



## Energy efficiency plan

### 1. General context

At its Board meeting on October 13, 2022, École Centrale de Lyon adopted its strategic plan for 2030, with one ambition: "to be recognized as a leader in major transitions at the service of economic players".

To ensure that every policy, action and decision is questioned in terms of its impact, Centrale Lyon has chosen to place major transitions at the heart of its strategy. This is reflected in the creation of a dedicated department, the Major Transitions Development Department, represented on the Executive Committee. The issue of energy sobriety is one of the components of the major transitions strategy, and permeates the company's various missions.

One of Centrale de Lyon's objectives is to train its students in "sustainable development", so that future decision-makers have the necessary skills to act within their companies and as citizens. Best practices are also learned when students are on campus, through projects run by student associations.

Research laboratories develop knowledge and provide expertise to socio-economic players on issues such as the management of natural resources, the development of renewable energies, sustainable mobility, resilient urban systems and responsible digital technologies.

Finally, the Établissement is committed to providing its stakeholders with responsible eco-campus, by adopting an exemplary attitude in the management of its assets and raising awareness among its staff.

To support the **ecological and solidarity-based transition** approach, Ecole Centrale de Lyon is proposing actions in three areas:

#### Energy efficiency:

- Reduce the School's overall energy requirements, all energy sources combined, by renovating its buildings;
- Adopt a low-energy approach by implementing less energy-intensive technical solutions, but also by changing and adapting working practices and methods.

#### Sustainable mobility:

- Develop and promote modes of transport that reduce the School's carbon footprint and that of its staff and students.

#### Digital sobriety:

- Reducing the carbon footprint of our facilities
- Raising user awareness of responsible digital practices

These areas of work are set out in the model action plan proposed in the letter from the Minister of Higher Education and Research dated September 24, 2022.

### 2. Real estate context

Ecole Centrale de Lyon operates on two campuses: the Ecully campus, where Ecole Centrale has been based since the 1960s, and the Saint-Etienne campus (comprising the Parot site and the Ecole Centrale campus).

and the Acières site) mainly occupied by the Ecole Nationale d'Ingénieurs de Saint-Etienne, an internal school of the Ecole Centrale de Lyon since January <sup>1</sup>. 2021.

### **Ecully campus :**

This campus, built in 1967, has 64,000 m<sup>2</sup> of premises spread over 17 hectares.

For its teaching (1,800 students), research (7 laboratories) and residential (an 800-seat restaurant and 400 student rooms) activities, fluids represent the establishment's biggest operating expense. Key annual consumption figures are :

- around 5,000 MWh of gas energy
- approximately 4,600 MWh of electricity
- approximately 30,000 m<sup>3</sup> of water

### **Saint-Etienne campus :**

The campus consists of two sites:

- State-owned Parot site, on which three buildings constructed in 1977 and two constructed in 1995 house 12,000 m<sup>2</sup> of teaching, research, administrative, student life and catering facilities, as well as a library for the activities of 1,000 students and 150 staff;
- The Acières site, owned by the City of Saint-Etienne and made available to the school, comprises 4,000m<sup>2</sup> divided into two buildings (a 500m<sup>2</sup> tertiary building and a nearly 3,500m<sup>2</sup> workshop and office building for teaching and research).

The key annual consumption figures are (for the entire in-house school) :

- approximately 1,400 MWh of gas energy
- approximately 450 MWh of electricity
- about 3000 m<sup>3</sup> of water

## **3. Action plan**

### **I- Training and raising everyone's awareness of the challenges of ecological transition and sustainable development**

#### **A- Raising awareness and training A1.**

##### **Actions already taken**

###### **Ecully campus :**

- 16-hour introductory course on sustainable development, including the climate mural, for the generalist curriculum and the energy engineer specialization;
- Marking of courses in the generalist curriculum dealing specifically with sustainable development and those dealing with the subject incidentally (more than 50% of courses related to sustainable development);
- WEEX: 3 weeks of project-based work on environmental topics;
- Inaugural lectures on the subject;
- SD Passport for students in the generalist curriculum as part of CHEL[s].

###### **Saint-Etienne campus :**

- Climate mural and digital mural for ENISE preparatory cycle students;
- Overhaul of the ENISE speciality engineering curriculum to meet the challenges of major transitions;
- Hosting speakers on the DDRRS theme. **A2.**

##### **Actions in progress**

### For both campuses :

- An application to calculate and track carbon footprints and aggregate data, to be launched in September 2023.
- Student awareness campaign in 2018 on the environmental impacts of digital activity. Resumed in 2022 in an open working group including teacher-researchers, students and the ISD.

### Ecully campus :

- A Pupil Project on student and staff mobility **A3. Planned actions**

### For both campuses :

- Awareness-raising actions and challenges between students using the carbon footprint application
- Introduction of "2-tonne" workshops for students and staff on a trial basis
- Introduction of an incentive carbon quota covering the entire curriculum

## **B- Associative activities**

### **B2 Actions already taken**

#### Ecully campus :

- Appointment of an Ecological Transition Manager for the School's Student Association ;
- Integrating training and awareness-raising into the school's associative activities;
- Activities of Planet & Co, student association for environmental awareness;
- Student representation on the DDRS committee.

#### Saint-Etienne campus :

- Activities of the sustainable development club, an environmental awareness association: participation in student COP2, actions as part of European sustainable development week, for example;
- Participation in the Auvergne Rhône Alpes mobility challenge.

### **B2. Actions in progress**

#### Ecully campus :

- Distribution of vegetarian meals and local fruit at major association events (WEI, challenges, etc.)
- Public transport preferred for association trips (Intercentrale, WEI, etc.) **B3. Planned**

### **actions**

#### For both campuses :

- Carrying out carbon audits of the main associative events and implementing actions to reduce emissions.

## **C- Plant personnel**

## C1. Actions already

### completed Saint-Etienne

#### campus :

- Organization of a fresco on the climate at the start of the new school year in 2022;
- Participation in the Auvergne Rhône Alpes mobility challenge.

## C2. Actions in progress

### For both campuses :

- At the end of 2022, the school will recruit a flow economist, one of whose tasks will be to implement a strategy to raise awareness of environmental issues among all the school's stakeholders (students, teachers, teacher-researchers, researchers, administrative staff);
- Recruitment in early 2023 of a project manager for major transitions, social and environmental responsibility;
- Existence of a DDRS commission made up of representatives of the establishment's staff and students;
- Creation for the start of the 2023 school year of an application for calculating and tracking carbon footprints and aggregating data. This application will also be used to raise awareness among staff.

## C3. Planned actions For

### both campuses :

- Organization of a fresco on climate during the staff day in July 2023;
- Setting up campaigns to raise awareness of everyday eco-gestures and digital uses;
- Awareness-raising activities and challenges between students using the carbon footprint application;
- Setting up 2-tonne workshops to raise staff awareness through activities that encourage cohesion and exchange.

## II- **Levers for action to achieve the objective of reducing energy consumption**

### A- Property management

#### A1- Work on buildings :

##### A1.1 - Actions already

#### completed Ecully campus :

- Installation of a **double skin** during the renovation of the library (January 2006);
- Installation of **external insulation** and low-emissivity glazing during the renovation of the facades of building E6 (April 2006) ;
- **Internal insulation** of the gable of the M14 restaurant during extension work (Sept 2012);
- Replacement of all the **glazed windows** in the bedrooms of residences T (August 2013), U, V and X (August 2014);
- **Thermal insulation** of building **roofs** between 2006 and 2016;
- **Thermal insulation of facades** with replacement of **glazed frames** in buildings M14/16 R+2 (2020), Z2 (2021)

### Saint-Etienne campus :

- **Thermal insulation of the former management offices** (2009): thermal insulation from the inside with internal reorganization of the premises;
- **Thermal insulation of the amphitheater** (2014): thermal insulation from the inside, insulation of the undersides of the low floor, installation of a double-flow air handling unit connected to the indoor hot water loop;
- **Thermal insulation of the "La Maison" administration and accommodation building** (2017): thermal insulation from the inside, replacement of the existing boiler with a condensing gas boiler with distribution modules;
- **Recovery plan work** (2021): refurbishment of 1,850 m<sup>2</sup> of flat roofs (waterproofing, safety and thermal insulation with a thermal resistance level of 6.25 m<sup>2</sup>.K/W).

### A1.2 - Actions in progress

#### Ecully campus :

- **Work under the stimulus plan**: renovation of 5 buildings (one building renovated with own funds). Work is scheduled for completion in summer 2023, and will involve **thermal insulation of facades** from the outside, **replacement of external joinery** with high-performance joinery (double glazing, solar factors, shading devices) and installation of **double-flow ventilation systems**;
- **Resilience Plan work**: as part of the Resilience Plan call for projects, Ecole Centrale de Lyon has been awarded a contract to **insulate the crawl spaces** of two buildings, which will be handed over in November 2022.

#### Saint-Etienne campus :

- **Finalization of the real estate and development master plan**: The plan, finalized in October 2022, includes an extension of the premises to meet the ambition of accommodating 1,600 students by 2035 (1,000 at present, compared with 400 when the campus opened), a transfer of activities from the Aciéries site to the Parot site, and the achievement of the objectives of the tertiary sector decree for the existing stock. The plan calls for the construction of two new buildings on the campus land reserve and the complete renovation of the main building (10,000 m<sup>2</sup>) and the foyer (200 m<sup>2</sup>).

### A1.3 - Projected actions

#### Ecully campus :

- **Impact project (CPER 2022-2027)**: Restructuring of the research halls in buildings H9 and H10 (stripping of the floors for complete reconfiguration) of 9734 m<sup>2</sup> SHON. I. The operation will also include the rehabilitation of the exterior envelopes of the buildings retained and their energy compliance, which is a priority for the Ecully campus and a necessity for achieving the objectives of reducing consumption under the tertiary sector decree.

#### Saint-Etienne campus :

- **Tremplin project**: Construction of a new teaching building to free up space in existing premises and accommodate new student populations. This project will provide the opportunity to undertake the complete renovation of the main building, with thermal insulation of the shell, modernization of equipment and comfort (creation of double-flow central units) and functional reorganization of the premises.

### A2- Work on technical installations :

## A2.1 - Actions already

### completed Ecully campus :

- Major renovation of the **central heating plant** (July 2007) ;
- Renovation of the restaurant's domestic **hot water system** (Sept. 2007) ;
- Renovation and optimization of **heating systems** in 7 buildings between 2007 and 2021;
- Gradual replacement of **interior lighting** with low-energy equipment and lighting management systems;
- Replacement of most of the campus' **outdoor lighting** (Sept. 2014) with more efficient equipment (to provide more light while controlling consumption) and long-lasting equipment (to reduce maintenance costs);
- Domestic **hot water** looping for U/V and T/X residences (2014) ;
- Installation of thermostatic valves with **network rebalancing** in building Z2 (2015) and residences T/X (2016) and U/V (2017);
- Replacement of the oil-fired boiler with a **condensing gas boiler** (Building N18-4) in July 2019;
- **Renovation of the air handling units** (AHUs) in the 3 amphitheatres and language rooms in the W1 R+2 building (2020), the student foyer (2020) and two large amphitheatres in the W1 building (2020/2021);
- Installation of 1,150 m<sup>2</sup> of self-consuming **photovoltaic panels** on the roofs of buildings D4/D5, M14/M16 and W1bis to cover 8 to 10% of the campus' electricity needs (2022).

### Saint-Etienne campus :

- **Installation of a dual-flow air handling unit in the amphitheatre (2014)**: dual-flow air handling unit connected to the indoor hot water loop;
- **Replacement of the boiler in the "La Maison" administration and accommodation building (2017)**: replacement of the existing boiler with a condensing gas boiler with distribution modules;
- Installation of a **variable-speed air compressor** with heat recovery (2017) at the Aciéries site;
- **Insulation of internal hot water networks (2020)**: the hot water distribution networks located in the crawl spaces and technical galleries of buildings on the Parot site were insulated to current standards in spring 2020;
- **Replacement of lighting in the civil engineering laboratory (2021)**: as part of the complete refurbishment of the laboratory (conversion of the former foundry), the lighting has been completely replaced by low-energy luminaires.

## A2.2 - Actions in progress

### Ecully campus :

- Connection of the Ecully campus to the Ouest Lyonnais **urban heating network**, enabling a minimum En&R biomass rate of 83% (roadworks 2022, connection summer 2023).

### Saint-Etienne campus :

- **Work under the TIGRE call for projects**: as part of the TIGRE call for projects, the school obtained funding to **replace the lighting in the student parking lot** with LED masts;
- **Resilience plan work**: as part of the resilience plan's call for projects, the facility obtained funding to **replace the neon lighting** in the interior corridors of its main building with LED lighting;

- **Replacement of the Parot compressor:** following the relocation of the mechanical engineering activity, the compressor was oversized. Its replacement will enable consumption to be adjusted to actual requirements.

## A2.3 - Projected actions

### Ecully campus :

- **Renovation of 5 heating substations**, including modernization of installations with primary/secondary decoupling, addition of BMS control, calorie meters, decoupling of building networks (programming of one substation per year over 5 years as part of the new 2023 operating contract, see A.3).
- **LED relamping** of teaching rooms in the W1 and W1bis buildings, comprising 26 classrooms and 4 toilet blocks, with the installation of luminosity detection systems enabling lighting to be dimmed or switched off according to natural lighting levels. The operation will reduce electricity consumption in these rooms by 50%.

### Saint-Etienne campus :

- **LED relamping** of the teaching, administration and research areas of the main building on the Parot site, including classrooms, lecture theatres and toilet blocks, with the installation of brightness detection systems to dim or switch off lighting according to natural lighting levels;
- **Creation of a photovoltaic power plant** on the roofs of the main building on the Parot site: according to the results of the 2017 photovoltaic potential study, several roofs can accommodate photovoltaic panels. A power plant will be created for self-consumption, based on the model already developed on the Ecully campus;
- Installation of **thermostatic valves** on all emitters at the Parot site (programmed as part of the new 2023 operating contract, see A.3) ;
- **De-sludging** and balancing of installations, with installation of a magnetic de-sludger in the boiler rooms on the Parot site (programmed as part of the new 2023 operating contract, see A.3);
- Installation of a **control system** on the constant circuits of the Parot site (programmed as part of the new 2023 operating contract, see A.3);
- Feasibility study underway for connection to the metropolitan heating network (planned as part of the new 2023 operating contract, see A.3).

## A3- Optimizing operations :

### A3.1 - Actions already taken

#### Ecully campus :

- Introduction of monthly **monitoring of** heating and electricity consumption (Sept. 2005) to monitor any deviations (almost 70 meters read each month);
- Implementation of a **profit-sharing contract** for the operation and management of the heating installations to guarantee a controlled level of consumption proportional to the severity of the climate (Sept 2006 to date).
- Specific actions to **raise awareness of** good behavior;
- Daily energy-saving **patrol** of the premises, ensuring that doors are closed and lights are switched off when not in use;
- **Setting** the temperature of air-conditioned computer rooms to 24°C instead of 20°C, saving 15% on air-conditioning energy;
- **Shutdown** of air handling units **when unoccupied**;

- **Timed programming of** outdoor lighting (differentiated according to sector use) via BMS, and of circulation lighting via BMS or clocks in building switchboards. For the corridors, 1/3 of the lighting is operated during working hours and 2/3 on push-buttons.

#### Saint-Etienne campus :

- Timer-controlled outdoor lighting with brightness detection ;
- **Shutdown** of air handling units **when unoccupied**;
- **Closure of cafeteria kitchen** (cold rooms, electric ovens, etc.)

#### **A3.2 - Actions in progress**

##### For both campuses :

- Continued fine-tuning of heating and air conditioning, applying the measures in the Prime Minister's circular of April 13, 2022 and the Prime Minister's circular of July 25, 2022, with the following specific features:
  - o Program the heating temperature setpoint at 19°C in commercial premises when occupied, at 16°C when unoccupied and in frost-free mode when closed.
  - o Program the heating temperature setpoint at 17°C in the workshops when occupied, at 15°C when unoccupied and in frost-free mode when closed.
  - o Heating time reduced by 2 hours during the day, with the reduced output switched on earlier at the end of the day (4 p.m. instead of 6 p.m.);
- Reduce the heating period (from late October to spring break if possible);
- Reduce the use of hot water in sanitary facilities;
- Adapt lighting schedules to reduce morning and evening lighting periods;
- Permanent recruitment in 2022 of a **flow economist** in charge of supporting the energy and ecological transition of the Ecole Centrale de Lyon on its Ecully and Saint-Etienne campuses, by developing and monitoring the school's energy management policy. His or her main tasks will be to:
  - Identify potential savings in energy fluids (heating, air conditioning, electricity) and water and implement actions to reduce building consumption as much as possible;
  - Monitor all consumption data and set up monitoring indicators ;
  - Regular awareness-raising campaigns (eco-actions, use of premises, etc.) for users (students, staff, lecturers, researchers);
  - Manage real estate energy renovation projects.

##### Ecully campus :

- **Data Center** containment **optimization** work at the Ecully site in 2021/2022, carried out in internal collaboration between DSI/Dirpat/LMFA (PSCM2I), enabling the Data Center's cold set point to be lowered by 4°C.

#### **A3.3 - Planned actions For**

##### both campuses :

##### Heating and air conditioning:

- Relaunch of the heating, ventilation and air-conditioning contract in 2023 with :



- Continuation of **profit-sharing contracts** for the operation and management of heating and air-conditioning systems;
- Integration of a **P3P programmed works service** (110 k€/year over 5 years) dedicated to the renovation of installations, the implementation and optimization of heating network control systems (separation of circuits in heating substations, extension of the BMS) and the development and implementation of an energy metering plan.

## B- Equipment management

### B1- Digital equipment :

#### B1.1 - Actions already taken

##### For both campuses :

- Management of digital equipment, including a longer lifespan for equipment before renewal (7 years if possible in view of usage);
- Data center audit (assessment of areas for improvement, equipment efficiency) ;
- Inclusion in the CINAURA project [Convergence des Infrastructures Numériques du Supérieur en région Auvergne - Rhône-Alpes \(Convergence of Higher Education Digital Infrastructures in the Auvergne - Rhône-Alpes region\)](#) & deployment of shared, economical and eco-efficient digital research platforms as part of the MESRI's response to the call for regional datacenter certification;
- Consolidation of research infrastructures such as servers and storage in the datacenter (indicator: number of servers hosted/UMR or entities) ;
- Pooling of computing and storage infrastructures (indicator no. of computing hours /UMR , no. of projects supported, contracts, publications) ;
- Urbanization, containment of datacenter floor space (evolution of PUE Power Usage Effectiveness, defined as the ratio of total energy consumed by the room to the energy consumed by all IT equipment).

<https://www.ec-lyon.fr/actualites/2021/datacentre-ecole-centrale-lyon-interaction-integration-mutualisation>

##### Saint-Etienne campus :

- Copiers and printers are automatically shut down at 8pm and restarted at 7am on working days.

#### B1.2 - Actions in progress

##### For both campuses :

- Drawing up a new digital master plan for the period 2022-2026, placing the issue of sobriety at the heart of the strategy;
- Issuing recommendations to all users to limit the environmental impact of digital activity;
- Capture and metrology of datacenter environmental parameters (current, temperature, humidity); automated shutdowns.

##### Saint-Etienne campus :

- Automatic shutdown (evening) and restart (morning) of workstations in administration and teaching rooms on working days.

#### B1.3 - Planned actions For both campuses :

- Recycling of equipment with associations and, in the case of irreparable equipment, recycling with approved WEEE collection points (indicator: number of items recycled);
- Edition of hardware reset procedures to restore original performance.

## **B2- Laboratory equipment :**

### **B2.1 - Actions already taken**

#### **Ecully campus :**

- On all new fume cupboards since 2016, installation of "guillotine open" alarms.

### **B2.2 - Actions in progress**

#### **For both campuses :**

- Individualized evaluation (sub-metering) of the consumption of the most energy-intensive equipment to optimize usage.

### **B2.3 - Planned actions For**

#### **both campuses :**

- Set up an energy advisor in each department/laboratory, who will work in close collaboration with the flow economist (based on the existing model for prevention assistants and the prevention advisor).
- Audit of research facilities by the flow economist and referents to enable the implementation of immediately feasible actions or the programming of actions to be financed.

#### **Ecully campus :**

- Restructuring of mechanical workshops to optimize use.
- Set up a specific consultation and usage schedule for high-consumption benches to ensure that they are not operated simultaneously.

#### **Saint-Etienne campus :**

- Installation of "guillotine open" alarms on fume cupboards.

## **C- Staff and student mobility C1- Staff**

### **mobility**

#### **C1.1 Actions already taken**

#### **For both campuses :**

- The teleworking charter allows for up to 2 fixed teleworking days per week and 15 floating teleworking days per year;
- Almost systematic deployment of hybrid meeting formats, particularly for inter-campus meetings;
- Reduction of number of travel business trips in 2022 (data data) compared to 2019 (ECL+ ENISE data).

### **Ecully campus :**

- 10-fold increase in existing bicycle parking to 288 spaces;
- Replacement of the Director's company car with a plug-in hybrid ;
- Carpooling awareness campaign at the end of 2021 in partnership with the metropolis;
- Mobility plan for the Lyon West campus to be completed in 2019.

### **C1.2 Actions in**

#### **progress For both**

#### **campuses :**

- The procedure governing business travel will be updated at the Board meeting in December 2022 to introduce the following rules:
  - No air travel is allowed if the outward journey can be made in 4 hours or less by train.
  - All car journeys of more than 300 km (one way) are forbidden and must be made by train, unless an exemption has been granted by management (for transporting equipment or problems in reaching the destination, tours).
- The establishment has budgeted for the acquisition of 3 electric vehicles in 2023, notably for inter-campus travel. Wherever possible, the use of these vehicles should be preferred to the use of a combustion-powered personal vehicle.
- Raising awareness of the carbon impact of travel via the individual application scheduled for the start of the 2023 school year.

### **C1.3 Planned actions For**

#### **both campuses :**

- Installation of an electric fast-charging station on each of the Ecully and Saint-Etienne campuses;
- Installation of secure bicycle racks.

## **C2- Student mobility C2.1**

### **Actions already taken**

#### **Ecully campus :**

- Obtaining a reinforced bus line serving the campus, making it possible to reach the metro in 15-20 minutes.

#### **Saint-Etienne campus :**

- Creation of direct links to the city center with Saint-Etienne Métropole and STAS. **C2.2**

### **Actions in progress**

#### **For both campuses :**

- Submission to the December Board meeting of a resolution granting financial assistance of €100 (in addition to the €50 Erasmus grant) for students taking the train for their Erasmus mobility.
- Raising awareness of the carbon impact of travel via the individual application scheduled for the start of the 2023 school year.

**Saint-Etienne campus :**

- Creation of a high-service bus line linking the various campuses and the station.

**C2.3 Planned actions For**

**both campuses :**

- Introduction of an incentive carbon quota covering the entire curriculum.

**Ecully campus :**

- Mobilization of the transport network to improve service to the campus during rush hour and evenings (especially weekends).

**Saint-Etienne campus :**

- Creation of a high-service bus line linking the campuses and the station.
- Introduction of a car-pooling incentive policy for students.

**D- Purchasing strategy**

**D1- Actions already taken**

**For both campuses :**

- Since 2018, dematerialization of all public procurement procedures.
- Since 2019, 100% of our contracts include social and environmental criteria.
- Since 2020, 100% of works contracts have included a social integration clause representing 5% of hours worked.

**D2- Actions in progress**

**For both campuses :**

- Systematic inclusion of a consideration of allotment by campus for services involving regular travel.

**D3- Planned actions For**

**both campuses :**

- Reinforcing the consideration of environmental criteria in the expression of needs and in the execution of services in compliance with law no. 2021-1104 of August 22, 2021 on combating climate change and strengthening resilience to its effects.

**Projection of precisely measurable energy consumption gains by the end of 2022**

**CAMPUS ECULLY**

Energy	Measures	Gain by energy 2019-2024 in	Gain in all energies 2019-2024 in	Comments
Electricity	LED relamping of buildings W1 and W1bis	2,4%	0,8%	Subject to Resilience Plan 2
	Work under the recovery plan	14,4%	9,5%	
Heating	Operations management : - Program the heating temperature setpoint at 19°C in commercial premises when occupied, and at 16°C when unoccupied and frost-free when closed. - Start heating as late as possible (end of October if possible) and switch off as early as possible (spring break if possible). - Reduced heating time during the day, with reduced heating earlier at the end of the day.	13,5%	8,9%	The gain is calculated on the basis of consumption after the stimulus plan.
<b>TOTAL CAMPUS ECULLY</b>			<b>19,2%</b>	

**CAMPUS SAINT-ETIENNE**

Energy	Measures	Gain by energy 2019-2024 in	Gain in all energies 2019-2024 in	Comments
Electricity	LED relamping for Jean Parot circulations	7,5%	1,9%	Resilience Plan 1 + subject to (BI2023 + Resilience Plan 2)
Heating	Management of Jean Parot and Aciéries : - Program the heating temperature setpoint at 19°C in commercial premises when occupied, and at 16°C when unoccupied and frost-free when closed. - Start heating as late as possible (end of October if possible) and switch off as early as possible (spring break if possible). - Reduced heating time during the day, with reduced heating earlier at the end of the day.	13,1%	9,9%	The difference between Ecully and Saint-Etienne for the same measurements is explained by a higher proportion of electricity than gas in Ecully.
<b>TOTAL CAMPUS SAINT-ETIENNE</b>			<b>11,8%</b>	

**TOTAL ECULLY AND SAINT-ETIENNE CAMPUSES**

**18,0%**

Calculated using the sum of kWh Elec et Gaz des 2 campus