent methodology and quality assurance across the industry
- Provide a voluntary scheme without government constraints
- Provide a not-for-profit solution, for the benefit of the industry, backed by the industry
- Use authoritative sector-specific benchmarks
- Highlight performance, encourage action and improvement
- Conduct benchmarking research for the industry
- Soft start the commercial sector into measuring performance
- Encourage deeper analysis to benefit building operators, designers and the whole industry

3. BENEFITS OF VOLDECS

VolDECs provide you with a number of benefits:

Various external and internal pressures mean that, for most organisations across all sectors, energy performance evaluation is fast-becoming unavoidably essential. Some see it as a burden but the more enlightened view is that it provides benefits for all their stakeholders – from shareholders to employees to customers and occupants.

The benefits of VolDECs are that they:

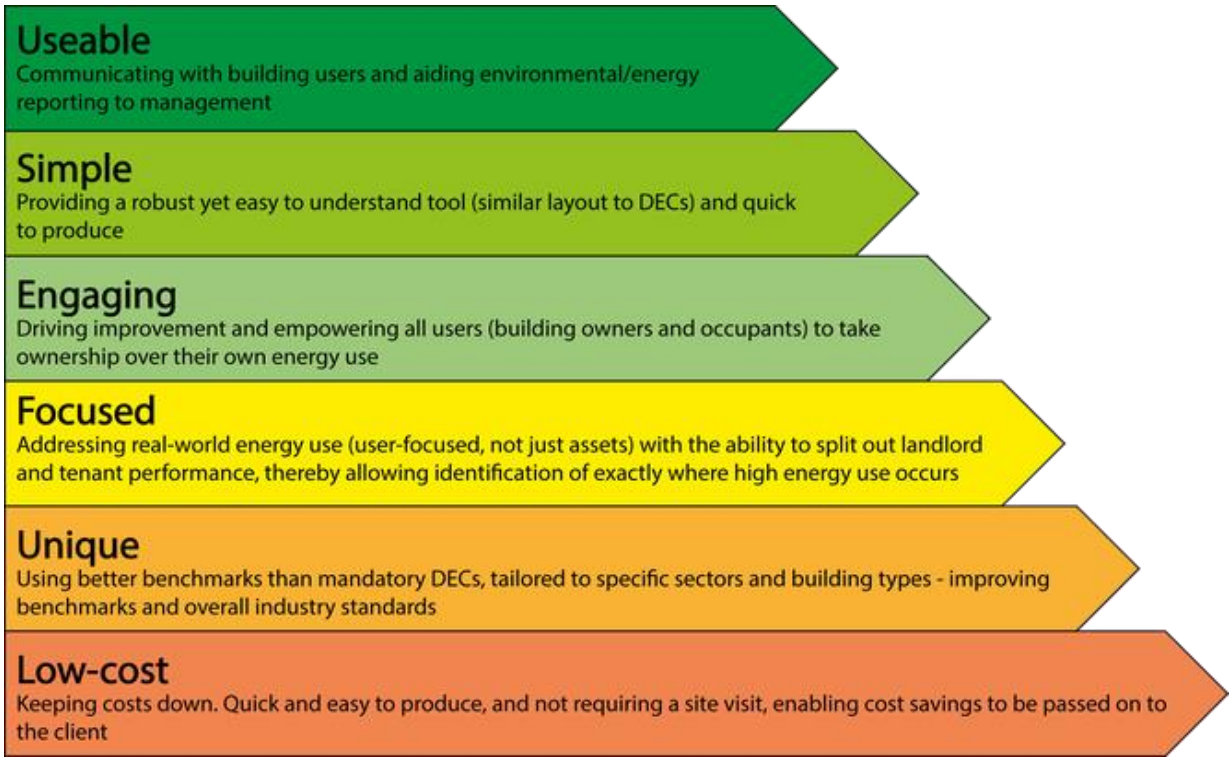
- Highlight energy performance and provide a clear driver for improving performance
- Are a stand-alone entry level engagement tool – based on relatively simple data, making them easy to produce and inexpensive
- Establish a consistent methodology and quality level across the industry
- Provide landlords and tenants with comparative energy performance of the areas that they control
- Offer a starting point for tenant engagement

- Use robust DEC methods but with more appropriate benchmarks and an extended scale for greater performance differentiation
- Have been piloted in various multi-tenanted offices, and are now being developed for other sectors and building owners/operators
- Help to highlight data and performance anomalies and the need for more detailed investigations

VolDECs are “by the industry, for the industry”

Whilst complex buildings will need external expertise, VolDECs provide a useful, cost-effective and relatively easy starting point, and one that can be built into a more sophisticated approach as and when skills and confidence grow.

Our aim with VolDECs is to create a USEFUL tool by the industry, for the industry.



4. BUILDING SECTORS

The sectors where VolDECs can be used

VolDECs were initially designed for commercial office buildings but the VolDEC methodology can be adapted and one of our aims is to use them to benefit the management of other types of buildings. As a result we have expanded the use of VolDECs to cover all of the main non-domestic building types including;

- Shopping centres
- Restaurants
- Shops
- Leisure facilities
- Hotels
- Warehouses

and many others.

If you're involved in a specific sector and would like to discuss applying VolDECs to your buildings, please contact us.

4.1 Sector-specific

We can make VolDEC certificates sector-specific to highlight aspects that are particular to either building types or sector practices. We can also work with sector associations to tailor and badge VolDECs in order to gain support across a sector.

Alternative benchmarking

Where the data is available, VolDECs can be based on sector-specific benchmarks such as kWh/meal in restaurants and kWh/bedroom in hotels. This provides an alternative performance rating that can sometimes indicate where problems lie in particular buildings.

Portfolio benchmarking

We can produce VolDECs based on benchmarks from a single large portfolio (a hotel chain, for example) to allow a comparison with a client's own stock of buildings, and these would be badged as client-specific VolDECs. This allows a more specific comparison to rate performance against organisational benchmarks, providing an even greater like-for-like comparison.

5. THE VOLDEC METHODOLOGY

VolDECs use the same methodology as statutory Display Energy Certificates (DECs) and provide a similar certificate layout with an A-G scale, but that's where the similarity ends. VolDECs take all the good features of statutory DECs and make them better, easier and more informative while also allowing tailoring for each sector and individual client requirements.

Better benchmarking

VolDECs use ECON19 benchmarks for offices while statutory DECs use a single CIBSE TM46 benchmark. This has the advantage of providing multiple benchmarks dependent on the building type instead of just a 'one shoe fits all' approach. Using a similar approach, VolDECs will be developed for other sectors.

Enhanced rating scale

The traditional A-G rating scale used in statutory DECs has been extended to include G1 to G4 ratings. This has the advantage of providing low-ranking buildings with a more defined rating in order to encourage improvement. VolDECs also include a U (Unclassified) rating for buildings where performance or data is exceptionally poor.

Improved data quality

Uniquely, VolDECs include a certificate quality rating: HIGH, MEDIUM and LOW, to encourage improvements in data quality. In some cases this encourages clients to go back and assess their data rather than simply trust a less robust rating. See later.

Office Landlord/tenant split

By separating out the tenant energy outputs from those produced by the common parts of an office building, property owners/operators are provided with cost-effective, user-friendly energy ratings for just those areas of an asset that are within their control to improve.

	Statutory DEC	**VolDEC**
Methodology	Produced using the methodology described in CIBSE TM47	Produced using the methodology described in CIBSE TM47
Benchmarks	Uses CIBSE TM46 benchmarks. This provides only one benchmark for all office types	Uses ECON19 benchmarks for offices. This provides four different office types and energy is broken down by end use for each type
Rating scale	A-G rating scale	Uses G1-G4 and U ratings, thereby providing more granular information for poor performing buildings
Data quality	No specific data quality checks	Uses a High/Medium/Low certificate data quality rating
Landlord/tenant split	Unable to provide a separate landlord/tenant DEC in the same building	Uses the granular energy breakdown in ECON19 to provide composite landlord and tenant benchmarks for seven different building scenarios

6. DATA REQUIREMENTS

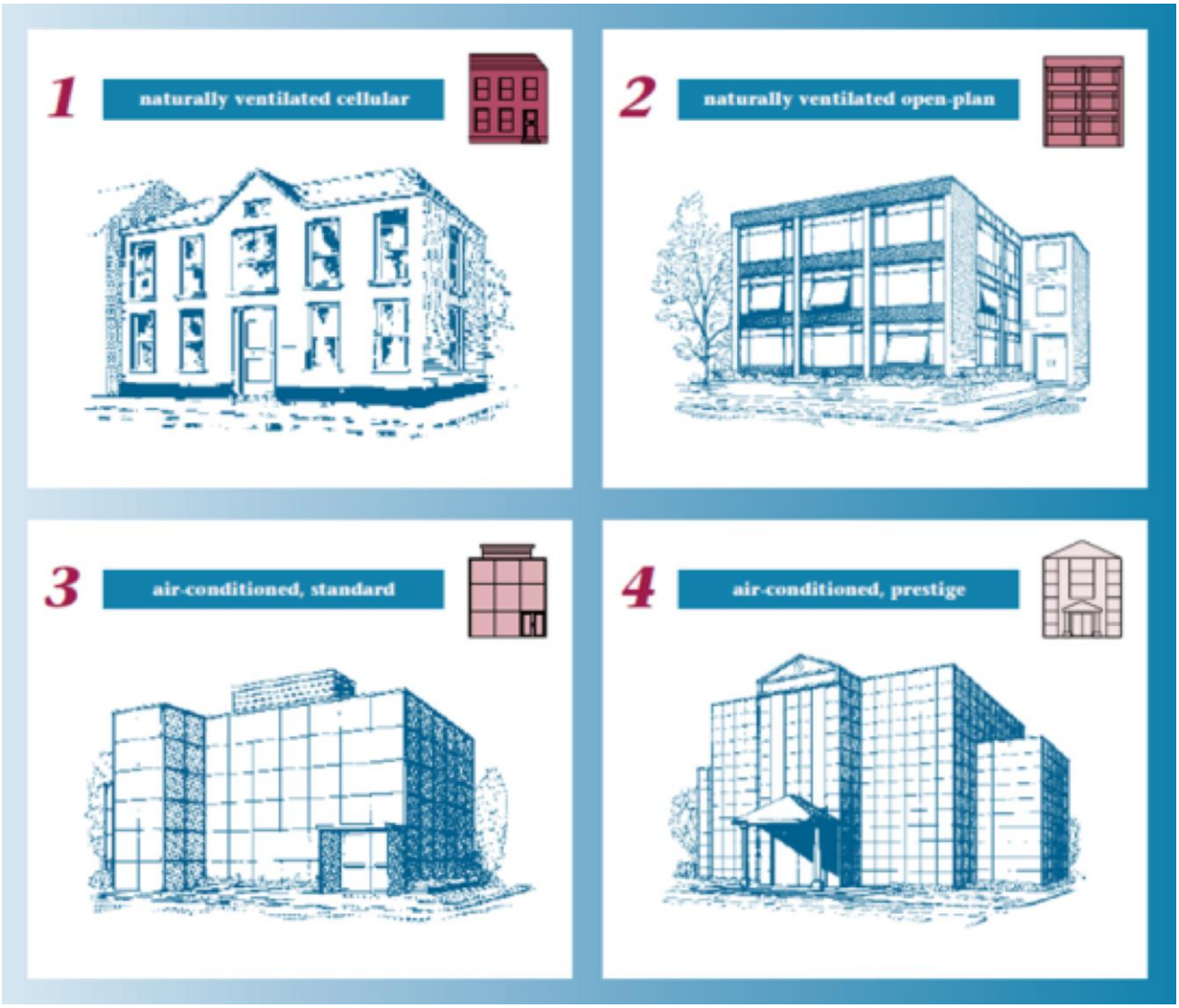
In order to produce a whole building VolDEC certificate for a particular building, you'll need to provide us with:

- Building address and postcode
- Building type
- Floor area
- Energy data by fuel type
- Energy data by user (landlord or tenant)
- Data year/reporting period
- Approximate hours the building is occupied

VolDECs for office buildings

Step 1 – Select your building type

Select which of the four office types matches your building:



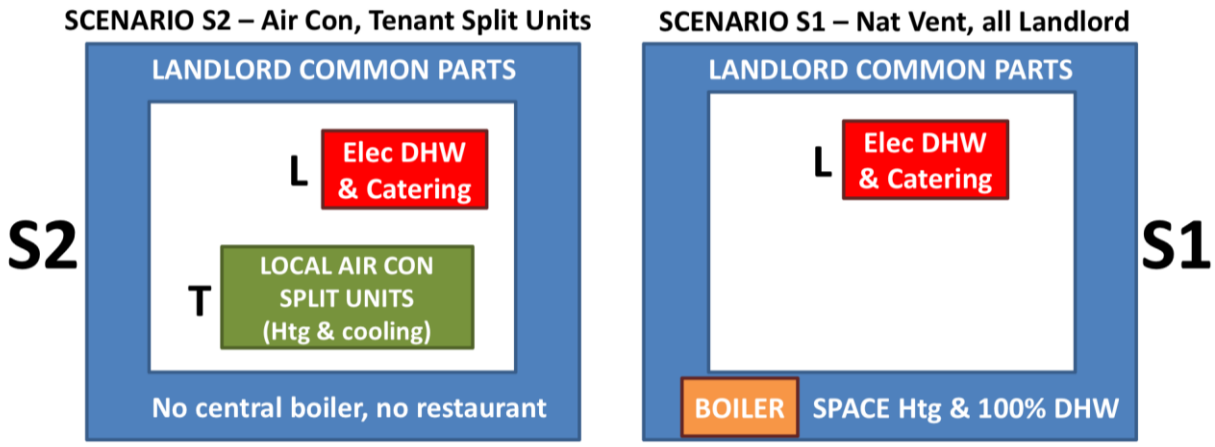
7. LANDLORD TENANT VOLDECS

Step 2 – Select your building scenario

If your building is an office, for which you'd like to develop separate landlord and tenant VolDECs, we also need to know which one of the seven building scenarios below applies. Please select the nearest match from below:

S1 – Naturally ventilated, all Landlord

- Landlord central gas boiler (Space Heating & 100% DHW)
- Landlord 100% Electric DHW & catering
- Central restaurant included in S1

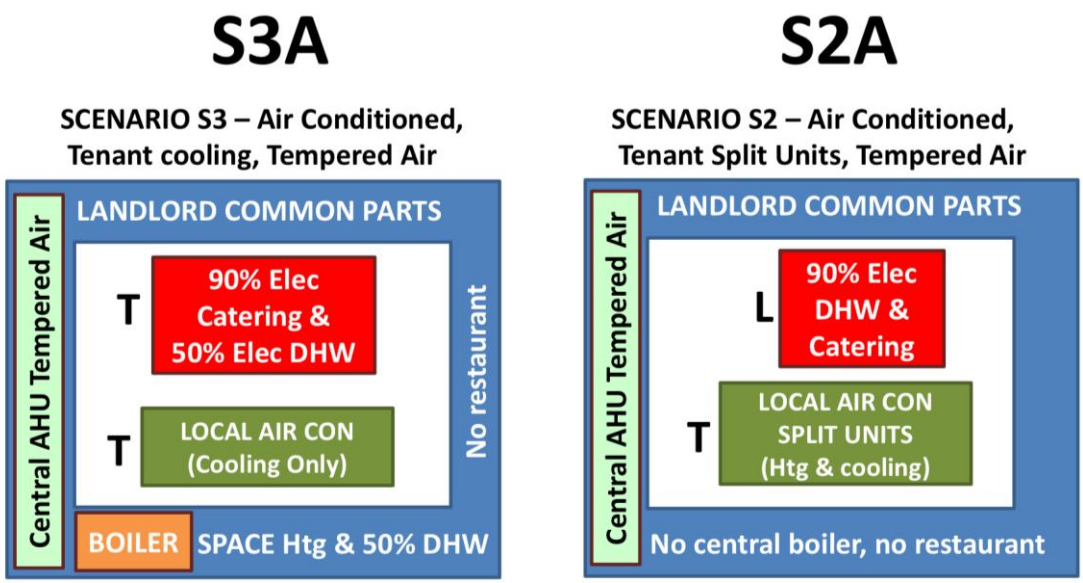


S2 – Air Conditioned, Tenant Split Units

- Tenant Local split units (Heating & cooling)
- Tenant 90% Electric DHW & catering
- No central restaurant in S2
- No central boiler in S2
- Space heating & DHW based on adjusted gas benchmark

S2a – Air Conditioned, Tenant Split Units, Tempered air

- Tenant Local split units (Heating & cooling)
- Tenant 90% Electric DHW & catering
- No central restaurant in S2
- No central boiler in S2
- Central AHU supplying background tempered air
- Space heating based on adjusted gas benchmark

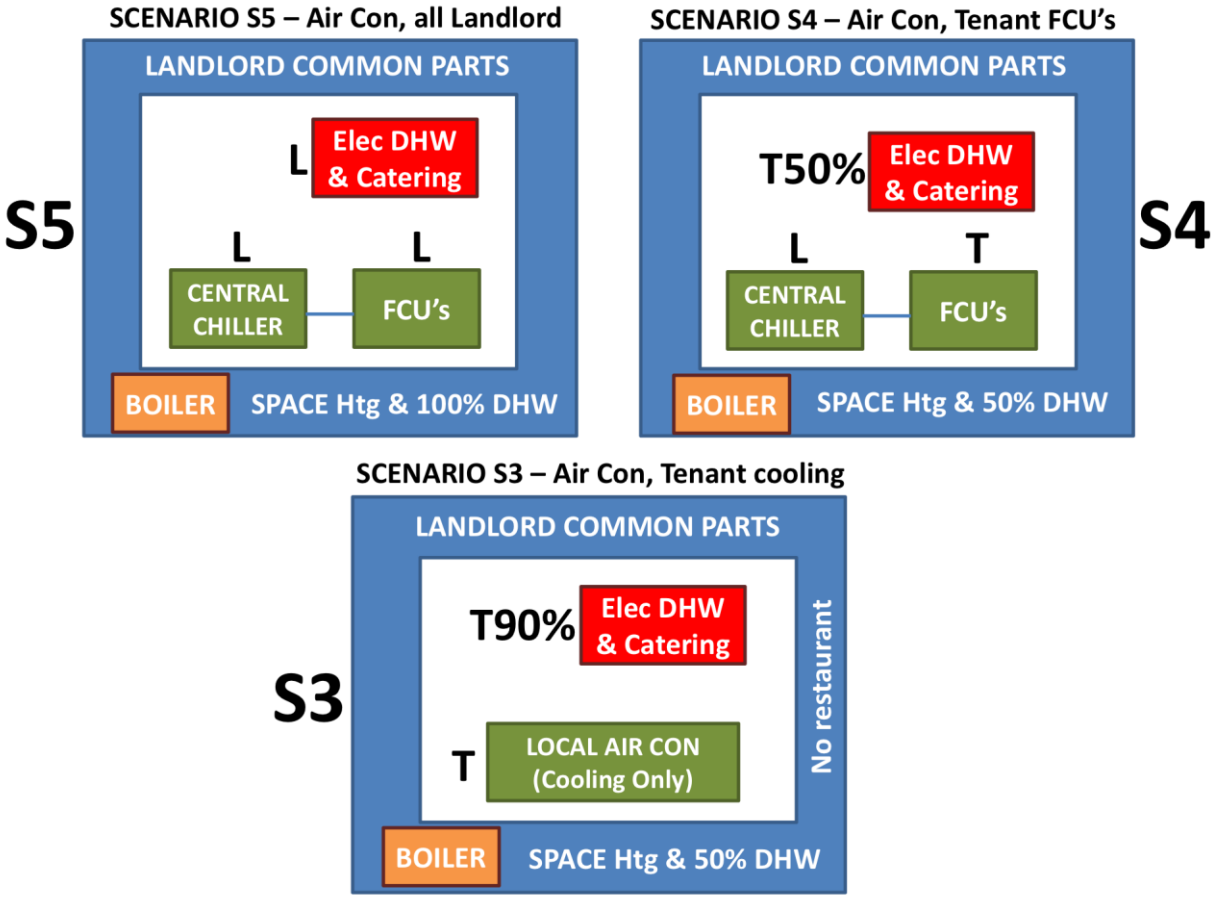


S3 – Air Conditioned, Tenant cooling

- Landlord central gas boiler (Space Heating & 50% DHW)
- Tenant Local Air Conditioning (Cooling Only)
- Tenant 90% Electric DHW & catering
- No central restaurant in S3

S3a – Air Conditioned, Tenant cooling & Tempered Air

- Landlord central gas boiler (Space Heating & 50% DHW)
- Tenant Local Air Conditioning (Cooling Only)
- Central AHU provides background tempered air
- Tenant 90% Electric catering
- Tenant 50% DHW as electric
- No central restaurant in S3



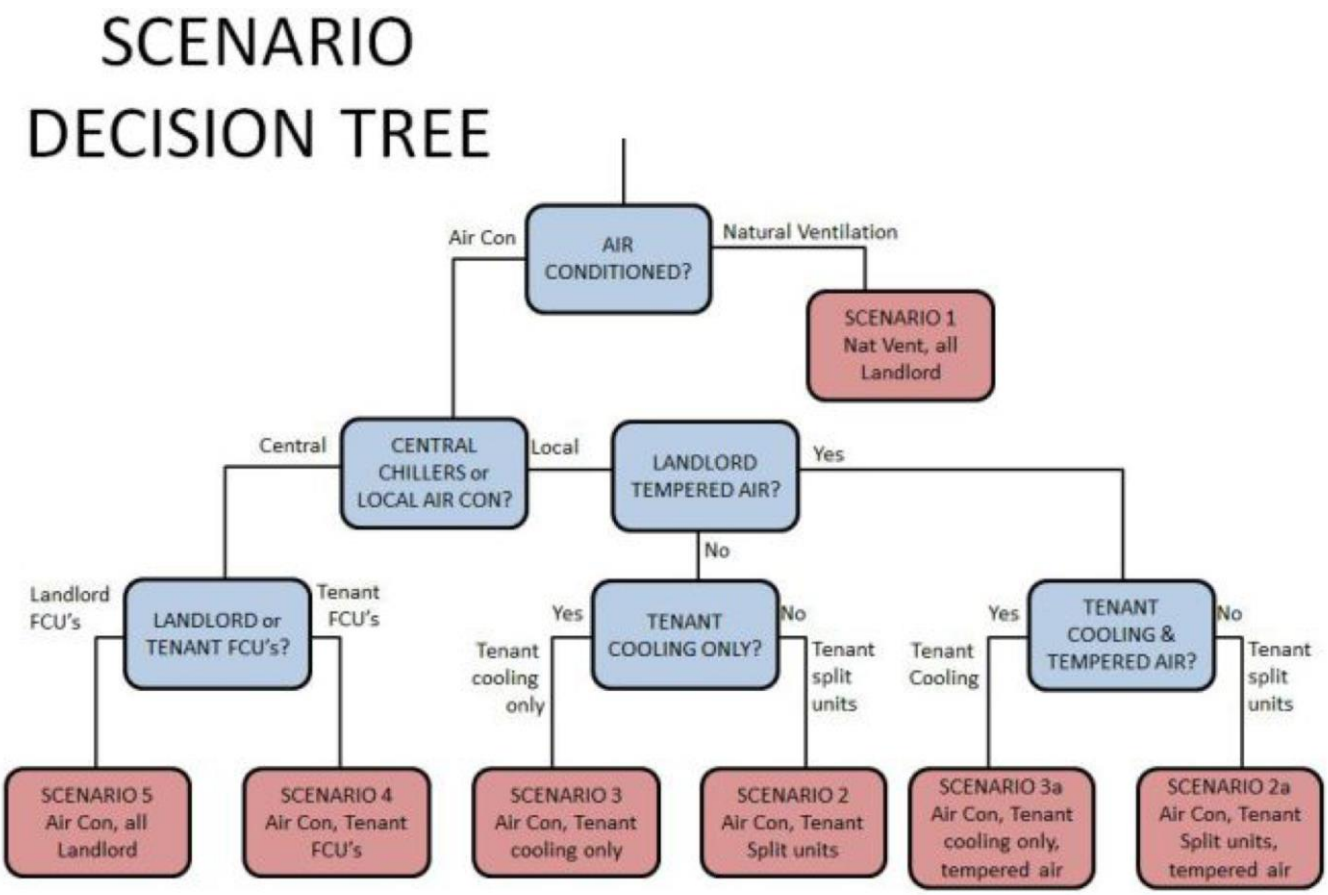
S4 – Air Conditioned, Tenant FCU's

- Landlord central gas boiler (Space Heating & 50% DHW)
- Landlord central chiller & central fans
- Tenant FCU's
- Tenant 50% Electric DHW & catering
- Central restaurant included in S4

S5 – Air Conditioned, all landlord

- Landlord central gas boiler (Space Heating & 100% DHW)

- Landlord central chiller
- Landlord FCU's
- Landlord 100% Electric DHW & catering
- Central restaurant included in S5



Step 3 – Begin inputting data on the platform or complete our simple data collection sheet which is available on request.

8. OFFICE ASSUMPTIONS

- Based on 'Typical' ECON 19 benchmarks (not good practice)
- ECON 19 benchmarks converted to Gross floor area using Guide F factors for each building type
- Gas DHW is 20kWh/m2 of total gas where there is a restaurant S5, S4, S1 (Landlord)
- Gas DHW is 10kWh/m2 of total gas where there is no central restaurant S3, S2
- Electric DHW & Catering is 100% Landlord in S5 & S1, 50% in S4 and 10% in S3 & S2
- S2A & S3A have a central AHU providing tempered air

9. FLOOR AREA

In general, the benchmarks used in VOLDEC are based on Gross Internal Floor Area (GIFA) i.e. internal wall to internal wall including everything. However, there are alternative metrics in some sectors:

- Net Lettable Area (NLA) in offices and shopping centres
- Car Park Spaces in car parks
- Sales Floor Area in retail buildings

The VolDEC platform can convert input data between these metrics.

10. SEPARABLES

The separables (special end-uses) allowed in VolDEC are:

S1 Regional server room

S2 Trading floor

S3 Bakery oven

S4 Sports flood lighting

S5 Furnace, heat treatment or forming process

S6 Blast chilling or freezing

S7 Cinema complex

S8 Large Gym

S9 Large process equipment

S10 swimming pool

S11 Very large medical equipment

11. RENEWABLES

The low carbon & renewable technologies allowed in VolDEC are:

Renewable Heat

- GSHP Heat
- ASHP Heat
- WSHP Heat
- Biomass Boiler Heat
- Solar Water Heat
- Biogas Boiler Heat

Renewable electricity

- Solar PV Electricity
- Wind Turbine Electricity
- Hydro Electricity
- Anaerobic digestion CHP Electricity

LZC Technologies

- CHP

- CCHP
- District Heating
- District Cooling

12. VERIFICATION & AUDITING

The VolDEC platform automatically carries out a series of data quality checks and provides WARNINGS to the user where data falls outside certain parameters. This approach provides an element of data verification and data cleansing by the user themselves. We also undertake data verification checks to ensure the database is the highest possible quality. This is a key issue as much of the data around building performance is relatively poor quality

Although there are no site audit requirements for VolDECs but the scheme itself is subject to periodic audits.

Two levels of audit:

1. Standard checks on all VolDECs to identify spurious data leading to unexpected results. In particular, we look at the landlord-to-tenant rating ratio, in order to spot any wide disparities, which might imply either poor data or a poor choice of scenario

2. A small number of site visits across each larger portfolio ~ 5%. These might take the form of follow up visits by the client's representative

Full site audits - We also reserve the right to conduct a full site audit on a small proportion of scheme participants in order to ensure the on-going robustness of the scheme.

13. DATA QUALITY

Certificate ratings

The VolDEC certificate includes a quality rating as part of our immediate feedback and auditing:

- HIGH. Well categorised, good energy data, good floor area data (for display)
- MEDIUM. Concerns about categorisation, energy or floor area data (for display – prompting improved data)
- LOW. Missing/poor categorisation, energy or floor area data (issue to Facilities Manager – not for display)

As the user enters data the platform automatically carries out a series of data quality checks and provides WARNINGS to the user where data falls outside certain parameters. These data WARNINGS are then collected into a 'Data Quality' TAB in the platform showing a list of all of the data queries (warnings). The platform includes a summary of the number of warnings and the overall quality rating based on:

- HIGH = Zero WARNINGS
- MEDIUM = UP TO 2 WARNINGS OR ONE HIGH WARNING
- POOR = MORE THAN 2 WARNINGS OR ONE HIGH WARNING

The user can then ‘resolve’ a warning by adding some justification text as to why this is acceptable data rather than erroneous. This text will form part of our VolDEC auditing process and we reserve the right to question false information and justification.

But the basic idea is that the platform identifies possible poor data, the user then questions that and perhaps seeks better data or provides a justification for the Warning. This will be an iterative data cleansing approach in order to make the VolDEC performance rating more robust.

14. TERMS & CONDITIONS

Our Terms & Conditions for providing VolDECs

The VolDEC website is maintained by Carbon Descent International Ltd (CDI) and Building Energy Solutions (BES). Use of the website, including any data calculations, is subject to these terms and conditions. Copyright within the text, photos, other images and methodology lies with either CDI or BES or is used under licence from third parties.

Should you wish to obtain a VolDEC (which may consist of data processing or other services and the issuing of a certificate or other reports) from CDI and BES, which are collectively referred to as “we” or “us” below, then the following additional terms and conditions will apply.

1. Data provided to us from you is regarded as being your sole responsibility, and we cannot be held responsible for any errors or omissions within it. Although we may undertake standard verification checks on all VolDECs, and may undertake additional verification and auditing checks on a sample of data submitted to us, these are designed to give us internal assurance as to the likely veracity of data, and we cannot guarantee identifying any inaccuracies or inconsistencies, and have no obligation to report to you any data that we consider to be potentially in error.
2. (a) Source data provided by you remains your property. However by entering data into our system (whether electronic or on paper forms) you are giving us an unrestricted right to process and report upon that data, save that in the case of reported data we shall not identify the property to which that data relates without your explicit consent other than through the production of a VolDEC certificate and report, which we will deliver to you or to your nominated agent.

(b) Calculated data from VolDECs belongs to us, although we give you an unrestricted right to report and act upon such calculated data. Furthermore, we are, under these terms, permitted to report publicly aggregated data about energy, waste or water use or energy generation by building type and or market sector (including sub-divisions such as age or geographical location) for purposes including (but not restricted to) research and the development of better benchmarks, subject to our taking reasonable steps to prevent users of such aggregated data being able to construe information about a specific building or buildings owned by you.

(c) Where we are reporting on a building with one or more landlords and one or more tenants, we may assume that the VolDEC results (including report and certificate) may be made available to all landlords and tenants relating to that building unless you give use specific instructions not to do so, or naming only those parties associated with that building who may be permitted to see the results. We may also presume that contracted facilities managers and letting/sales agents may be informed about VolDEC results unless you specifically require us not to do so.

(d) VolDEC reports are issued with a specific period of validity. You agree not to continue to refer to a VolDEC rating on a building as being current beyond the stated period of validity. You may continue to refer to it as a historical rating, and act upon any recommendations for energy performance improvement actions beyond that date.

(e) Energy consumption data varies with many factors including the level of activity inside a building, external weather conditions, employee or occupant behaviour, and any changes made to the building or its services during the period of data collection. The VolDEC rating is based on historical data for a defined period, so cannot be guaranteed to be representative of energy use in that building or as an indicator of future energy consumption.

(f) We will audit 5% of the VolDECs generated through the online VolDEC portal, in order to ensure that data input to the system is accurate. This audit may require you, the user of the VolDEC portal, to provide us with additional data or supporting evidence. This might also involve us carrying out a site visit to any building recorded on the VolDEC online system. By agreeing to these terms and conditions you agree to take part, cooperate with and support us in the execution of any such audits that involve you. Should an audit indicate incorrect inputs or use of the VolDEC platform then CDI/BES will work with the organisation to resolve any issues and re-issue the certificate with a normal certificate cost to the client. CDI/BES reserve the right to block organisations that continue to submit poor data or misuse the VolDEC platform. Any appeal will be referred to an independent energy expert at a joint cost to the client."

3. We will not sell data relating to your properties to third parties for the purpose of marketing energy performance improvement actions without your explicit consent. We may sell aggregated data (as in condition 2 above) to interested parties, including government agencies, but with the same proviso that we shall use reasonable endeavours to prevent data relating to your individual properties being identifiable, without your explicit consent.
4. Any actions taken by you following the completion of a VolDEC, including (but not restricted to) your undertaking any recommendations for energy performance improvement actions, are undertaken by you at your own risk and we cannot be held liable for the failure of such actions to achieve anticipated (or any) energy savings, or for any consequential losses as a result of such actions, howsoever caused.
5. The detailed VolDEC methodology and processes are owned by us, and you agree not to seek to reverse engineer them or to otherwise produce VolDEC outputs without using our systems or services. If, during the conduct of a VolDEC process, you identify potential improvements to the methodology, system or service, then you may offer it to us as an improvement and we may, at our absolute discretion, decide whether to seek to create a similar improvement through our own efforts or to negotiate with you for incorporation of your specific improvement into our system.
6. We agree to provide the certificate providing payment has been agreed in accordance with our terms of business and reserve the right to withhold provision of VolDEC results until such time as we have been paid. Where certificates need to be subsequently revised or updated due to either incorrect or poor quality source data provided by you, extra charges may need to be applied.
7. These terms and conditions form the basis of the legal agreement between you and us for the provision of VolDEC services, including the production of any certificates or reports as may be agreed. They are applicable to the extent that they may be applied; if any terms become illegal or unable to be delivered, the remaining terms shall stay in force and be construed in the light of the changed circumstances. If necessary, they shall be interpreted according to English law and subject to the jurisdiction of English courts.
8. CDI and BES accept no liability for the use of the VolDEC online tool and benchmarks both of which are to be used entirely at the user's risk. The VolDEC tool should not be used for any application with potential liabilities unless the user has first established to their own satisfaction the tool's functionality and appropriateness."

15. SUCCESS STORIES

Legal & General Property has been involved with VolDECs from the very beginning and has pioneered the piloting of the VolDEC concept on a number of offices in its estate.

"We believe that VolDECs are a great first step in engaging managing agents and tenants to improve energy performance. At a lower cost than a statutory DEC, we feel that it is truly cost effective to roll out across large fund portfolios and will allow us not only to determine the annual operational rating of our assets in order to ensure that our supply chain is managing them effectively but most importantly to act if any exceptions show up. In time we hope to extend the scheme to cover other environmental aspects."

Debbie Hobbs, Head of Sustainability, Legal & General Property

16. ABOUT US

Voluntary Display Energy Certificates (VolDECs) was originally developed through a partnership between the National Energy Foundation and Phil Jones of Building Energy Solutions. The scheme was initially funded by Legal & General Property and was successfully tested on 16 of its major, multi-tenanted office properties. Subsequently NEF's role was taken on by Carbon Descent International Ltd.

Carbon Descent is an independent company based in Bishops Stortford, which has been at the forefront of improving the use of energy in buildings since 1998.

Building Energy Solutions is an independent energy consultancy run by Phil Jones with a track record of over 25 years specialising in addressing energy problems in the built environment. BES provides training, research and building/technology troubleshooting across the non-domestic building sector.

Phil Jones - Senior Energy Consultant, Building Energy Solutions

"VolDECs are a real step-change for commercial buildings that currently don't use DECs and will help engage people in dealing with the energy performance gap."

Phil Jones is an independent energy consultant with over 30 years' experience in the built environment sector. He has spent his career trying to make buildings more energy-efficient and investigating failing buildings. For the last 25 years he has run the independent energy consultancy Building Energy Solutions where he carries out building energy research and training across a wide range of buildings and technologies. Phil is the original author of CIBSE Guide F – Energy Efficiency in Buildings. He also wrote CIBSE TM31 on Building Log Books and CIBSE TM39 on Building Energy Metering. Phil is a leading specialist on energy benchmarking of buildings, he chairs the CIBSE Energy Performance Group and is a member of the CIBSE Benchmarks Steering Group. In 2010, he was involved with UCL in analysing the DEC database for CIBSE.

The VolDEC platform software has been developed in partnership with NEF/BES by Carbon Descent.

Chris Dunham - Managing Director, Carbon Descent

“VolDECs’ separate landlord and tenant ratings provide a unique approach in dealing with what was an intractable energy problem and they help people to understand what they can control and improve.”

Chris has worked at Carbon Descent since the organisation’s inception in 1998 and became its Director in 2001. With qualifications in both engineering and architecture and 23 years’ experience in the field, he has an excellent understanding of the range of solutions open to organisations to reduce their carbon reduction emissions and with a particular interest in both software model development energy auditing and heat networks. Over the last year he has been developing a custom version of Carbon Descent’s energy auditing software for DECC. Over the last 3 years he has provided training in heat network modelling to many of the key players from the industry ranging from utilities such as SSE & EON, to construction companies such as Vital Energi and consultants such as, Aecom, Atkins Arup and Fichtner. More recently he has developed a model of the pioneering heat network scheme in Islington incorporating both heat pumps drawing their heat from waste sources at varying temperatures and CHP alongside thermal storage.

17. CONTACT US

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