

## Factsheet on understanding BACS requirements

# S.I. 393 COMPLIANCE ASSESSMENT



## Introduction

The European Union (Energy Performance of Buildings) Regulations 2021 (S.I. 393 of 2021) introduces a requirement for building owners to install building automation and control systems (BACS) in buildings where the effective rated **output of heating, air-conditioning and ventilation system(s) in a building is above a threshold of 290 kW** by 31st December 2024. The Regulations transpose requirements of the European Union Energy Performance of Buildings Amending Directive 2018/844.

This guide has been written to help building owners, assessors, designers to carry out a Building Automation and Control System installation assessment using the Energy Performance of Buildings Regulations 2021 Technical Guidance.

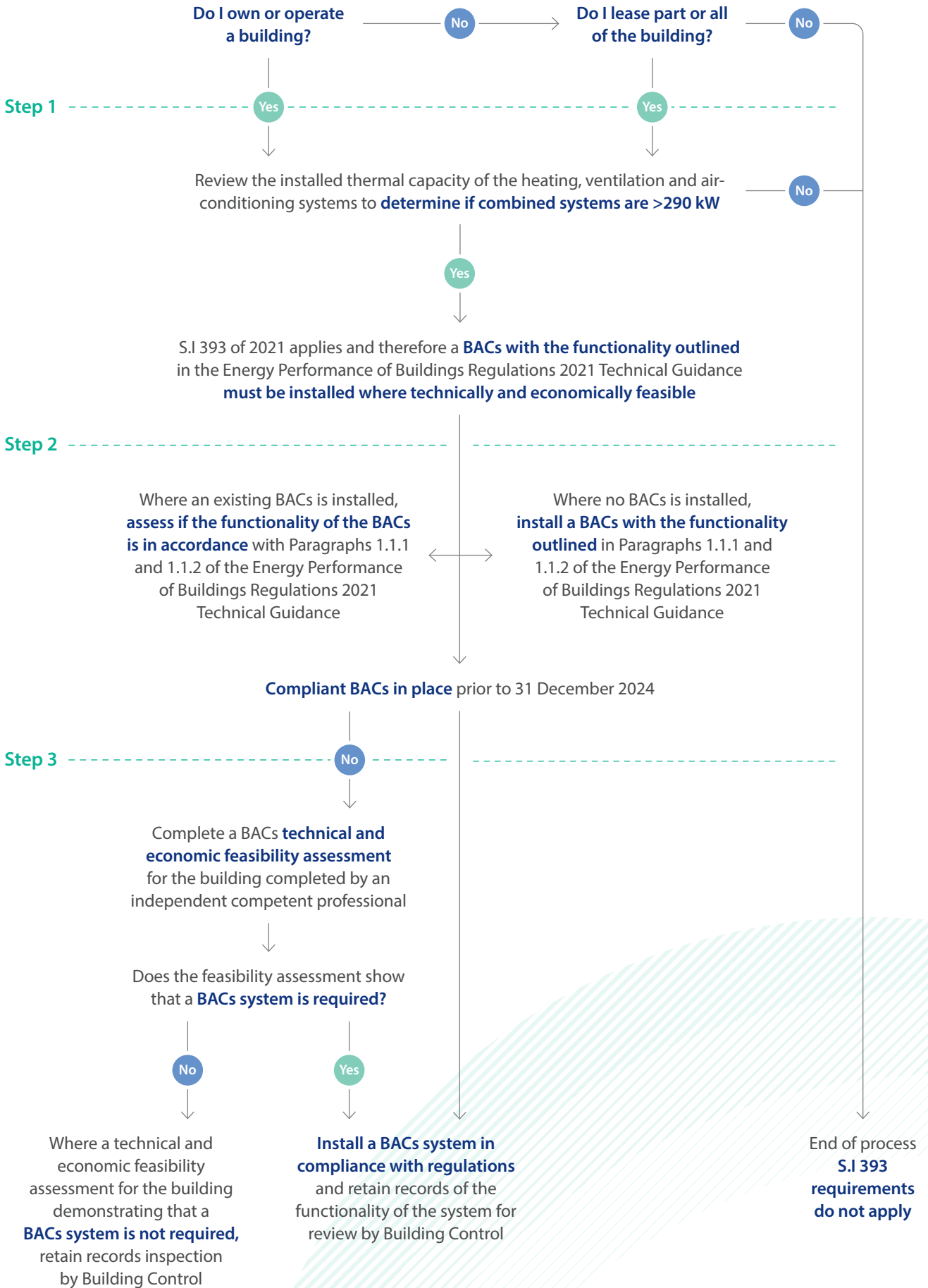
This guide should not be interpreted as a restriction on the installation of BACS but provides guidance on the minimum requirements that should be in place surrounding the automation and control of building heating, ventilation, and air-conditioning systems.

## Assessment steps – BACS decision tree

The initial assessment (steps 1-2 below) which focuses on assessing the system capacities, can be carried out by the building owner or a representative of the building owner who is competent to carry out this assessment.

A compliance assessment report should document the size of the heating, ventilation and air-conditioning systems that are in place in the building. Guidance on the assessment process and information that should be retained on file is outlined below.

Where an assessment is required to demonstrate that the installation of the measures is not technically or economically justifiable (step 3 below), this should be carried out by an independent competent professional as outlined under the Building Control Act 2007.



## Step 1: Determine rated output of applicable systems

It is required to review the effective rated output of all heating, air-conditioning, and ventilation systems in a building to determine the total effective rated output of the combined systems. This can be completed by reviewing building handover documentation, if available, or by completing a site inspection of the equipment in a building that make up the heating, ventilation, and air-conditioning systems. The nameplate data of the installed equipment can be used to determine the rated output of the systems. Where information on the system is not available, due to:

- Age of equipment,
- Nameplates not being visible or accessible,
- Split between heat used for space heating and domestic hot water is not possible,

then a conservative rated output of 200 W/m<sup>2</sup> should be used. The reason for this is to ensure that the intent of the regulations is applied, as far as is practicable. All assumptions that are made where the information is not available should be documented in the determination of the effective rated output of the systems.

Table 1 below is an example of a record, which could be used to determine the effective rated output of the combined systems in a building when carrying out an assessment.

**Table 1 Assessment on the effective rated output of the HVAC Systems**

System	Tag No.	Rated Output	Comment
Original Building LPHW Boiler	BLR-01	125 kW	Included in the determination of effective rated output
Original Building LPHW Boiler 2	BLR-02	125 kW	Included in the determination of effective rated output
Building Extension LPHW Boiler 3	BLR-03	42 kW	Included in the determination of effective rated output
Building Extension LPHW Boiler 4	BLR-04	42 kW	Included in the determination of effective rated output
IT Room Air-conditioning Unit	AC-001	16 kW	Included in the determination of effective rated output
Domestic Hot Water	CLA-001	12 kW	Domestic Hot Water is exempt from the regulations as the as it is a separate DHW heating system.
<b>Total effective rated output</b>		<b>350 kW</b>	

In the example above, the total rated output of the applicable systems is greater than 290kW and therefore a building automation and control system with the functionality outlined in the Energy Performance of Buildings Regulations 2021 Technical Guidance must be installed where technically and economically feasible.

## Step 2: Assess the adequacy of control measures in place

Once the size of the combined systems has been assessed, (in Step 1 above) and it has been determined that the regulations apply, a building automation and control system with the functionality outlined Paragraphs 1.1.1 and 1.1.2 of the Energy Performance of Buildings Regulations 2021 Technical Guidance should be installed. Where a building automation and control system is already installed in the building this can be assessed to determine if the functionality that is in place complies with the regulations.

Table 2 below outlines the functionality that is required in buildings where the regulations apply.

**Table 2 Assessment of BACS functionality**

System	Functionality required	Considerations
Heating and Ventilation Systems & Ventilation and Air-conditioning Systems	Continuously monitoring, logging, analysing, and allowing for adjusting energy use.	Review of the systems in place to ensure they are provided with self-regulating devices including zone, timing, and temperature controls to enable temperature control in each functional area to the required temperature only during the period when it is occupied. <b>Note:</b> Where the functionality does not exist, it must be installed.
Heating and Ventilation Systems & Ventilation and Air-conditioning Systems	Benchmarking the building's energy efficiency, detecting losses in efficiency of technical building systems, and informing the person responsible for the facilities or technical building management about opportunities for energy efficiency improvement	Review of the systems in place that monitor the energy associated with the systems in order to facilitate benchmarking and performance monitoring. <b>Note:</b> Refer to CIBSE TM39 Guide for further guidance on metering
Heating and Ventilation Systems & Ventilation and Air-conditioning Systems	Allowing communication with connected technical building systems and other appliances inside the building and being interoperable with technical building systems across different types of proprietary technologies, devices, and manufacturers.	Review of the systems in place to ensure they communicate with other systems within the building, examples of this include monitoring and control of heating and ventilation systems and associated energy monitoring systems. <b>Note:</b> All systems must be networked together to provide control.

### Step 3: Complete an assessment of the feasibility of installing the required BACS functionality

The Department of Housing, Local Government and Heritage commissioned a report in 2018 titled “Report on the Development of Cost Optimal Calculations and Gap Analysis for Buildings in Ireland under Directive 2010/31/EU on the Energy Performance of Buildings (RECAST)” which identified the installation costs for effective Building Automation and Control Systems (at the time of publishing) to be in the order of €38.15/m<sup>2</sup>.

The report should be used as a reference when estimating the implementation costs of the BACS to determine the economic feasibility of installing the measures. See Table 3 below “Technical and Financial Feasibility of measures” for further guidance.

The decision point on determining the economic feasibility of installing the measures is based on a maximum payback time of 10 years for public buildings and 3 years for other buildings. Regarding the benefits associated with the installation of BACS, it is anticipated that a 10% improvement in energy costs will be delivered as a result of the installation and full utilisation of BACS functionality and 5% improvement can be anticipated from implementing energy monitoring on a system.

**Table 3 Technical and financial feasibility of measures**

Measure detail	Technical feasibility	Cost	Benefit	Simple payback	Feasibility
Boiler-01 and Boiler 2 have local timeclock control and do not have zone controls in the building. The boilers are required to be connected to a BACS and self-regulating devices installed on the radiator circuits.	Yes, it is technically feasible to install self-regulating devices and connect the boilers to the BACS.	€20,500 (Source QS Report)	€3,150 (10% of Heating System Energy and 5% of the bills)	6.5	The measures are technically feasible to install. In this example, it is considered economically feasible to install a BACS where this is a public building. For other buildings, it may not be considered economically feasible. However, this does not preclude a building owner from installing a BACS.
There is no energy monitoring in the building and therefore an electricity and gas meter will need to be installed.	Yes, it is technically feasible.				

### Output of the assessment

The output of the assessment should be documented by the assessor in order to comply with the requirements of SI393 of 2021. A record of the assessment should be retained by the building owner and furnished to the building control authority upon request.



## Helpful definitions

**“Air-conditioning system”**: means a combination of the components required to provide a form of indoor air treatment, by which temperature is controlled or can be lowered.

*Source: Energy Performance of Buildings Directive 2010/31/EU; Energy Performance of Buildings Regulations 2021 Technical Guidance*

**“Building automation and control system”**: means a system comprising all products, software and engineering services that can support energy efficient, economical, and safe operation of technical building systems through automatic controls and by facilitating the manual management of those technical building systems.

*Source: Energy performance of Buildings Amending Directive 2018/844; Energy Performance of Buildings Regulations 2021 Technical Guidance*

**“Heating system”**: means a combination of the components required to provide a form of indoor air treatment, by which the temperature is increased.

*Source: Energy Performance of Buildings Amending Directive 2018/844; Energy Performance of Buildings Regulations 2021 Technical Guidance*

**“Self-regulating devices”**: self-regulating devices provide for the separate regulation of the temperature in each room or in a designated heated zone of the building.

*Source: Building Regulations Technical Guidance Document L 2021*

