



# **Energy Performance Contracts Handbook**

**Sample Document: Technical File and Baseline Data**

**December 2013**

# Technical File & Baseline Data

Template

for

**[Client Organisation Name]**

**[Facility Location]**

**Prepared by [Name]**

In this template, text within **square brackets** should be replaced with client-specific text.

Text in the **grey panels** and other **grey text** consists of instructions to the Energy Advisor and should be deleted or replaced as appropriate, before submission of the report to the client / SEAI.

The normal **black** text should be left in the final version of the report – unless it is inappropriate.

*Date:* \_\_\_\_\_

SEAI Project ID: **[Client ID]**

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## 1 Introduction

### 1.1 Site Information

Organisation Name: [Client Name]

Site Name & Address: [Address]

Names of facility  
/buildings included: \_\_\_\_\_

SEAI Client ID: [SEAI Client ID]

Prepared by: [Name of manager / engineer responsible for this document]

### 1.2 Objective

**Instructions to client:** The ESCOs that will tender for the EPC will each have to prepare an Investment Grade Audit (IGA) as part of the procurement process. The IGA is a thorough and detailed study to identify and quantify energy savings. It is in your interest that this be as accurate as possible, as that will reduce the ESCOs' risk and help improve the competitiveness of the tenders. It is also in your interest that the facility technical information they will require will be ready for them, as all ESCOs will ask for this information during the tender phase, putting your resources under pressure to provide this quickly and slowing the procurement process. It is in the national interest that information be provided to all ESCOs as this will reduce ESCO tendering costs, resulting in a more competitive market.

Organisations receiving SEAI support must prepare the Technical File & Baseline Energy Data before entering the Dialogue and Tender stage. It is a part of the Handbook to EPC – Stage 3.

The objective of this document is to present the information necessary to bidding ESCOs in order to enable them to efficiently develop the necessary Investment Grade Audit to be included in their bids in respect to the [facility]. It has two main components:

- . Technical file – technical information on the facility
- . Baseline data – energy (and water) use, activity data and environmental data<sup>1</sup> that will provide the basis for calculations and the Measurement & Verification plan. Utility price information may be included here, but ESCOs must use utility prices as specified in the Request for Quotation (RFQ) or Invitation to Tender (ITT) documentation so that all savings are valued on a similar basis.

<sup>1</sup> The International Performance Measurement and Verification Protocol uses the terms 'Independent Variables' and 'Static Factors', which are broadly similar.

This document incorporates 'verifiable' and 'non-verifiable' data. As their titles suggest, the former can be checked by the pre-selected candidates and they will assume full responsibility for it, while the latter comprises historical data (such as occupancy levels, operating procedures, etc) which cannot be verified by the pre-selected candidates. You must identify all 'non-verifiable' information.

The information in this document has been compiled by the Client to facilitate and expedite the Tenderer's preparation of its Investment Grade Audit. The Client accepts no liability or responsibility for the accuracy or completeness of the information classified as 'verifiable' in this document and the Tenderer is at liberty to verify any or all of such information. The Client will accept no liability or responsibility for the accuracy or completeness of the information classified as 'non-verifiable' in this document following the earlier of either the date being one year after the Commencement Date under the Energy Performance Contract to be entered into between the Client and the successful Tenderer or, if no such Energy Performance Contract is entered into, one year from the date of issue of the Invitation to Participate in Competitive Dialogue. Unless otherwise noted, the Client should assume all information is verifiable.

**How complete should this document be?** The more complete, the fewer the questions that will come back to you from the ESCOs, the less groundwork each ESCO will have to do, the more accurate and comparable the tenders, and the more competitive the price. Focus on providing the information the ESCOs can reasonably expect and avoid spending time on providing additional information they are unlikely to require.

This document does not have to be fully complete, it is essentially a checklist for you. The extent of completion is down to your judgement. In forming this judgement, consider things from an ESCO's perspective: *are they likely to use this information to identify and quantify energy savings?* You can always discuss with any advisors you have. Avoid omitting information that is likely to be required because you regard it as too much trouble to gather or you lack resources.

You may wish to focus your efforts on the large energy users, from which the main savings are likely to come (e.g. detailed information on large Air Handling Units (AHUs) with long operating hours; basic information on smaller AHUs). Include information not identified here, but which you consider to be appropriate. You may find it helpful to (a) start by assembling the checklist of information in Section 1.3, (b) complete the sections where you have information available, and (c) identify what else is required and prioritise the completion of some sections.

**How accurate should the information be?** As it will contribute to the final contract, it must be accurate. Most information required is factual in nature, although some statements, such as plant condition, may involve judgement. If there is some doubt about the facts (such as when a building was refurbished or the accuracy of energy data), this should be clearly stated (perhaps as a footnote reference). Any areas which involve judgement should be stated as opinions. If information is coming from other sources, and you cannot rely on these, you may wish to include a disclaimer. The disclaimer in Section 1.2 will help protect you.

**Do you have to complete the document the way it is laid out here?** No. This is an example template; use it to guide you on the type of information required and as a template to follow where it is convenient to do so. Information can be copied and pasted from other documents, imported from a maintenance database, or attached and referenced. Ideally, most of the information will come from other sources, such as contractor operations and maintenance files, and facility drawings.

The **checklist** below is a 'wishlist' of documents that would be of value to an ESCO. Add and delete to include what you have available. Pull electronic files into a folder with appropriate file names and reference numbers that can be distributed to the shortlist of tendering ESCOs. Paper records that cannot be scanned should be stored in a single location for reference by the ESCOs when they come to site. If you have this information together, then very little additional effort will be required to complete this Technical File and Baseline Data document.

### 1.3 Checklist of Supporting Documentation

| Item                                | Details  | Filename & Location | Non-Verifiable ? |
|-------------------------------------|--|---------------------|------------------|
| <b>Access Requirements</b>          |  |                     |                  |
| Health & Safety Requirements        |  |                     |                  |
| Site Security Requirements          |  |                     |                  |
| Other Requirements                  |  |                     |                  |
| <b>General Site Information</b>     |  |                     |                  |
| Buildings List                      | Building name, address, year built, floor area   |                     |                  |
| Site Plan                           | Building names   |                     |                  |
| Floor Plans                         | Preferably .dwg or .vsd formats  |                     |                  |
| Building Activity Data              | Type of building (e.g. Office), opening hours & occupancy data. Any information that is likely to be a driver of energy use, e.g. bednights, production volumes, etc.    |                     |                  |
| Details of Building Uses by Area    | To facilitate tailored benchmarking, e.g. number of operating theatres and total floor area  |                     |                  |
| <b>Energy Management</b>            |  |                     |                  |
| Building energy performance records | BER, DEC, other.   |                     |                  |
| Energy surveys                      | Any previous energy surveys, including any SEAI Preliminary Energy Audit that may have been completed. You may wish to remove some information, such as budgetary costs. |                     |                  |
| Completed measures                  | List of previous energy efficiency measures/projects implemented (last 3 years, longer for major investments).   |                     |                  |
| Completed upgrades                  | List of completed upgrades to building services/energy infrastructure (last 3 years, longer for major investments).  |                     |                  |
| Capital programme                   | List of major capital expenditures planned or deferred on building services/energy infrastructure.   |                     |                  |
| Suggested measures                  | Register of opportunities and/or management  |                     |                  |

|  |  |   |  |  |
|--|--|---|--|--|
|  |  | suggestions of areas of potential savings.  |  |  |
| <b>Utilities Measurement, Monitoring &amp; Baseline Data</b> |  |   |  |  |
|  | Number of electric meters and locations              | Preferably schematic. Identify recording / logging arrangements.  |  |  |
|  | Number of natural gas meters and locations           | Preferably schematic. Identify recording / logging arrangements.  |  |  |
|  | Number of steam meters (if applicable) and locations | Preferably schematic. Identify recording / logging arrangements.  |  |  |
|  | Number of water meters and locations                 | Preferably schematic. Identify recording / logging arrangements.  |  |  |
|  | EU Emissions Trading Scheme Submission               |   |  |  |
|  | Monthly data   | Spreadsheet summary of 24 recent months of consecutive elec, gas, LPG, steam, water consumption data as applicable for each utility supply, building and submeter |  |  |
|  | Elec QH data   | 12 months of Quarter Hourly data for each fiscal electricity meter  |  |  |
|  | Utility data   | Copy of 24 recent months of consecutive electricity, gas, LPG, water utility bills / cost and consumption information   |  |  |
|  | Compressed air                                       | Consumption data.   |  |  |
|  | CHP data   | Fuel in, metered energies out. Differentiate between metered and calculated heat out. Note if heat out is metered before or after any heat dump fans.             |  |  |
|  | Renewables data (wind, solar, biomass)               | Metered generation.   |  |  |
|  | Utility rates  | Energy supplier agreements and rates.   |  |  |
| <b>Technical Information</b>                                 |  |   |  |  |
|  | Buildings overview                                   | A summary of the building services / configuration for each building: heating, ventilation, cooling, lighting.  |  |  |
|  | Basic system configuration information               | A summary overview of the installation and major systems, such as DH system.  |  |  |
|  | Drawings – mechanical, electrical, etc.              | Facility mechanical, electrical and plumbing drawings (.DWG   |  |  |



|                                    |  |  |  |  |
|------------------------------------|--|--|--|--|
|                                    |  | or .VSD formats where possible).   |  |  |
| Asset register                     |  | Equipment manufacturer, specifications, age, condition and maintenance records (Ideally all assets should be tagged).  |  |  |
| Controls                           |  | Control drawings (e.g. BMS screenshots), sequence of operation (e.g. description of system control) and equipment schedules.   |  |  |
| Lighting                           |  | BMS/lighting system architecture on a building by building basis. Lighting fittings type, power output and quantity on a building by building basis.   |  |  |
| District heating                   |  | Schematic diagram of district heating/cooling piping with pipe sizes and lagging. P&ID or single line diagram. Network condition report.   |  |  |
| Heating systems                    |  | Schematic diagram.   |  |  |
| Power distribution info            |  | Schematic diagram of power distribution systems.   |  |  |
| Compressed air                     |  | Schematic diagram of compressed air distributions systems.   |  |  |
| Asset register – HVAC              |  | Equipment list/inventory of the main HVAC system assets (air handling units, boilers, chillers, pumps, exhaust fans, electrical loads) with capacities and or power input such as fan CFM, fan and pump HP, boiler and chiller capacities as applicable. Include age, type, output, etc. |  |  |
| Asset register – onsite generation |  | Equipment list/inventory of emergency generator and CHP assets and hours of operation if available. Include age, type, output.   |  |  |
| Maintenance contracts – HVAC       |  | List of existing maintenance contracts (Compressed air, BMS, Boilers, Chillers, Electrical, Mechanical)  |  |  |
| Maintenance contracts – lighting   |  | List of existing lighting maintenance contracts  |  |  |
| Maintenance contracts – other      |  | List of current energy systems related contracts (example CHP Power Purchase Agreement, BMS maintenance, etc)  |  |  |
| Maintenance / upgrade requirements |  | Maintenance and capital equipment back log   |  |  |
| Water                              |  | List of all of the equipment /   |  |  |

|                           |   |   |  |  |
|---------------------------|---|---|--|--|
|                           |   | assets for non-clinical water and which areas they are in.  |  |  |
| <b>Reports</b>            |   |   |  |  |
|                           | F-gas and ozone-depleting substances                          | Records of F-gas and ODS installation and any inspection reports.   |  |  |
|                           | Oil / gas system combustion test reports                      | Last two annual combustion test reports for oil / gas combustion systems.   |  |  |
|                           | Pressure vessel test reports                                  | Last two annual pressure vessel test reports for systems.   |  |  |
|                           | Borehole testing reports previously completed                 |   |  |  |
|                           | Control of legionellosis inspection reports                   |   |  |  |
|                           | Other reports or maintenance records that may be of use.      |   |  |  |
| <b>Environmental</b>      |   |   |  |  |
|                           | Room environmental condition requirements                     | Contractual / REC temperature setpoint, air changes per hour, air quality, pressure differential, lighting level requirements on a building by building and room by room basis. |  |  |
|                           | Site safety risk register                                     |   |  |  |
|                           | Asbestos register   |   |  |  |
| <b>Existing Contracts</b> |   |   |  |  |
|                           | Existing maintenance or service contracts that affect the EPC |   |  |  |
|                           |   |   |  |  |

## 2 Existing Characteristics and Operations

Identify any information in this section that is non-verifiable

### 2.1 General Description of the Facility

Give a general overview of the facility.

Provide a table/list of buildings included in the contract:

- o Name and any site reference number or letter
- o Floor areas (state if Total Usable Floor Area, Gross Internal Area, etc)
- o Year of construction, renovation and extension
- o BER / DEC if available

Site Plan: map of the site with building names or references.

### 2.2 Specific Building Information

The information below should be provided for each building.

#### Drawings

If drawings are available, prepare a table or list of floor plan drawings and their numbers – preferably in .dwg or .vsd formats. Identify all available drawings, rather than simply floor plans. Drawings may be available in electronic format from the original design team.

#### Internal Areas & Uses

Ceiling height (for volume calculations)

Number of floors.

Details of building uses and environmental requirements by area. This will facilitate establishing HVAC requirements and tailored benchmarking. Specialist buildings will have a number of different areas with different requirements, which may be categorised (e.g. all operating theatres in a hospital building). Other buildings (e.g. offices) may have one or two categories of areas only.



## 2.3 Occupancy Profile

The information in this section is likely to be non-verifiable, so it must be accurate.

Identify the typical number of occupants in each building. If a public building, these numbers may be categorised into staff and members of the public, etc. Include occupancy schedules (i.e. the scheduled hours for which the building/area must be at its desired temperature) and days when the building is unoccupied or at low occupancy (e.g. public holidays, school holidays, university semester breaks).

**Table 2: Occupancy schedules**

| OCCUPANCY SCHEDULES OF THE BUILDING |             |       |                    |
|-------------------------------------|-------------|-------|--------------------|
| Building                            | Description | Floor | Occupancy schedule |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |
|                                     |             |       |                    |

### GROUP A

Sectors:

Annual Occupancy And Holidays:

Number of vacation days per annum:

| J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|
|   |   |   |   |   |   |   |   |   |   |   |   |

Dates of Holidays:

New Year's Day

St Patrick's Day

Good Friday (not a public holiday)

Easter Monday

First Monday in May

First Monday in June

First Monday in August

Last Monday in October  
Christmas Eve (not a public holiday)

Christmas Day  
St Stephen's Day

Number of annual days of occupancy:

## 2.4 The Building Envelope

This section – in which the information is likely to be *verifiable* – describes the thermal characteristics of the building envelope and is used where the building fabric may be upgraded.

The building regulations to which the building was constructed may be derived from information in Section 2.1. If there have been any changes (e.g. replacement of some fabric elements) since then these should be clearly identified.

Where appropriate, include descriptions, e.g. “The windows were installed in 1989, are double-glazed with a 6mm air-filled gap, have timber frames and can be opened. They are prone to drafts. A number of the frames are in poor condition and in need of repair/replacement.”

Areas are important, e.g. total wall area, total window area, total roof area. If there are two different types of elements used, these should be separated, e.g. wall type 1 and wall type 2. Window area should generally be for the entire window, including frame, as the entire window is generally replaced. Roof area should be measured according to the area of the insulated surface, e.g. if the insulation is at the ceiling joist level, then ceiling area matters; if it is a pitched roof with insulation between rafters, this area matters. Whatever area you give, be specific about what you used.

If the components of the fabric elements are known, these should be included, e.g. 105 brick, 50mm, 100mm dense concrete block, 13mm dense plaster. If you have U-values for different elements, provide these. However, this information is quite specialised and you should generally reference a professional source.

**Table 3: Envelope description**

| Building Name | Architectural element | Description | Surface (m <sup>2</sup> ) | U-value | Comment / source |
|---------------|-----------------------|-------------|---------------------------|---------|------------------|
| Building 1    | Wall type 1           |             |                           |         |                  |
|               | Wall type 2           |             |                           |         |                  |
|               | Roof                  |             |                           |         |                  |
|               | Windows + frames      |             |                           |         |                  |
|               | TOTAL                 |             | ---                       |         |                  |
| Building 2    | Wall                  |             |                           |         |                  |
|               | Roof                  |             |                           |         |                  |
|               | Fenestration          |             |                           |         |                  |
|               | TOTAL                 |             | ---                       |         |                  |
| Building 3    | Wall                  |             |                           |         |                  |
|               | Roof                  |             |                           |         |                  |
|               | Fenestration          |             |                           |         |                  |
|               | TOTAL                 |             | ---                       |         |                  |

### 3 Lighting Installation

#### 3.1 Interior Lighting Systems

The information in this section is likely to be verifiable.

There are \_\_ types of lighting fixtures at the facility/ in building \_\_\_\_\_. Their distribution according to their importance is as follows:

- |   |                    |    |   |    |
|---|--------------------|----|---|----|
| - | Fluorescent        | kW | ( | %) |
| - | Incandescent       | kW | ( | %) |
| - | Mercury            | kW | ( | %) |
| - | Metal halide lamps | kW | ( | %) |

The total power of the interior lighting fixtures is estimated at \_\_\_\_\_ kW.

Brief description of how controlled. The \_\_\_\_\_ fixtures are manually controlled while the \_\_\_\_\_ fixtures are equipped with timers with an approximate duration of \_\_\_\_\_.

You will find in the following page more accurate information regarding the different types of lighting used.

Note: The power indicated for the interior lighting fixtures does not include the installed lighting power for \_\_\_\_\_ and for the operation of advertising and commercial signs.

Drawings of the installation are/are not [delete as appropriate] available.



**Table4: Interior Lighting**

| DESCRIPTION TABLE OF INTERIOR LIGHTING <sup>1</sup> |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|---|---------------------|-------------------|----------------|-------------------|---|--------------------------------|----------|------------------------------|----------------|-------------|----------|
| Area / Lighting zone                                | Fitting & Lamp Type | Control Gear Code | Function/ use  | Method of control | Schedule of operation (hour/day) <sup>2</sup> | Approx. area (m <sup>2</sup> ) | Quantity | Total power (Watt) Installed | Lighting level |             | Comments |
|   |                     |                   |                |                   |   |                                |          |                              | Average (lux)  | Local (lux) |          |
|   | e.g. 4 x 18W T8     | EM                | General office | Manually switched | 5 days@11 hrs<br>1 day@4 hrs<br>1 day off     |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |
|   |                     |                   |                |                   |   |                                |          |                              |                |             |          |

- (1) Legend on the following page.
- (2) Typical. Only complete if known, otherwise leave for ESCO to judge.

**Table 5: Legend of lighting**

| <b>LEGEND OF INTERIOR/EXTERIOR LIGHTING</b>   | <b>CODE</b>                                  |
|---|--|
| <b>Control Gear Code</b><br>Electro-Magnetic<br>High Frequency Electronic<br>High Frequency Electronic with Quick Start<br>High Frequency Electronic with Dimmable  | EM<br>HF<br>HF-QS<br>HF-D                    |
| <b>Function / Use</b><br>Drawing and precision work<br>Office work and reading<br>Rest area recreation (cafeteria, lounge, gym, swimming pool)<br>Storage space (equipment halls and warehouses)<br>Circulation space (corridor, toilets)<br>Commercial (circulation space) | A<br>B<br>C<br>D<br>E<br>F                   |
| <b>Control Code</b><br>Floor control<br>Premises control<br>Group control<br>Control by computer<br>Timer<br>Programmable clock<br>Electric photocell<br>Other  | C1<br>C2<br>C3<br>C4<br>C5<br>C6<br>C7<br>C8 |
| <b>Light Fitting Code</b><br>Create a code if useful  |  |

**Table 6: Interior total lighting power installed**

| TOTAL LIGHTING POWER BALANCE INSTALLED AT EVERY TENANT |                   |                               |                                  |  |                             |
|--|-------------------|-------------------------------|----------------------------------|--|-----------------------------|
| Level  | [Tenant] [Sector] | Installed lighting power (kW) | Area of sector (m <sup>2</sup> ) | Power of unitary lighting (W/m <sup>2</sup> )* | Sector of cooling (Unit n°) |
|  |                   |                               |                                  |  |                             |
|  |                   |                               |                                  |  |                             |
|  |                   |                               |                                  |  |                             |

\* The unitary power is expressed in watt of lighting installed by square meter of floor occupied by the [tenant] or by [sector]. The average unitary power of lighting is W/m<sup>2</sup> for all the [tenants] of [sectors].



## 4 Heating, Ventilation and Air Conditioning Installation

The information in this section is likely to be verifiable.

### 4.1 Building Ventilation Systems

The objective of this section is to provide an understanding of the ventilation strategy (or strategies) for the different building zones, and specific energy-related information on the ventilation hardware. Although an AHU may be the main energy user, downstream zone control systems (such as reheats and VAVs), must also be considered; together the AHU and downstream zone control units provide the ventilation system.

#### Ventilation system overview

Brief description of the installation and controls.

There is a total of \_ air handling units, which may be designated into \_\_\_ types of systems.

The ventilation system serving \_\_\_ (name areas) is of supply-return type with a mixing temperature [constant] or [modulated] by [exterior temperature] [heating demand] or/and [cooling demand in the rooms]. Describe any zone systems downstream of the AHU, e.g. VAVs, FCUs, etc.

The system serving (name areas) is of type [constant volume] [variable air volume] [dual duct] [induction] [constant volume, variable temperature]. The supply temperature is [modulated] [maintained constant] and is controlled by .

Etc.

Consider providing a summary table of AHUs (possibly from asset register), and BMS screenshot of each AHU and associated zone controls, with operating schedule noted, in an electronic appendix. The following information is also required:

- Supply and extract fan volumes: ideally as commissioned
- Supply and extract motor power: ideally readings from variable speed drive, but ammeter readings, commissioning datasheet readings, or name-plate ratings are also acceptable
- Heating and cooling coil capacities

Completing the table below for each ventilation system will provide comprehensive information.

#### Extract Systems (excluding extract fans matched to AHU supply air units)

Many rooms are equipped with extract fans to maintain acceptable air quality for occupants and/or control interior humidity level. The rooms are the following:

**Table 8: Ventilation system**

| VENTILATION SYSTEM N° _____ TABLE  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● System designation:</li> <li>● Local zone units:</li> <li>● Area served:</li> <li>● System type<sup>(1)</sup>:</li> <li>● Percent fresh air (range):</li> <li>● Humidifying method<sup>(2)</sup>:</li> <li>● Fan nameplate:                             <ul style="list-style-type: none"> <li>- Manufacturer:</li> <li>- Fan rpm:</li> <li>- Serial number:</li> <li>- Static pressure:</li> <li>- Flow rate (l/s):</li> </ul> </li> <li>● Operation schedule:                             <ul style="list-style-type: none"> <li>- Week:</li> <li>- Weekend:</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>● Heating type:</li> <li>● Preheat coil capacity:</li> <li>● Terminal total coils capacity:</li> <li>● Cooling system type:</li> <li>● Cooling capacity:</li> <li>● Motor nameplate:                             <ul style="list-style-type: none"> <li>- HP:</li> <li>- Casing:</li> <li>- Variable/fixed speed:</li> <li>- Amperes:</li> <li>- Phases:</li> <li>- Voltage:</li> <li>- Power:</li> </ul> </li> </ul> |
| Description of system control (control graphics included <u>Y/N</u> )  |  |

**Table 9: Ventilation system 2**

| VENTILATION SYSTEM N° _____ TABLE   |  |
|---|--|
| <ul style="list-style-type: none"> <li>● System designation:</li> <li>● Local zone units:</li> <li>● Area served:</li> <li>● System type<sup>(1)</sup>:</li> <li>● Percent fresh air (range):</li> <li>● Humidifying method<sup>(2)</sup>:</li> <li>● Fan nameplate:                             <ul style="list-style-type: none"> <li>- Manufacturer:</li> <li>- Fan rpm:</li> <li>- Serial number:</li> <li>- Static pressure:</li> <li>- Flow rate (l/s):</li> </ul> </li> <li>● Operation schedule:                             <ul style="list-style-type: none"> <li>- Week:</li> <li>- Week-end:</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>● Heating type:</li> <li>● Preheat coil capacity:</li> <li>● Terminal total coils capacity:</li> <li>● Cooling system type:</li> <li>● Cooling capacity:</li> <li>● Motor nameplate:                             <ul style="list-style-type: none"> <li>- HP:</li> <li>- Casing:</li> <li>- Variable/fixed speed:</li> <li>- Amperes:</li> <li>- Phases:</li> <li>- Voltage:</li> <li>- Power:</li> </ul> </li> </ul> |
| Description of system control (control graphics included <u>Y/N</u> )   |  |

(1), (2), (3), (4): See table legend regarding information on ventilation systems.

**Table 10: Legend for ventilation systems**

| <b>LEGEND OF INFORMATION ON VENTILATION SYSTEMS</b> |  |
|---|--|
| <b>1.</b>   | <p><b>VENTILATION SYSTEM TYPES</b></p> <p><u>CENTRAL VENTILATION SYSTEMS</u></p> <ul style="list-style-type: none"> <li>● Constant volume terminal reheat</li> <li>● Constant volume with terminal derivation box</li> <li>● Variable air volume</li> <li>● Induction</li> <li>● Dual duct with constant volume</li> <li>● Dual duct with variable air volume</li> <li>● Constant volume with variable temperature (simple zone)</li> <li>● Roof top unit</li> </ul> <p><u>DECENTRALISED SYSTEMS</u></p> <ul style="list-style-type: none"> <li>● Fan coil units (2 pipes)</li> <li>● Fan coil units (4 pipes)</li> <li>● Unit ventilator</li> <li>● Space heater</li> <li>● Domestic furnace</li> </ul> <p><u>Extract systems</u></p> <ul style="list-style-type: none"> <li>· Kitchen or other extract hoods</li> <li>· Bathroom exhaust or other exhaust</li> <li>· Laboratory fume cupboard</li> </ul> <p><u>ADDITIONAL INFORMATION (IF AVAILABLE)</u></p> <ul style="list-style-type: none"> <li>● Ventilation system at high/low velocity</li> </ul> |
| <b>2.</b>   | <p><b>METHOD TYPES</b></p> <p><u>WATER ATOMISING</u></p> <ul style="list-style-type: none"> <li>● By rotating plate</li> <li>● By ultrasounds</li> <li>● By compressed air</li> <li>● By air washer</li> <li>● By evaporative cooling</li> </ul> <p><u>VAPOR GENERATOR</u></p> <ul style="list-style-type: none"> <li>● Boiler</li> <li>● Bottle</li> </ul> <p><u>WATER POOL</u></p> <ul style="list-style-type: none"> <li>● Heated by electric coils or other</li> <li>● Heated by infra-red</li> </ul>  |
| <b>3.</b>   | <p><b>HEATING SYSTEM TYPES</b></p> <ul style="list-style-type: none"> <li>● Vapour coils</li> <li>● Electric coils</li> <li>● Hot water coils</li> <li>● Glycol coils</li> <li>● Electric baseboards</li> <li>● Space heaters</li> </ul>   |
| <b>4.</b>   | <p><b>COOLING SYSTEM TYPES</b></p> <ul style="list-style-type: none"> <li>● Chilled water</li> <li>● Direct expansion</li> <li>● Evaporative cooling</li> </ul>  |

## Description of Ventilation System Controls

Refer to BMS description of system control or, if possible, complete for each main system.

### System Identification

The ventilation system number \_\_\_\_\_ is placed in \_\_\_\_\_ and functions according to the following control sequence:

1. When the system starts, the inlets of fresh air open and take the required position to give the minimum quantity of fresh air. If at \_\_\_\_\_ % of fresh air, the minimum thermostat mixing temperature read by the return duct thermostat is high, this thermostat will increase the opening of inlet dampers to admit additional fresh air. The transmitter of the most elevated signal will choose the largest demand. If, on the other hand, the exterior temperature is above \_\_\_\_\_ °C, the fresh-air inlets will regain the position that corresponds to minimum fresh air.
2. The heating and cooling ventilation unit coils are started in sequence by the room thermostat located in \_\_\_\_\_. This thermostat maintains the heating and cooling temperatures by modulating the valves [ ] and [ ] by starting of the various stages of heating and cooling according to demand.
3. The relative humidity is maintained at \_\_\_\_\_% by a humidistat placed in the return air duct which controls the [water] or [steam] valve.



## 4.2 Pumping Equipment

The building has a total of pumping systems. The present section sums up in detail the specifications and the available information on the following pumping equipment: (delete as appropriate)

- . The heating hot water pumping
- . The chilling water pumping
- . The domestic hot water pumping
- . The domestic cold water pumping
- . The refrigerant pumping (glycol)
- . The sanitary water pumping (well)
- . Cooling tower water pumping
- . Water pumping, fire protection system

Information about these pumps is available at the corresponding survey form section included in this document. However, the accurate circulation characteristics of the pumps is detailed below.

**Table 11: Pumps systems**

| PUMP TABLE FROM N° ____ TO ____  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● System designation:</li> <li>● Localisation:</li> <li>● Utilisation:</li> <li>● Connection: (in series or parallel):</li> <li>● Pump brand:</li> <li>● Model:</li> <li>● Serial number:</li> <li>● Flow (l/s):</li> <li>● Operation <math>\Delta</math> pressure (head):</li> </ul> | <ul style="list-style-type: none"> <li>● Motor:               <ul style="list-style-type: none"> <li>- HP:</li> <li>- Brand:</li> <li>- Casing:</li> <li>- Variable/fixed:</li> <li>- Amperes:</li> <li>- Phases:</li> <li>- Voltage:</li> <li>- Power:</li> </ul> </li> </ul> |
| Control sequence:  |  |

| PUMP TABLE FROM N° ____ TO ____  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● System designation:</li> <li>● Localisation:</li> <li>● Utilisation:</li> <li>● Connection: (in series or parallel):</li> <li>● Pump brand:</li> <li>● Model:</li> <li>● Serial number:</li> <li>● Flow (l/s):</li> <li>● Operation <math>\Delta</math> pressure (head):</li> </ul> | <ul style="list-style-type: none"> <li>● Motor:               <ul style="list-style-type: none"> <li>- HP:</li> <li>- Brand:</li> <li>- Casing:</li> <li>- Variable/fixed:</li> <li>- Amperes:</li> <li>- Phases:</li> <li>- Voltage:</li> <li>- Power:</li> </ul> </li> </ul> |
| Control sequence:  |  |

### 4.3 Heating Systems and Equipment

#### Overview

Give a brief overview description of:

- Heating fuel(s)
- Central heat generator installation (boilers), including rated output.
- Heating strategy
- Any auxiliary local heating

The \_\_\_\_\_ is heated by [electricity] [oil No. 2] [oil no. 6] [natural gas].

The building has \_\_\_\_\_ ( ) boiler, [steam] [hot water] whose power is \_\_\_\_\_ kW each and operates with oil grade \_\_\_\_\_ as well as \_\_\_\_\_ ( ) boiler having a power of \_\_\_\_\_ kW operating with oil grade \_\_\_\_\_.

Rooms are heated through ventilation [terminal reheat coils] [main coil] and by [electric] [hot water] [steam] peripheral convectors.

We also find \_\_\_\_\_ ( ) auxiliary heating systems serving the following rooms:

- \_\_\_\_\_ : ventilation air is heated by [electric coils] [hot water coils] [glycol coil with heat exchanger] [backup heating by electric convectors] [hot water]. The flow of the supply air system is \_\_\_\_\_ l/s. The total power of the auxiliary heating equipment is \_\_\_\_\_ kW.

**Table 12: Heating systems**

| TABLE OF HEATING SYSTEMS  |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|---|-----------|------------------------|--------------|-------------------------------------|--------------------------|-----------------------------|---------------------------------------|-------|-------------------------------------|
| Description<br>(zones served)   | System n° | Heating coils          |              |                                     |                          | Electric baseboard power kW | Space heaters convectors radiators kW |       | Net heating power of served zone kW |
|   |           | Coil type <sup>1</sup> | No. of coils | Power at each stage kW <sup>2</sup> | Energy type <sup>3</sup> |                             | Type <sup>4</sup>                     | Power |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
|   |           |                        |              |                                     |                          |                             |                                       |       |                                     |
| * The total power of the heating equipment installed in the building is |           |                        |              |                                     |                          | kW.                         |                                       |       |                                     |

- (1) Type of coil: reheat, main, terminal reheat.
- (2) If the coil is of the modulating type, indicate (M) between brackets.
- (3) Energy type: Natural gas (NG), Vapour (VA), Hot water (HW), Electrical (EL).
- (4) Heating equipment type: Spaceheater (S), Convector (C), Radiator (R), Ventilo-convector (VC).

**Boiler and combustion test**

Boilers efficiency has been evaluated based on a combustion test realised at the following time under the following conditions:

Time:

Conditions:

The energy efficiency combustion was determined from data collected during the normal boilers operation.

- a. Temperature of the exhaust fumes provides an indication of the boiler heat exchangers performance
- b. Percentage of carbon dioxide in the exhaust fumes that indicates air/fuel ratio
- c. Quantity of fume in the exhaust indicates how clean the combustion is.

You will find in the next page the complete data on the boiler(s) as well as results collected during the combustion test .

**Table 13: Boilers characteristics**

| DESCRIPTION OF BOILERS                                    |                       |             |             |             |
|---|-----------------------|-------------|-------------|-------------|
| Description of heating equipment using oil or natural gas | Boiler n° 1           | Boiler n° 2 | Boiler n° 3 |             |
| Boiler brand  |                       |             |             |             |
| Boiler model  |                       |             |             |             |
| Serial n°   |                       |             |             |             |
| Fuel type   |                       |             |             |             |
| Type of system: steam / hot water / hot air               |                       |             |             |             |
| Rated fuel input (gross calorific value) (kW)             |                       |             |             |             |
| Rated heat output (kW)                                    |                       |             |             |             |
| Operation pressure kPa / psig                             |                       |             |             |             |
| Temperature of water / steam                              |                       |             |             |             |
| Burner brand  |                       |             |             |             |
| Flow of nozzles   |                       |             |             |             |
| Heating surface (m <sup>2</sup> )                         |                       |             |             |             |
| Combustion test   |                       |             |             |             |
| Exhaust pipe diameter (cm)                                |                       |             |             |             |
| Temp. of exhaust fumes °C                                 |                       |             |             |             |
| Room temperature °C                                       |                       |             |             |             |
| Net temperature °C  |                       |             |             |             |
| Flue draft (mm water)                                     |                       |             |             |             |
| Pressure over (mm water)                                  |                       |             |             |             |
| Smoke test (scale 0-10)                                   |                       |             |             |             |
| Carbon dioxide (%)  |                       |             |             |             |
| Efficiency (%)  |                       |             |             |             |
| Exterior conditions                                       | Wind: _____           | Calm: ___   | Light: ___  | Strong: ___ |
|   | Temperature: _____ °C |             |             |             |
| By:   | Date:                 |             | Hour:       |             |

These ( ) boilers are equipped with \_\_\_\_\_ burners; the minimum oil flow recommended for this type of burner is \_\_\_\_\_, to maintain good combustion efficiency.

### Heating Circulation Pumps

The hot water circulation network used for heating includes ( ) pumps. These pumps operate \_\_\_\_\_ out of \_\_\_\_\_.

Circulation pump no \_\_\_\_\_ of \_\_\_\_\_ HP supplies \_\_\_\_\_ sector.  
 Circulation pump no \_\_\_\_\_ of \_\_\_\_\_ HP supplies \_\_\_\_\_ sector and the circulation pump no \_\_\_\_\_ of \_\_\_\_\_ HP supplies \_\_\_\_\_ sector.

Pumps no \_\_\_\_\_ and \_\_\_\_\_ operate [in parallel] [in cascade] to supply heat to the \_\_\_\_\_ sectors.

The boilers are operated starting from \_\_\_\_\_ of the month of \_\_\_\_\_ until \_\_\_\_\_ of the month of \_\_\_\_\_. The pumps used for heating are operated for the same period that extends from \_\_\_\_\_ to \_\_\_\_\_.

## 4.4 Chillwater and Refrigeration Systems and Equipment

### 4.4.1 Chillwater System and Equipment

Identify what areas/loads/units cooling is required for.

Brief description of system installation and controls.

Discuss operation: schedules, seasonal changes, temperatures. Note chillwater temperature requirements for process / data centre cooling circuits.

Refer to schematic drawing number.

Provide chiller nameplate information.

Provide cooling tower nameplate information.

The cooling is carried out from \_\_\_\_\_ . A pump  
 \_\_\_\_\_ , carries the chilled water. This pump is controlled by \_\_\_\_\_ . This pump  
 operates under the following conditions: \_\_\_\_\_ .

A cooling tower \_\_\_\_\_ is used to extract the heat outside the building. A pump  
 \_\_\_\_\_ is allocated to the operation of the cooling tower. The pump control  
 consists of \_\_\_\_\_ .

The chillers are operated starting from \_\_\_\_\_ of the month of \_\_\_\_\_  
 and the \_\_\_\_\_ of the month of \_\_\_\_\_ . The pumps are  
 operated starting from \_\_\_\_\_ (month) until the month of \_\_\_\_\_ . These  
 pumps operate hours out of \_\_\_\_\_ hours.

**Table 14: Cooling systems characteristics**

| TABLE OF COOLING SYSTEM N° ____  |
|--|
| <ul style="list-style-type: none"> <li>● Zone and/or ventilation system supplied:</li> <li>● Localisation:</li> <li>● Type of cooling<sup>1</sup> equipment/system:</li> <li>● Nominal or estimated coefficient of performance (COP):</li> <li>● Refrigerant type:<sup>2</sup></li> <li>● Capacity: _____ tons</li> <li>● Description:                             <ul style="list-style-type: none"> <li>- brand:</li> <li>- model:</li> <li>- series:</li> </ul> </li> <li>● Reference stages:</li> <li>● Number and type of condenser:</li> <li>● Other information:<sup>3</sup></li> <li>● Zone and/or ventilation system supplied:</li> <li>● Localisation:</li> <li>● Type of cooling<sup>1</sup> equipment/system:</li> </ul> |
| TABLE OF COOLING SYSTEM N° ____  |

- Nominal or estimated coefficient of performance (COP):
- Refrigerant type:<sup>2</sup>
- Capacity:                      tons
- Description:
  - brand:
  - model:
  - series:
- Reference stages:
- Number and type of condenser:
- Other information:<sup>3</sup>

**Table 15: Legend for cooling systems**

| <b>LEGEND OF THE INFORMATION ON COOLING AND REFRIGERATION</b> |   |
|---|---|
| <b>1.</b>   | <p><b>TYPE OF COOLING SYSTEM</b></p> <ul style="list-style-type: none"> <li>● Absorption single-stage</li> <li>● Absorption two-stage</li> <li>● Absorption three-stage</li> <li>● Air-air heat pump</li> <li>● Water-air heat pump</li> <li>● Geothermal heat pump (ground or water/air)</li> <li>● Reciprocating compressor</li> <li>● Centrifugal compressor</li> <li>● Screw compressor</li> <li>● Volute compressor</li> </ul> |
| <b>2.</b>   | <p><b>TYPE OF REFRIGERANT</b></p> <ul style="list-style-type: none"> <li>● R-12</li> <li>● R-22</li> <li>● R-123</li> <li>● R-134a</li> <li>● R-502</li> <li>● R-503</li> <li>● Ammonia</li> <li>● Propane</li> <li>● Lithium bromide solution</li> <li>● Other (specify)</li> </ul> <p>Note: Only the most frequently encountered types are listed.</p>  |
| <b>3.</b>   | <p><b>OTHER</b></p> <p>This information could be about the following:</p> <p>a) The chiller (brand, model, serial, heat recovery system, etc)</p> <p>b) The cooling tower (brand, model, serial, pumping systems, etc)</p>  |

**4.4.2 Direct Refrigeration Systems and Equipment**

This section describes direct refrigeration or air-conditioning systems where the evaporator containing refrigerant is used to cool the air supplied to/situated in the space. It includes single room split a/c units, multi-split systems, ducted and variable refrigerant flow systems. It may also include close control units used in server rooms or data centres.



Identify what areas/loads/units cooling is required for.

Brief description of system installation and controls.

Provide a list of the installations and associated details (from asset register or F-gas/ODS management records).

Discuss operation: schedules, seasonal changes, temperatures.

The building has \_\_\_\_\_ refrigeration systems that serve to \_\_\_\_\_.  
 The cold room is used to refrigerate the \_\_\_\_\_ at a temperature of \_\_\_\_\_ °C.  
 The room humidity level is maintained at \_\_\_\_\_ %.

The refrigeration system consists of \_\_\_\_\_ evaporator(s) located at \_\_\_\_\_ a chiller with a capacity of \_\_\_\_\_ tons, \_\_\_\_\_ compressors of \_\_\_\_\_ HP each and \_\_\_\_\_ condenser(s) located at \_\_\_\_\_.

The refrigeration system consists of \_\_\_\_\_ ( \_\_\_\_\_ ) refrigerant circuits. Each of them is connected to a compressor with a maximum capacity of \_\_\_\_\_ tons of refrigeration. The total capacity is \_\_\_\_\_ tons at a suction temperature of \_\_\_\_\_ °C and a condensation temperature of \_\_\_\_\_ °C. The hot gases of each compressor are condensed at \_\_\_\_\_ ( \_\_\_\_\_ ) through exterior condensers located at \_\_\_\_\_ having \_\_\_\_\_ ( \_\_\_\_\_ ) refrigerant circuits that are connected to heat recovery systems that serve a \_\_\_\_\_.  
 Two of the condensers are located above the \_\_\_\_\_ whereas the last one is located above the \_\_\_\_\_.

\_\_\_\_\_ ( \_\_\_\_\_ ) pumps of \_\_\_\_\_ [brine] [glycol] [chilled water] are installed in the circuit. Their task consists of carrying \_\_\_\_\_ l/s of chillers refrigerant to [the dehumidifier pipes circuits beneath the ice skating ring slab \_\_\_\_\_] [the dehumidifier located in the ventilation return] [the refrigeration coils \_\_\_\_\_]. An expansion tank is installed at the highest circuit level to absorb the expansion of \_\_\_\_\_ [brine] [glycol] [chilled water] when the temperature varies.

When the circulation is on, pressure breakers installed on the piping will start each of the compressors by transmitting a signal through a relay. The compressors will not start unless they receive a signal from the thermostat placed in contact with the refrigerant. The compressors will sequentially stop when the temperature of the \_\_\_\_\_ reaches the setpoint of each of the stages. Chillers' low limit thermostat will shut off the corresponding compressors if the fluid temperature drops below \_\_\_\_\_ °C.

On a normal basis, the temperature was \_\_\_\_\_ °C at the chiller inlet and \_\_\_\_\_ °C at the outlet.

#### 4.5 Domestic Cold Water

Brief description of system installation

Pressure control and setpoints.

Pressurisation unit nameplate information.

Operating hours.

The building has ( ) pumps for domestic cold water distribution.

The network also supplies the [sanitary services] [water spray humidification] [etc].

The pumps operation hours are .

## 4.6 Domestic Hot Water Systems

Identify what areas / loads hot water is required for and what drives its use.

Brief description of system installation, heating sources (e.g. DHW boiler, immersion, calorifier) and controls.

Discuss operation: schedules, temperatures, seasonal changes.

Refer to schematic drawing number.

Provide DHW boiler and immersion nameplate information.

Provide information on storage volume.

Provide cooling tower nameplate information.

The \_\_\_\_\_ has \_\_\_\_\_ ( ) insulated calorifier(s) serving to accumulate the domestic hot water.

The total volume of these calorifiers is \_\_\_\_\_ litres.

The domestic hot water of sector \_\_\_\_\_ is heated through a heat exchanger \_\_\_\_\_ [water vapour] of an approximate power of \_\_\_\_\_ kW.

The domestic hot water is heated by \_\_\_\_\_ ( ) electric resistors having an individual power of \_\_\_\_\_ kW each and/or by an oil water heater having a power of \_\_\_\_\_ kW.

The circulation of domestic hot water is done through \_\_\_\_\_ ( ) circulating pumps of \_\_\_\_\_ kW. The circulating pumps operate \_\_\_\_\_ ( ) hours per day.

The following table shows more details about this installation.

**Table 16: Domestic hot water systems**

| DOMESTIC HOT WATER SYSTEMS                          |                                       |                                     |                                   |                            |                     |                              |
|---|---------------------------------------|-------------------------------------|-----------------------------------|----------------------------|---------------------|------------------------------|
| Description of system and service type <sup>1</sup> | Installation in parallel or in series | Energy source for heating the water | Calorifer total capacity (litres) | Calorifer temperature (°C) | Months of operation | Total power for heating (kW) |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
|   |                                       |                                     |                                   |                            |                     |                              |
| TOTAL:  |                                       |                                     |                                   |                            |                     |                              |

**Table 17: Legend of domestic hot water**

| LEGEND OF DOMESTIC HOT WATER SYSTEMS |   |
|--------------------------------------|---|
| <b>1.</b>                            | <b>SYSTEM AND SERVICE TYPE</b> <ul style="list-style-type: none"> <li>● Domestic hot water</li> <li>● Laundry hot water</li> <li>● Kitchen hot water</li> <li>● etc</li> </ul>  |
| <b>2.</b>                            | <b>ENERGY SOURCE FOR WATER HEATING</b> <ul style="list-style-type: none"> <li>● Electric resistors</li> <li>● Natural gas burner</li> <li>● Oil burner</li> <li>● Plate heat exchanger (vapour-water)</li> <li>● Plate heat exchanger (water-water)</li> <li>● Shell and tube (vapour-water)</li> <li>● Shell and tube (water-water)</li> </ul> |

- Heat recovery (refrigerant water)

## 4.7 Special Equipment Installed for Energy Management and Saving Purposes

### 4.7.1 Demand Regulator / Load Shedding

Currently a power regulator is installed at \_\_\_\_\_ . Description of this controller is as follows:

Manufacturer: \_\_\_\_\_ Current setting: \_\_\_\_\_  
 Model: \_\_\_\_\_ Maximum power: \_\_\_\_\_  
 Series: \_\_\_\_\_ Currently set: \_\_\_\_\_  
 Multiplier: \_\_\_\_\_

**Table 18: Demand regulator**

| Relay no. | Description of controlled load | Power of load subject to shut off (kW) | Priority of shut-off | Priority of restart | Cycle timer |
|-----------|--------------------------------|--|----------------------|---------------------|-------------|
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |
|           |                                |  |                      |                     |             |

The installed loads controller in the \_\_\_\_\_ building shows a demand control setpoint of \_\_\_\_\_ kW.

The date of the last reset programming is \_\_\_\_\_. Following this last resetting carried by \_\_\_\_\_ the users have reset its maximum demand at \_\_\_\_\_ kW for the following reasons:

The loads cycling time for the controller model installed at \_\_\_\_\_ is of \_\_\_\_ minutes.

Complementary information on the demand regulator:

- The clock is of the [weekly] [annual] type.
- Possibility of extension (number of circuits):

- Any optimising on/off controls:
- Any alarms in the system:

#### 4.7.2 Power Factor Correction

A power factor correction is installed. The power factor correction description is:

- Manufacturer:
- Series:
- P.F. display:
- Voltage:
- Amperes:
  
- Number of levels for P.F. correction using capacitors or a group of condensers
  - # 1: KVAR
  - # 2: KVAR
  - # 3: KVAR
  - # 4: KVAR
  - # 5: KVAR
  
  - TOTAL: KVAR
  
- Light indicator showing the correction levels that are on .

#### 4.7.3 Centralised Control

A centralised control is installed at \_\_\_\_\_ . The system description is:

Manufacturer:

Current setting:

Brand:

Maximum power:

Series:

Currently set:

Multiplier:

**Table 19: Centralised Control**

| DESCRIPTION OF CENTRALISED CONTROL SYSTEM AND OPERATION SCHEDULE |                                  |               |                  |            |           |                         |
|--|----------------------------------|---------------|------------------|------------|-----------|-------------------------|
| No. of controller circuit  | Description of controlled system | No. of system | Days of the week | hour/start | Hour/stop | Time of daily operation |
| 1  |                                  |               |                  |            |           |                         |
| 2  |                                  |               |                  |            |           |                         |
| 3  |                                  |               |                  |            |           |                         |
| 4  |                                  |               |                  |            |           |                         |
| 5  |                                  |               |                  |            |           |                         |
| 6  |                                  |               |                  |            |           |                         |
| 7  |                                  |               |                  |            |           |                         |
| 8  |                                  |               |                  |            |           |                         |
| 9  |                                  |               |                  |            |           |                         |
| 10   |                                  |               |                  |            |           |                         |

The \_\_\_\_\_ has at present a centralised control system that operates the main heating and water production loads of the building.

The controller has \_\_\_\_\_ connection circuits that control \_\_\_\_\_ main systems. These systems operation schedules are described in table format in this section.



#### 4.7.4 GENERATORS

The \_\_\_\_\_ is equipped with a generator that operates emergency lighting, and pumps serving to operate the boiler, and the entire building at a time of an electric failure.

These generators operate using [oil no. 2], [natural gas]. The parameters that describe the generators are indicated in the following table:

**Table 20: Generators**

| DESCRIPTION TABLE OF THE GENERATOR(S)  |                |                |
|--|----------------|----------------|
| Descriptive parameters   | Generator n° 1 | Generator n° 2 |
| Brand of generator   |                |                |
| Model of generator   |                |                |
| Serial n° of generator   |                |                |
| Actual nominal power (kW)  |                |                |
| Reactive nominal power (KVAR)  |                |                |
| Power factor: COSØ (%)   |                |                |
| Voltage / Phase / Cycle  |                |                |
| Rotation per minute (RPM)  |                |                |
| Amperage (amp)   |                |                |
| Operation combustible  |                |                |
| Brand of motor block   |                |                |
| Model of motor block   |                |                |
| Serial n° of motor block   |                |                |
| Cylinder of motor block  |                |                |
| Consumption: <ul style="list-style-type: none"> <li>● 100% load (USGPH)</li> <li>● 75% load (USGPH)</li> <li>● 50% load (USGPH)</li> </ul> |                |                |
| Other relevant information   |                |                |
| Maintenance service (Co. + add.)   |                |                |
| Tel. no. of maintenance service  |                |                |
| Remarks  |                |                |

#### **4.8 Other Equipment**

Kitchen, pools, laundry, specialised equipment, furnaces, ovens, etc.

#### **4.9 Air Compressors**

#### **4.10 Office Automation**



**Table 22: Public lighting – legend**

| <b>LEGEND OF PUBLIC LIGHTING</b> |   |
|----------------------------------|---|
| <b>1.</b>                        | <b>Lamp technology</b> <ul style="list-style-type: none"><li>. incandescent</li><li>. fluorescent</li><li>. mercury vapour</li><li>. metal halide</li><li>. high-pressure sodium</li><li>. quartz</li><li>. halogen</li><li>. etc</li></ul> |
| <b>2.</b>                        | <b>Ballast technology</b> <ul style="list-style-type: none"><li>. electromagnetic</li><li>. high-efficiency electromagnetic</li><li>. electronic ballast</li><li>. any dimming option</li></ul>   |





## 5 Baseline Data

The information in this section is likely to be non-verifiable.

Although historical energy invoices and other readily available energy data may have been assembled, the EPC Assessment may have identified areas requiring metering, or more regular readings or logging of existing meters may be required. The more baseline energy meters, and the more frequent the readings from these meters, the more accurate the reference point against which future savings will be measured and verified. Furthermore, detailed baseline energy data will help the ESCOs better value the savings from measures they propose.

Non-energy baseline data, such as environmental data and activity data, should also be included. This will provide evidence of operational conditions prior to the contract. Start gathering this information now, so you will have a substantial amount of data gathered by the time the Measurement & Verification Plan and contract are finalised.

Provide schematics of the energy metering installations.

Identify recording/logging arrangements.

Provide 24 recent consecutive months of energy data for each meter.

Provide quarter-hourly data for all meters where available.

### Invoices for Electricity

Invoices for the last 3 years

Technical data of the meter

### Invoices of Fuel

(heavy or light) oil for the last 3 years

Technical data of the meter

### Invoices of Natural Gas

Invoices for the last 3 years

Technical data of the meter

### Invoices of Water

Invoices for the last 3 years

Technical data of the meter

(Include all others energy invoices as needed)

Included activity and environmental data.

## **Appendix 1**

Complete as appropriate