CENTRO SAN GIROLAMO PARMA

AUGUST 2019

SUSTAINABILITY ACTION PLAN

PREPARED AND PRESENTED BY

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This Sustainability Action Plan is prepared in fulfillment of the Capstone requirement by Matteo Chiampo, ALM candidate for the Master of Liberal Arts in Sustainability under the supervision of Professor William O'Brien, MBA, JD.

I would like to thank Francesco Chiampo and the Energy Fisioterapia S.r.l. team for their help and availability. A special note of gratitude goes to Professor O'Brien for the willingness to share his expertise in class and during the development of this report.

Finally, and most importantly, thank you Ashley, Stefano and Lodovico for all your support and patience over the last two and a half years.

EXECUTIVE SUMMARY

Energy Fisioterapia S.r.l. operates physical re-education and physiotherapy centers in Italy under the brand Centro San Girolamo.

Sustainability has been front and center in Centro San Girolamo's practices from the startup of the first health center.

To institutionalize a path to greater sustainability, the Center's management has agreed to complete this Sustainability Action Plan.

The first objective of the SAP is to create a baseline for the company's impact, by calculating the total greenhouse gas emissions, in metric tons of CO_2 equivalent, using the standards indicated by the General Reporting Protocol Version 2.1.

The GHG inventory exercise reported 31 mtCO2e emitted in 2018. Heating and cooling of the buildings in which the company operates contribute close to two-thirds of total emissions.

Using the insights from the analysis of GHG sources, the SAP recommends several actions to mitigate the impact, including:

- Improve building's thermal management.
- Reduce electricity consumption.
- Measure waste and adopt actions to reduce its production.
- Decrease use of paper and single-use supplies.
- Mitigate emissions from business travel and staff commute.

The company plans to open four new centers by 2021. One stated objective is to aim for net-zero carbon footprint as the company grows its operations. This SAP provides a "plug & play" blueprint to evaluate the sustainability of additional centers.

In the longer term we identified self-generation of renewable energy, or procurement of zero-carbon energy as two key strategies, if the client wants to achieve the stated net-zero goal.

Senior management is committed to increase the sustainability of the company's operations.

The behavior change techniques outlined in this report will guide the team towards minimizing Energy Fisioterapia S.r.l.'s overall impact.

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BACKGROUND

Energy Fisioterapia S.r.l. is a privately-owned company that operates healthcare centers in Italy under the brand Centro San Girolamo. For the purpose of this report the company's name and Centro San Girolamo will be used interchangeably.

The centers specialize in physical reeducation and physiotherapy, with activities organized around two main areas: traditional physiotherapy and technology-assisted therapy.

Traditional physiotherapy uses manipulative therapy, which includes kneading and manipulation of muscles, joint mobilization, and joint manipulation to treat musculoskeletal pain and disability.

In the area of technology-assisted therapy, Centro San Girolamo is the exclusive representative for Italy of two innovative solutions: CyberDyne's Hybrid Assistive Limb (HAL) rehabilitation technology (see Box 1); and Diers spinometry, which enables a three-dimensional radiation-free analysis of patients' back morphology, posture, and dynamic bio-mechanics (see Box 2).

Energy Fisioterapia S.r.l. currently operates two clinics. The main center operates from a leased 340 m^2 facility in Stradello San Girolamo in Parma, Italy – hence the name.

A second center, which started operations October 2018, is based in a 90 m^2 location in Rubiera near Reggio Emilia, Italy, also leased.

As of May 2019, Energy Fisioterapia S.r.l. employs a total of nineteen full time employees and contractors.

The two centers delivered approximately 1,000 treatments to more than 800 patients in May 2019. Management forecasts growth of 5% or more month-on-month going forward.

In addition to organic patient growth, the company plans to open one new center in Milan and one in Rome in the next 12 months and three more by the end of 2021.

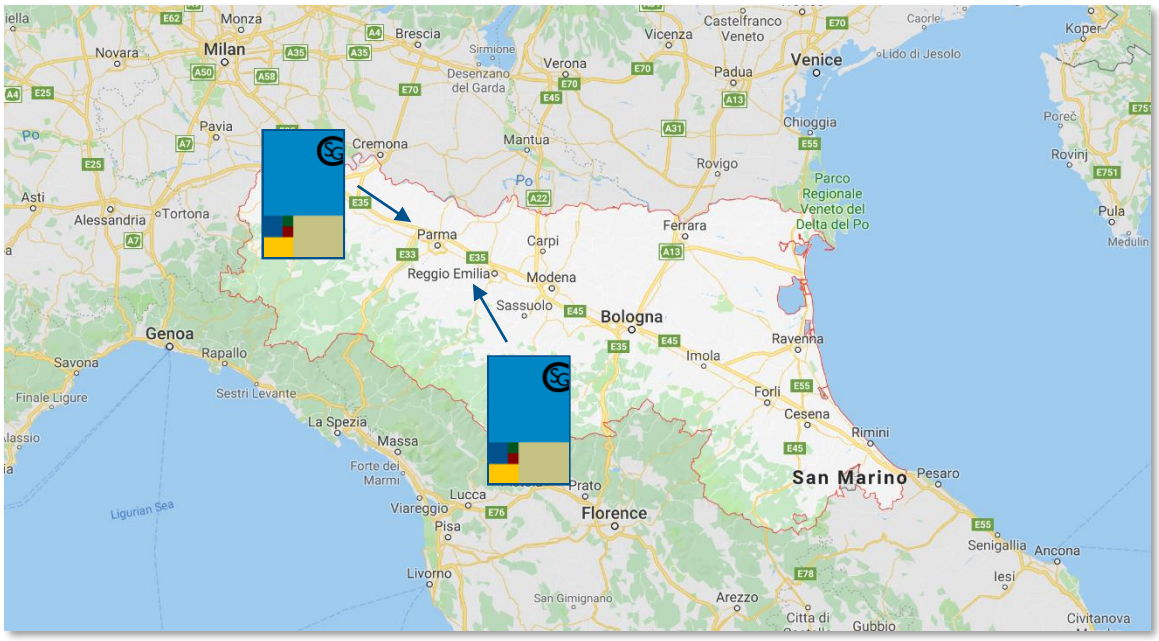


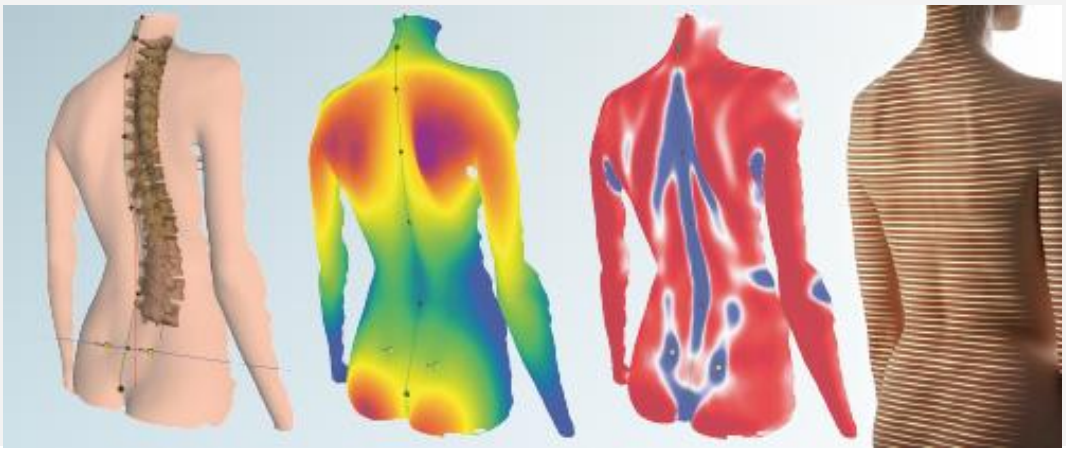
Figure 1 - Energy Fisioterapia S.r.l. locations (as of April 2019).

BOX 1 – CYBERDYNE'S HAL

Developed since 2004 by CyberDyne, a leading Japanese technology innovator, HAL technology uses a powered exoskeleton to support and expand the physical capabilities of its users, particularly people with physical disabilities. When a person attempts to move their body, the brain sends nerve signals to the muscles through the motor neurons, moving the musculoskeletal system. Sensors attached to the skin of HAL wearer detect small electrical biosignals. HAL's computing unit processes the signals obtained and directs the power unit to moves the exoskeleton's motorized joint to support and amplify the wearer's motion (Kawamoto, et al., 2013).

BOX 2 – RASTERSTEREOGRAPHIC SURFACE RECONSTRUCTION

Rasterstereographic surface reconstruction, colloquially known as spinometry, uses a system of parallel lines projected onto the back surface of a patient. Using triangulation of observations and projection, the three-dimensional shape of the patient's back is reconstructed with high accuracy, and various parameters can be identified to support the patient's diagnosis (Krause, 2012).



SUSTAINABILITY AT CENTRO SAN GIROLAMO

CURRENT SUSTAINABILITY PRACTICES BUILD THE FOUNDATION FOR LONG-TERM IMPACT REDUCTION.

Sustainability has been front and center in Centro San Girolamo's practices from the startup of the first health center.

There are several reasons for the attention and efforts put into minimizing the center's operational impact.

First, the personal interest of the center's owner has driven adoption; second, the general attention that is paid in Italy to issues of sustainability, which permeates the citizens' daily lives and informs business activities, driven by national, regional, and local regulations; finally, the recognition that striving for sustainable business practices makes good financial sense, allowing the business to achieve its goals while consuming fewer resources, which in turn translates in lower operating costs.

These well-established sustainability practices at the Center represents both a risk for this project, as well as an opportunity.

The risk is that additional improvements are harder and more expensive to achieve given the already high starting point. This may discourage management and the team from pursuing additional sustainable practices. Having already implemented low-cost, high-impact solutions, taking more expensive actions with lower marginal benefits might make economic payback elusive.

However, the management team is keen to catalog the low-to-no cost, high-impact actions already implemented to create a baseline to measure additional improvements in the future, and to establish aggressive impact reduction goals.

Furthermore, given the company's expansion plan, the SAP can serve as a "plug & play" blueprint for additional centers.

Finally, the SAP can serve as a roadmap toward the long-term goal of net-zero impact in the company's business operations.

OPPORTUNITIES & RISKS

EXISTING ATTENTION TO SUSTAINABILITY CREATES BOTH OPPORTUNITIES AND RISKS.

Traditional business models aim to create value for shareholders, often at the expense of other stakeholders. Sustainable businesses are redefining the corporate ecosystem by designing models that create value for all stakeholders, including employees, shareholders, supply chains, civil society, and the planet (Whelan & Fink, 2016).

Incorporating sustainability in a company's business can improve its resilience to external risks (i.e.: resources depletion and impacts of climate change). In addition to reducing risks, sustainability can play a proactive role in making a business better, for instance pushing the organization to pursue innovation both in product and process design. When faced with the mandate to reduce impact, company management and employees look for – and usually find – ways to achieve equivalent or better output than the status quo using fewer resources, reduce the use of harmful material and processes, and create entire new products which appeal to sustainability-conscious customers (Lee & Bony, 2007).

Energy Fisioterapia S.r.l. is keen to leverage the opportunities coming from tightly embedding sustainability in its business practices. We have identified the key ones below, along with the risks that are commonly present whenever a change initiative is undertaken.

Opportunities

- Reduce resources use, reduce costs, increase profitability of the center.
- Competitive differentiation through marketing of the center's sustainability excellence.
- Increased service quality through in-situ 3D printing of orthopedic products.
- Increased engagement and retention of employees and contract staff through valorization of sustainable practices.

Risks

- Lack of follow-through on planned sustainability initiatives.
- Lack of financial returns on suggested actions, making the initiatives less compelling.
- Marginal improvements do not justify the effort required for implementation of SAP.
- Failure to realize the expected intangible competitive benefits.

KEY STAKEHOLDERS

A HIGHLY ENGAGED TEAM WELCOMES THE DEVELOPMENT OF A CORPORATE SUSTAINABILITY ROADMAP.

In the past decade the idea that businesses are responsible exclusively for the maximization of profit to their owners or shareholders has progressively lost its shine.

Milton Friedman described in 1962 what can be defined as *laissez-faire* economics: "There is one and only one social responsibility of business — to use its resources and engage in activities designed to increase its profits so long as it … engages in open and free competition, without deception or fraud." (Friedman, 1962). The mounting evidence of the impacts this approach is causing to crucial life-supporting systems leads to more frequent challenges to this view of the profit-motive being the sole goal of business.

Businesses activities cause externalities, such as resource depletion, climate change, forest and land degradation, etc. The effects of those externalities are felt by "stakeholders", who represent groups impacted outside the small circle of owners/shareholders.

It makes sense therefore that stakeholders besides the owners of a business, such as customers, regulators, governments, and civil society, would exert pressure on management to address the consequences of their business activities. And the way external stakeholders are doing this is by requesting businesses to embed sustainability practice in day-to-day operations and product development (Smith, 2003).

In summary, we are witnessing a shift from shareholder value creation only to shared value creation. Shared value proposes to redefine the purpose of business as "creating economic value in a way that also creates value for society by addressing its needs and challenges" (Porter & Kramer, 2011).

The team at Centro San Girolamo has embraced a responsible business approach, and it is fully committed to the sustainability initiatives undertaken by the company. The stakeholders participated with enthusiasm and commitment to the scope definition, solution identification, and data collection phases of the project.

The box in the next page describes roles and responsibility of the stakeholders involved with the project so far.

Francesco Chiampo – Owner and Managing Director

Final decision-maker and approver for the implementation of the actions proposed in this plan.

Margherita Tomasi - Physiotherapist

Led R&D data sharing on the 3D printing project and provided input for this and other procurement initiatives.

Ilaria Masera - Physiotherapist

Collected and organized data on patient treatments and operational metrics.

Lodovica Rampinelli Rota - Admin Staff

Facilitated access to energy consumption and other data sets to baseline current sustainability metrics.

Patient Population

Will be informed of the center's efforts to reduce its impact and hopefully will maintain, or increase, their patronage of the center because of this.

CLIENT REQUIREMENTS AND RECOMMENDED ACTIONS

The company hosted in April 2019 a project inception workshop to articulate the overall strategic sustainability roadmap and to begin the data collection process.

Over the course of two days stakeholders were interviewed to understand motivation and expected outcomes from the project, and to articulate the key requirements.

One key outcome of the workshop is that the formulation of the SAP. Is an opportunity to create a blueprint for achieving Energy Fisioterapia S.r.l.'s long-term sustainability goals, especially in light of the planned expansion.

The overarching strategic goal of the SAP should be to support Centro San Girolamo's aspirations to be recognized as a leader in sustainable practices by industry participants, employees and associates, and by the broader patient population.

Operationally, the long-term goal is to bring the net impact of the center's business operations to zero. To achieve this goal, the SAP must include a holistic review all aspects of Centro san Girolamo's operations, identify areas of actionable intervention for impact reduction, and suggest a realistic plan to reduce or eliminate the center's impact.

To begin with, the SAP needs to include a quantitative assessment of where the center stands as far as sustainability. Today's snapshot can be subsequently used as the baseline from which to establish improvement goals for the medium- and long-term, and to measure the effect of the proposed actions.

After articulating the desired overall strategic objective, we detailed them into four specific client requirement areas listed in the table in the next page.

Since the owner of the business is driving this initiative, a key requirement is that the financial return of the identified interventions is positive.

Therefore, a common requirement across the four areas is the generation of financial analysis (at the very minimum a calculation of the payback period) to aid with the prioritization and selection of each impact reduction action.

R1

Develop Greenhouse Gas Inventory

Energy Fisioterapia S.r.l. wants the SAP to establish baseline sustainability metrics and to serve as a guide for future improvements as the organization grows. A greenhouse gas inventory is the most effective way to achieve this.

R2

Material and Energy Reduction Plan

Suggest actions to optimize and reduce use of energy and materials. This will translate in tangible cost reductions, possibly within a short timeframe, while contributing to reduce the organization's overall footprint.

R3

Supply Chain Optimization

Review the company's supply chain practices to identify opportunities for impact mitigation. Focus on single-use disposable items (latex gloves, paper products, etc.) and medical products (i.e.: orthopedic insoles 3d printing using biodegradable plastic filaments).

R4

Develop Electricity Self-Generation Plan

Research solutions to recuce the emissions from electricity use. Create a shortlist of suitable options, and suggest an action plan for implementation.

R1 – GREENHOUSE GAS INVENTORY

"IT IS IMPOSSIBLE TO MAP OUT A ROUTE TO YOUR DESTINATION IF YOU DON'T KNOW WHERE YOU'RE STARTING FROM" (Suze Orman)

Overview

Centro San Girolamo has consistently acted in a sustainable manner since its founding in 2014. However, sustainability has never been explicitly identified as one of the core elements of the company's mission.

The development of Centro San Girolamo's first Sustainability Action Plan marks the commitment to raise awareness around sustainability to a more explicit and measurable level, and to plot a course of action to further improve on sustainability metrics. Hence the client's first requirement: to measure and baseline materials and energy flows in and out of the company.

Accomplishing this task allows to, first, understand the current level of resources utilization, and, secondly, to mark the starting point for the journey toward a higher level of organizational sustainability.

Recommendations

The most accurate way to measure the baseline of the Center's material and energy flows, in a way that makes comparison across time and operational areas meaningful, is through the completion of a greenhouse gas (GHG) inventory exercise.

This is the first time Energy Fisioterapia S.r.l. undertakes a GHG inventory exercise.

The process used follows the guidelines detailed in the General Reporting Protocol (GRP) Version 2.1 published by the World Resource Institute (WRI and WBCSD, 2004).

We identify the organizational boundary for this inventory using the Operational Control approach, which requires Energy Fisioterapia S.r.l. to account for all GHG emissions from operations for which it has direct control, and where it can influence decisions that impact emissions.

In our case this includes the center in Parma, while we exclude the center in Rubiera as it has been in operation for only the last quarter of calendar year 2018. We suggest including emission attributable to the Rubiera location in the 2019 inventory.

Energy Fisioterapia S.r.l.'s operational boundaries for this report include all direct (Scope 1) and indirect (Scope 2) emissions of six out of the seven internationally recognized GHGs (carbon dioxide CO_2, methane CH_4, nitrous oxide N_2O, hydrofluorocarbons HFCs, perfluorocarbons PFCs, sulfur hexafluoride SF_6) generated from the facilities within the organizational boundary (WRI and WBCSD, 2004).

Nitrogen trifluoride (NF_3) is excluded as is not used anywhere in Energy Fisioterapia S.r.l.

In this first iteration of GHG inventory, we consider only employee commute and business travel. We recommend adding solid general waste, bio-hazard waste and single-use disposables in the subsequent revisions of the GHG inventory.

The inventory relies on global warming potential (GWP) values for the required gasses provided by The Climate Registry's default emission factors (The Climate Registry, 2017).

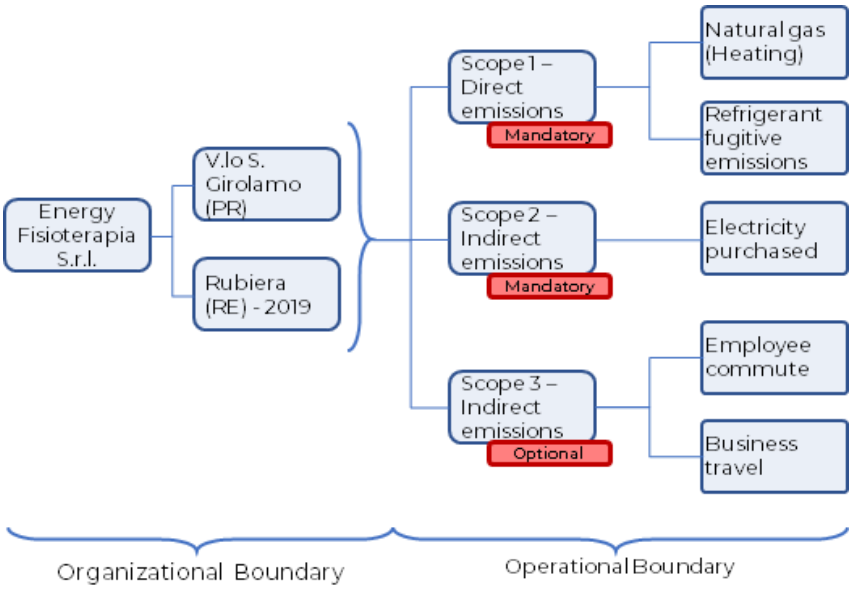


Figure 2 - Organizational and operational boundaries

Scope 1 emissions

Scope 1 includes all direct GHG emissions from sources that are owned or controlled by the organization. In the case of Energy Fisioterapia S.r.l. these are static combustion of natural gas and refrigerant fugitive emissions.

Natural gas, supplied by IREN Mercato S.p.A., is burned in the furnace on -site for building and water heating.

IREN Mercato S.p.A. bills Energy Fisioterapia S.r.l. based on the volume (in cubic meters, or m^3) of the fuel delivered.

Volumetric data is converted into so-called standard cubic meters to account for the difference between the actual gas delivery conditions and the standard conditions of temperature of 15 °C (288.150 °K) and a pressure of 101.325 kPa (1 Atm) (Wikipedia, 2019). Energy Fisioterapia S.r.l. provided access to the gas company on-line portal, from which gas consumption data between 2016 and 2018 was retrieved.

The Annexures show monthly 2018 data used to complete the GHG inventory.

The Parma center utilizes one Carrier centralized a/c unit, model 30RA 033. Technical specs for the unit are available in the Annexures.

We use the screening method to estimate whether emission from fugitive gas are below the threshold of 10% admissible for use of Screening Estimation Method (SEM).

The GRP recommends using the following equation for the calculation of refrigerant fugitive emissions using the screening method (WRI and WBCSD, 2004):

$$\frac{(C_N \times k) + (C \times w \times T) + [C_D \times y \times (1 - z)]\ (kg)}{1,000\left(\frac{kg}{mt}\right)}$$

Where:

C_N = Quantity of refrigerant charged into the new equipment[1]

C = Total full charge (capacity) of the equipment

T = Time in years equipment was in use (e.g., 0.5 if used only during half the year and then disposed)

C_D = Total full charge (capacity) of equipment being disposed of[2]

k = Installation emission factor[1]

w = Operating emission factor

y = Refrigerant remaining at disposal[2]

z = Recovery efficiency[2]

Centro San Girolamo has not installed or disposed of any refrigeration or air conditioning equipment in 2018, and the time in use is one year.

The operating emission factor is equal to 10% for Residential and Commercial A/C including Heat Pumps (The Climate Registry, 2017).

Scope 2 emissions

Scope 2 emissions include emissions from purchased electricity, classified as indirect because they do not occur at the location of Centro San Girolamo, but rather at the electricity generation plant (WRI and WBCSD, 2004).

While Energy Fisioterapia S.r.l. does not own or control the source of the emissions, its activities require the generation of electricity to power gym and exercise machines, small medical equipment, internal and external illumination, computing/office machines, air conditioning equipment, etc.

The entire supply of electricity to Energy Fisioterapia S.r.l. IREN Mercato S.p.A. is metered. Energy Fisioterapia S.r.l. does not purchase steam, hot or chilled water from outside providers.

Scope 3 emissions

Scope 3 includes all other indirect emissions generated from sources not owned or controlled by Energy Fisioterapia S.r.l. for activities required to deliver the organization's services. A partial list of Scope 3 emissions relevant to the operations of Centro San Girolamo is shown in Table 1.

Although GRP standards do not mandate calculation of Scope 3 emissions, they are significant contributor to an organization's total GHG output and provide opportunities for substantial emissions reduction (WRI and WBCSD, 2004).

We identified employees commute and business travel to be included in Scope 3 calculations in the first iteration of the GHG inventory, as they contribute significantly to the emission total, and management can influence practices to reduce their impact.

We recommend adding other Scope 3 categories to Energy Fisioterapia S.r.l.'s emission inventory in subsequent years.

[1] Omitted if no equipment was installed during the reporting year or the installed equipment was pre-charged by the manufacturer

[2] Omitted if no equipment was disposed of during the reporting year

Upstream / Downstream	Category	Activity	Included (Yes/No)
Upstream	1	Procurement of pharmaceuticals, medical devices, single-use disposables, etc.	No
Upstream	2	Acquisition of capital goods	No
Upstream	4	Patient travel to the center's locations	No
Upstream	5	Solid general waste	No
Upstream	5	Biohazard and medical waste	No
Upstream	6	Staff transportation for business-related activities during the reporting year (in vehicles not owned or operated by the reporting company)	Yes
Upstream	7	Staff transportation of employees between their homes and their worksites during the reporting year (in vehicles not owned or operated by the reporting company)	Yes
Downstream	9	Patient travel from the center's locations	No

Table 1 – Partial list of Scope 3 activities

Emission calculation

Table 2 summarizes the emissions in mtCO2e from sources identified within Energy Fisioterapia S.r.l.'s boundaries for calendar year 2018, broken down by scope.

Activity	Emissions [$mtCO_2e$]	% of total
Scope 1	*17.2*	*55.1%*
Natural Gas - Static combustion	15.9	51.1%
R407c - Refrigerant fugitive emissions	1.3	4.0%
Scope 2	*4.5*	*14.3%*
Purchased electricity	4.5	14.3%
Scope 3	*9.5*	*30.6%*
Staff business travel	1.8	5.6%
Staff commute	7.8	25.0%
Grand Total	**31.2**	**100.0%**

Table 2 - Summary GHG emission 2018

Calculations, parameters, conversion and emission factors are found in Table 10, Table 11, and Table 12 of the Annexures.

Emission breakdowns by and within scope are shown in Figure 3, Figure 4, and Figure 5.

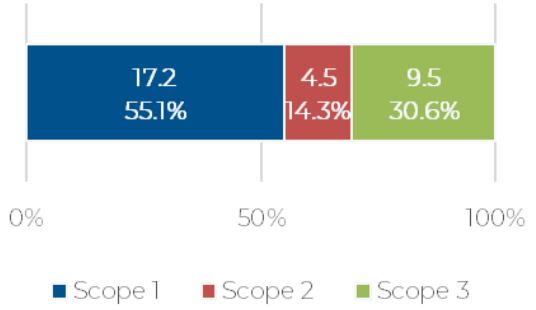


Figure 3 - Centro San Girolamo 2018 emissions by scope [$mtCO_2e$]

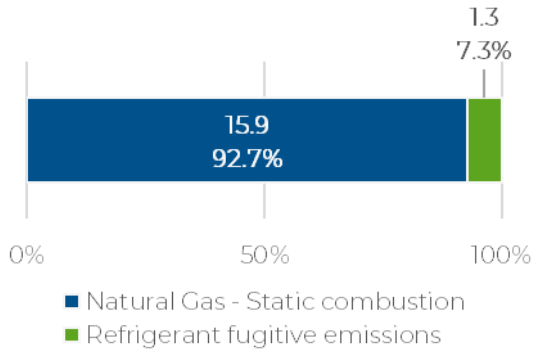


Figure 4 - 2018 Scope 1 emissions breakdown [$mtCO_2e$]

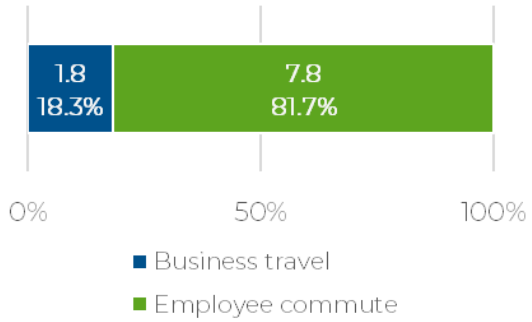


Figure 5 - 2018 Scope 3 emissions breakdown [mtCO$_2$e]

Results analysis

The GHG inventory provides important insights to guide the sustainability actions for the organization.

First, combustion of natural gas for heating is the largest single contributor to Centro San Girolamo's 2018 GHG emissions. Second, the consumption of electricity represents a meaningful, but not large, contributor to overall GHG emissions.

Finally, Scope 3 emissions are already significant in this initial "lightweight" inventory and should be further investigated to gain a more thorough picture of the total emissions from the Center's operations.

Equipped with the baseline provided by the GHG inventory, we can proceed to identify and measure the effects of possible intervention to mitigate the Centro San Girolamo's impact.

The next Section "R2 - MATERIAL AND ENERGY REDUCTION PLAN" provides a detailed description of the recommended actions and their expected effect on the reduction of GHG emissions for the organization.

R2 – MATERIAL AND ENERGY REDUCTION PLAN

Overview

Once the emissions are baselined, we proceed to develop a set of actions to reduce such emissions. In addition, the baseline will be used as a reference to monitor the achievement of reduction targets set in the "PERFORMANCE METRIC AND REPORTING" section of this report.

Background

The key stakeholders participated in a data collection session in April 2019 to account for all the materials and energy flows supporting the company's operations. Data was collected for:

- Water consumption
- Electricity consumption
- Natural gas consumption
- Waste generation
- Paper and disposable purchases

Electricity, water and gas consumption data were extracted from utility bills from January 2016 to January 2019. We measured waste and recyclables generation with direct observation, while we gathered paper and other consumables information from invoices and purchase orders.

We baselined the flows of paper and medical supplies in this section. However, the reduction actions for these materials are presented in section R3 "SUPPLY CHAIN OPTIMIZATION".

Because of constraint the amount of time available to develop this SAP, we recommend to only record the historical water consumption as a baseline, while postponing any reduction action to future initiatives.

Figure 6, Figure 7, and Figure 8 show the pattern of consumption for water, electricity, and gas over the stated period.

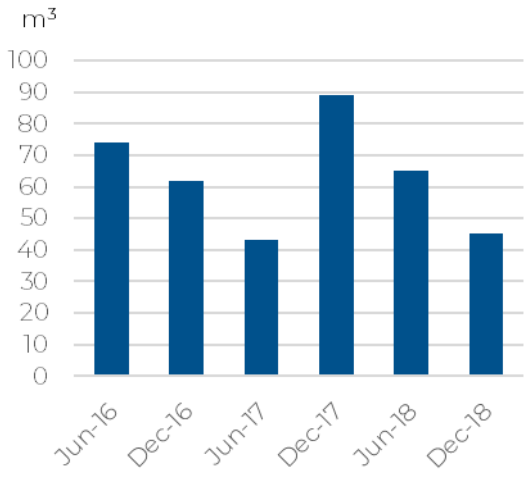


Figure 6 - Water consumption

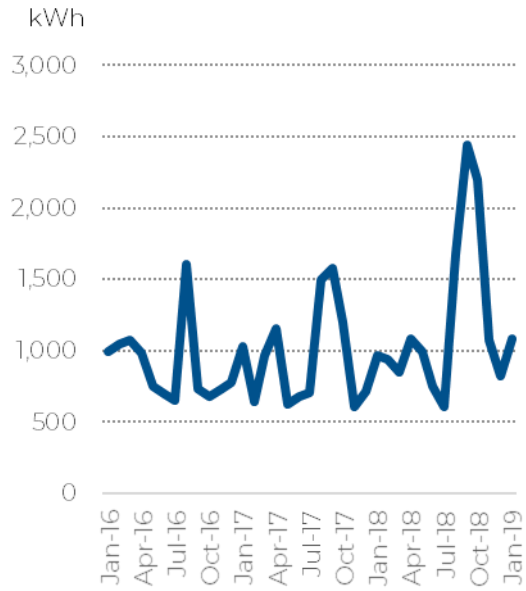


Figure 7 - Electricity consumption

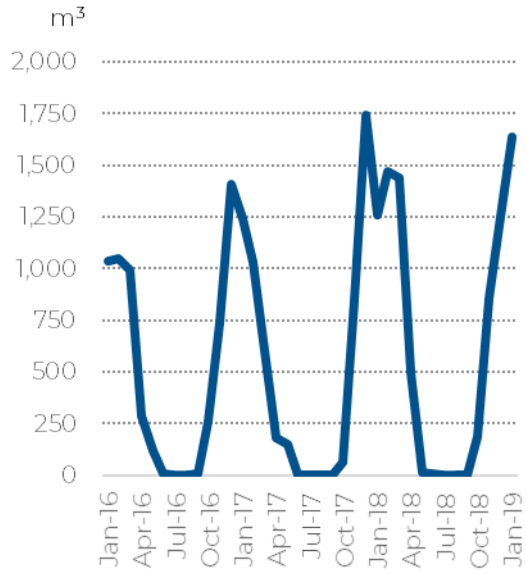


Figure 8 - Gas consumption

Electricity and gas consumption highlight a seasonal pattern: heating in the cold season is provided by a gas-burning furnace, with corresponding spike in gas consumption during the winter. The cooling plant is powered by electricity, causing the consumption surge during warmer months.

Using the data acquired, we grouped our recommendation in six areas, using the results from the greenhouse gas inventory as guideline to identify and prioritize interventions. Having created a baseline GHG inventory for the base year 2018 gives Energy Fisioterapia S.r.l. a way to track the effectiveness of the actions recommended, by quantifying changes in the amount of CO_2e emitted in the following years.

1. Building's thermal management

The first set of recommendations targets the optimization of the thermal comfort level inside the center.

We would advise to increase the set temperature during the summer months, and decrease the internal temperature during the winter months, compatibly with patients' and customers' comfort requirements. Specifically:

Recommendation 1.1 – Lower indoor heating set temperature by 1°C compared to current. Reduce set temperature by 5°C during non-business hours. Setting back thermostats by 1°C is estimated to reduce natural gas consumption anywhere between 3.7% and 13% (Manning, Swinton, Szadkowski, Gusdorf, & Ruest, 2007) (U.S. Department of Energy, 2019) (Nelson & MacArthur, 1978). For the purpose of this report we use a conservative 4%. As we could not find sources for the proportion of natural gas used for ambient versus water heating, we assume a ratio of 95% to 5%. Detailed calculations of the expected emission reduction from implementing Recommendation 1.1 are available in Table 18 in the Annexure.

Recommendation 1.2 – Set indoor temperature 2°C higher compared to current when using air conditioning. Ensure that A/C is turned off during non-business hours. As in the case of heating, we conservatively estimate a 3.5% reduction in energy consumption for cooling for each 1°C of set temperature increase, hence in the case modeled here 7% reduction for 2°C. We estimate 57% as the portion of electricity

used in commercial buildings for summer cooling (ENEA - AssoImmobiliare, 2019). Detailed calculations of the expected emission reduction from implementing Recommendation 1.1 are available in the Annexure a Table 19..

Recommendation 1.3 – Changing behavior to ensure closing doors and windows in the winter and summer seasons to avoid heated or cooled air to escape.

Recommendation 1.4 – Conduct surveys to verify that the energy saving actions are not reducing thermal comfort level of patients and personnel.

2. Electricity use reduction

The second area of intervention includes recommendations aimed at reducing electricity consumption.

Recommendation 2.1 – Review the illumination technology used across the buildings. Currently light points use a mix of LED and fluorescent bulbs. We recommend replacing all bulbs with LED technology. The census of all light points with current bulb technology, recommended action, and expected energy savings is visible at Table 16 in the Annexures. Overall this intervention should reduce electricity use by more than 1,350 kWh, savings of € 450 against a one-time cost of € 315, resulting in a payback period of eight months. Detailed calculations are available are available in the Annexure at Table 20.

Recommendation 2.2 – Develop and deploy power management policies to reduce the idle load (also known as “vampire loads”) of electronic devices. Electronic devices are usually not in use for more than half of the day, yet they draw power when the machine is off or in stand-by/sleep mode. The team should commit to ensure such devices are shut down completely during off hours. A list of all devices, with their estimated phantom load and location on the Center’s floorplan, is provided in Table 17 and Figure 14 in the Annexures. The initial estimate calculation shows a possible saving of approximately 340 kWh or € 110, respectively 2.3% and 2.4% of the annual total. One action we recommend in this area is to procure a power -measuring device to measure actual idle load and refine the estimated energy savings. At a cost of around € 20 the payback period for this intervention is less than three months (Amazon, 2019). Detailed calculations are available are available in the Annexure at Table 21.

3. Waste measurement and reduction

The third group of recommendations aims at gaining a better understanding of the waste streams, and potential action to reduce them.

Recommendation 3.1 – Characterize hazardous and non-hazardous waste streams. Baseline the amount of waste generated. Develop and propose plan for waste reduction in the case of non-hazardous waste.

Recommendation 3.2 – Reduction of hazardous medical waste offtake. The client is evaluating Crumble 50.2, a medical and bio-hazard waste treatment machine by Re3cube (Re3cube, 2019). Crumble 50.2 compacts and sterilizes infected wastes, transforming them into a non-dangerous fuel comparable to urban waste. Dr. Francesco Chiampo oversees this project and will provide input necessary to evaluate the expected reduction of impact using this device compared to the current baseline.

4. Paper and non-medical single-use

The fourth area of recommendation for this SAP concerns paper. Even though the company makes limited use of paper in its operations, it is important to minimize the impact of this non-essential product.

Recommendation 4.1 – Paper use reduction: trace all paper uses; double-sided printing whenever possible; use 100% recycled-content paper or FSC-certified paper.

5. Business travel

Increased international cooperation with Cyberdyne, and the planned opening of several new centers are expected to lead to increased business travel in the coming years.

Therefore, even though business travel generates only 1.8 $mtCO_2e$, or approximately 5% of the company's 2018 total GHG emissions, it is still worth investigating ways to mitigate its impact.

We recommend the following:

Recommendation 5.1 – Investigate if some of the air travel can be replaced when feasible within business requirements with rail travel or other mode of transportation with lower per passenger-km CO_2 emissions.

Recommendation 5.2 – When switching to lower carbon emission forms of transportation is not feasible for scheduling or travel time reasons, investigate buying offsets to mitigate CO_2 emitted because of staff business travel. For instance, the Norwegian company Chooose.today offers online options to offset CO_2 emissions for the entire organization or just for business flights (Chooose.today, 2019).

6. Employee commute

Employee commute generates one quarter of the total company 2018 emissions, at 7.8 $mtCO_2e$ and is an area of possible mitigation. We recommend the following actions:

Recommendation 6.1 – Disincentive for parking private cards and incentive low-carbon/no-carbon modes of commute (i.e.: incentive for biking, and paid parking after a set number of allotted free parking days).

Recommendation 6.2 – Organize carpool among the staff members sharing similar or same itinerary.

Recommendation 6.3 – If enacting policies to change commuting behavior and consequent reduction in CO_2 emitted is not practically feasible, investigate buying carbon offsets for the commuters. The Norwegian company www.chooose.today offers business contracts to offset CO_2 emissions (Chooose.today, 2019).

ID	Action	Expected CO_2 Reduction [mt CO_2e]	Cost	Return (p.a.)	Payback [Month]
1.1	Reduce set temperature for heating	1.55	€ 0	€ 185	Immediate
1.2	Increase set temperature for cooling	0.178	€ 0	€ 190	Immediate
1.3	Establish thermal saving behavior				
1.4	Survey to confirm thermal comfort	Nil			
2.1	Re-lamping project	0.423	€ 315	€ 450	8
2.2	Reduction of idle loads	0.111	€ 20	€ 120	2
3.1	Characterize hazardous and non-hazardous waste streams	Nil	€ 0	€ 0	N/A
3.2	Medical waste offtake reduction				
4.1	Paper use reduction	Nil			
5.1	Replace business travel mode	25% of air business travel	€ 0	€ 0	N/A
5.2	Buy offsets for business trips flight CO_2 emission	Varies, up to 1.462	€ 100-200 p.a.	N/A	N/A
6.1	Disincentivize personal ICE vehicle use, incentivize low/no-carbon modes				
6.2	Facilitate carpooling among staff				
6.3	Buy offsets for staff commute CO_2 emissions	Varies, up to 7.8	€ 100-200 p.a.	N/A	N/A

Table 3 - Summary of recommended action and expected effects

Recommendation summary

In Table 3 we summarized the expected reductions in energy or material consumption, cost, return, and payback period for the actions recommended in this section.

Additional recommendations requiring longer-term implementation and more thorough feasibility and financial analysis are described in the "FUTURE INITIATIVES" section of this report.

R3 – SUPPLY CHAIN OPTIMIZATION

Overview

The client would like to review critically its supply chain setup to identify opportunities for impact mitigation in the areas of single-use disposable items (examination gloves, paper products, etc.) and medical products (i.e.: orthopedic insoles).

It is crucial in this area to evaluate potential sustainability improvements against the functionality of the new product, as in medical practice the need to provide the appropriate treatment, using the correct materials, often eclipses sustainability considerations.

Therefore, to identify and scope opportunities to make supply chain more sustainable, we will need to rely heavily on the staff's feedback as to whether the replacement products are appropriate. This can be done by conducting interviews with key staff to identify and validate opportunities for lower-impact replacement items.

The following are areas of interest to research.

Biodegradable material for insole 3D printing

The center prescribes insoles for the treatment of its patients' locomotory issues.

Today, the insoles, made with non-biodegradable plastic, are purchased from external suppliers, manufactured in remote facilities and shipped.

Centro San Girolamo is evaluating to acquire technology that will enable it to 3D print on-site, on-demand, made-to-measure insoles using biodegradable materials.

Margherita Tomasi oversees this project. She will be interviewed to provide input necessary to evaluate the expected process and emission reduction.

We recommend conducting a Life Cycle Assessment (LCA) exercise to compare cradle-to-cradle the impact of the purchased insole versus the 3D on-site printed ones.

Consumables optimization

Several consumables and materials will be analyzed to identify opportunities to reduce their impact. Among those being considered:

- Green cleaning supplies.
- Nitrile single-use gloves. Must verify that they are biodegradable, as not all the offerings are.
- Examination bed covers made of recycled material. For example, Lucart offers table paper cover rolls made entirely of recycled TetraPak material (Gruppo San Marco, 2019).

The senior staff at the center will be interviewed to identify opportunities to reduce the impact from materials and consumables while maintaining the highest level of patient care and safety.

We recommend creating a shortlist of suppliers specialized in sourcing sustainable medical products. The company can then refer to the approved list of suppliers, to be reviewed periodically, to source the needed products.

R4 – DEVELOP ELECTRICITY SELF-GENERATION PLAN

Overview

As section "R1 – GREENHOUSE GAS INVENTORY" shows, emissions from purchased electricity, while not the largest single source of GHG, are significant at 4.5 metric tons of CO_2e per year, or 15.6% of total.

Section "R2 - MATERIAL AND ENERGY REDUCTION PLAN" offers several recommendations to reduce electricity use and consequently the emissions from its generation.

However, one of the client's requirement is to further investigate options, and recommend actions, to remove the dependency on grid electricity and to rely as much as possible on self-generation using renewable electricity sources.

The client utilizes a leased facilities for its centers. This adds a layer of complexity to the requirement, as an installation of a solar rooftop system is, for all intents and purposes, a capital improvement to the building, which normally would be financed and carried out by the owners.

Unfortunately, preliminary conversations on this topic indicate the landlord is not amenable to participate, in full or in part, to the investment in rooftop solar generation system.

We identified three options to implement the client's requirement. Although the requirement applies to both centers, for the scope of this initial SAP iteration we consider only the center located in Parma.

Option 1 – Install rooftop solar PV system

Engage a professional organization to Install a rooftop solar system complete with required power electronics, inverters and battery storage.

The installation set up must be designed and realized keeping in mind that since the rooftop is not owned by Energy Fisioterapia S.r.l., the system might be removed and installed at a different location upon the lease expiration in 2024, if the client decides to move to a different facility.

We run a simulation on the rooftop of the building, using the online tool provided by Engie Italia, which allows to precisely model the insolation and expected energy generation of the Center's rooftop using Google's Sunroof software tool (Engie, 2019).

The simulation results are encouraging: a 16.8 kW_p system without battery storage requires an upfront investment of less than € 20,000 with a payback period of three years, well within the remaining term of the lease on the property. With battery storage, the values are respectively € 30,000 and four year (Engie, 2019).

Detailed results of the simulation are visible in Table 4.

	Solar PV only	Solar PV + storage
Installed power	16,8 kWp	16,8 kWp
Number of panels	59	59
Total annual generation	21,684 kWh	21,684 kWh
Battery capacity	N/A	12.0 kWh
Estimated cost all inclusive	€ 17,955 to € 19,845	€ 27,265 to € 30,135
Total savings (25 years)	€ 125,345	€ 158,060
Payback period	4 year	5 year
Total investment return per year	€ 4,338	€ 5,642
Self-generation	€ 1,229	€ 2,976
Feed-in tariff	€ 1,831	€ 1,044
Fiscal/tax benefits	€ 945	€ 1,435
Engie rebated electricity rate Savings	€ 333	€ 187

Table 4 –Engie's rooftop PV simulator tool results

Option 2 – Legal structure for rooftop access

Investigate writing a tripartite agreement with landlord to separate the ownership of the rooftop PV system asset from the real estate asset.

Landlord offers long term access rights to the roof for installation of PV system. Tenant owns the PV system and the stream of energy generated. What happens if and when the real estate asset is sold must be clarified. One option is that the PV system could be evaluated and included in the real estate transaction as a drag-along right. Alternatively, the PV system may remain under ownership of the landlord.

Option 3 – Procure part or all renewable electricity from the open market

Over the course of the past 20 years the electricity market in Italy has evolved from a single monopolistic, state-owned provider, to a fully liberalized market, expected to be in place in 2020.

Electricity marketing companies have developed a range of offering to compete in this open market. Customers can choose among fixed or variable price options, as well as contracts that guarantee the sourcing of renewable electricity, whose provenance is guaranteed by the Gestore Servizi Energetici (GSE).

GSE promotes sustainable development by granting economic support for electricity generation from renewable energy sources and by organizing communication campaigns to raise awareness of environmentally-sustainable energy use (Bankpedia, 2019).

We recommend the client evaluate switching electricity supply from IREN Mercato S.p.a. to a new provider in the Italian open electricity market that offers 100% renewable electricity plans.

Portals offering a complete picture of the various providers operating in the country are available online.

The regulatory authority "Autorità di Regolazione per Energia Reti e Ambiente" (ARERA) publishes the "Portale delle offerte luce-gas". A search on this portal returns 34 providers offering renewable electricity plans (Figure 9).

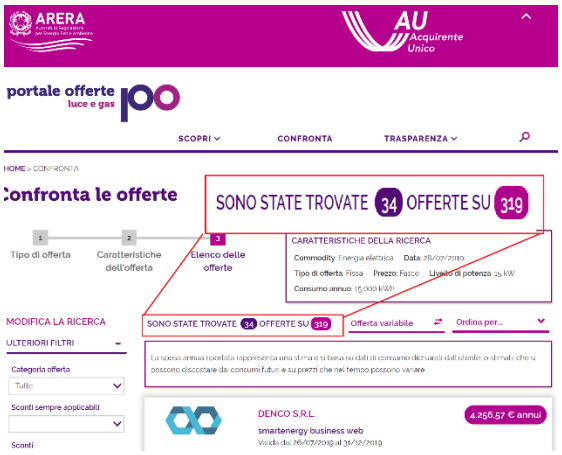


Figure 9 - Zero-carbon electricity suppliers (ARERA, 2019)

Two suppliers offering contracts with 100% renewable electricity options are PLT Puregreen (PLT Puregreen, 2019) and Dolomiti Energia (Dolomiti Energia, 2019). We recommend evaluating their offerings and investigate the cost/benefits of switching energy supply to either provider.

Recommendations

We recommend selecting either Option 1 or Option 3 for further analysis and potential implementation.

The actions required are an investigation of the feasibility of both options, leading to a detailed model for the intervention and consequent go/no-go decision for the option chosen.

In either case, as the client ultimately decarbonizes its electricity supply, there are several venues to electrify other energy loads, to remove sources of greenhouse gas production.

For instance, a portion of the winter heating could be generated with electricity rather than by on-site combustion of natural gas, which we have seen contributes more than half of the company's total 2018 GHG emissions.

In fact, given that the current lease is going to be renewed at expiration in 2024, it is worth investigating the financial feasibility of installing a geothermal heating/cooling system.

Geothermal systems transfer heat to and from the ground, where, at a depth below 15 meters the temperature is stable year around at between 10°C and 15°C (Wikipedia, 2019). Using such systems to provide energy to run heating and cooling for the building would remove the entire emissions from natural gas combustion. The only energy use is to run the pump to circulate the heat exchanger fluid, and to run the heat pump equipment. Once the electricity supply is decarbonized, even this energy would generate zero CO_2e emissions.

A draft cost/benefit estimate the installation of a geothermal system is available in the "Future Initiatives" section.

FOSTERING SUSTAINABLE BEHAVIOR

Overview

As stated throughout this report, the team at Energy Fisioterapia S.r.l. is committed to increase the sustainability of the company.

Even so, the implementation of the suggested recommendations to reduce the Center's impact will require changes in the management, staff, patients, and visitors' behavior.

It is therefore important to identify and implement a series of actions to ensure the changes required are permanently embedded in the stakeholders' habits.

Community-based social marketing

Traditionally this would have relied mostly on informational and educational campaigns. Instead, we suggest to develop a behavior change program following the framework of community-based social marketing (CBSM).

The keystone to effectively achieve behavior change with CBSM is to develop initiatives that focus on removing barriers to an activity while simultaneously enhancing the activity's benefits (McKenzie-Mohr, 2011).

CBSM involves five steps (McKenzie-Mohr, 2011):

1. Selecting which behavior to target;
2. Identifying the barriers and benefits to the selected behavior;
3. Developing a strategy that reduces barriers to the behavior to be promoted, while simultaneously increasing the behavior's perceived benefits;
4. Piloting the strategy; and
5. Broad scale implementation and ongoing evaluation once the strategy has been broadly implemented.

In the case of Energy Fisioterapia S.r.l. we describe below several actions aimed at initiating behavior change in support of the initiatives recommended over this report. Whenever the application of a CBSM approach is deemed appropriate, we described the five steps for the specific recommendation.

Articulate sustainability explicitly

Mention explicitly sustainability as an operating principle for the center, or better yet, develop a sustainability mission statement to share and promote throughout all interactions with company's stakeholders.

This will clearly highlight the organization's efforts to provide the highest level of rehabilitative care while being mindful of conserving resources and minimizing its operations' impact.

We recommend articulating the company's efforts and progress to minimize its impact through two channels: in the corporate website; and generating a annual brief

sustainability report to highlight progress and goals.

Website – The "About us" page on the newly redesigned website can serve as a starting point to articulate explicitly the company's efforts and goals in sustainability.

The page is organized around the areas of specialization and focuses on the technology assisted rehabilitation services. A few highlighted words on this page can convey to the patients and the general public how the company values sustainability as a core pillar of its operations.

Below is the current page copy with suggested edits to incorporate the message of sustainability in the company's mission.

Figure 10 – Centro San Girolamo "About us" webpage

We suggest appending the sentence below to the second paragraph:

"… e **fisioterapisti**, con continua attenzione alla **minimizzazione dell'impatto ambientale** delle proprie attività."

This last sentence should be linked to the summary sustainability report outlined in the paragraph below.

Sustainability report – We recommend the client further reinforces the mention of sustainability on the corporate website with a detailed sustainability report.

This document shall report on various initiatives' progress to internal and external stakeholders, and shall be made available on a dedicated sustainability page on the website, paired with flyers or posters to display in the company's centers.

The sustainability report shall articulate clearly the company's strategic commitment to sustainable business practices; describe the initiatives already undertaken across Energy Fisioterapia S.r.l.'s operations in previous years; highlight the results of the current GHG inventory exercise; list the impact reduction targets and the actions planned to reach these targets; and finally highlight the progress toward the targets.

A proposed sample of the company's 2018 sustainability report is visible in the Annexures.

Apply CBSM to GHG reduction recommendations

In section "R2 – MATERIAL AND ENERGY REDUCTION PLAN" we have recommended actions to reduce materials and energy flows in the company's, and therefore mitigate the greenhouse gas emission from its operations.

For each recommendation we suggest a strategy, based on the concept of CBSM, to increase the likelihood that the action will be completed, therefore realizing the expected GHG reduction benefit (Table 5).

ID	Action	Stakeholders	Barriers	Strategy to overcome barriers	Benefits
1.1	Reduce set temperature for heating	Operation staff	Forget, uncomfortable	Prompts, reminders, results of thermal comfort survey	Achieve target GHG reduction and cost savings
1.2	Increase set temperature for cooling	Operation staff	Forget, uncomfortable	Prompts, reminders, results of thermal comfort survey	Achieve target GHG reduction and cost savings
1.3	Establish thermal saving behavior	N/A	N/A	N/A	N/A
1.4	Survey to confirm thermal comfort	N/A	N/A	N/A	N/A
2.1	Re-lamping project	Operation staff, senior management	Cost	Highlight expected recurring annual savings and short PB	Achieve target GHG reduction and cost savings
2.2	Reduction of idle loads	All staff	Forget, perceived as low priority	Quantify savings, minimize effort required, prompts	Achieve target GHG reduction and cost savings
3.1	Characterize hazardous and non-hazardous waste streams	Operation staff	"Yuck!" factor, forget, not a priority	Ensure proper bagging, prepare weighing area, prompts	Baseline starting point to measure effectiveness of reduction actions
3.2	Medical waste offtake reduction	Senior management	Cost, bandwidth	Perform biowaste lifecycle cost analysis, use funds from sustainability capital reserve	Achieve GHG reduction
4.1	Paper use reduction	All staff	Forget, perceived as low priority	Prompts, communication	Achieve GHG reduction
5.1	Replace business travel mode	All staff undertaking travel	Schedule, convenience	Engage travel agent to optimize schedule, offer incentive to switch travel mode	Achieve GHG reduction
5.2	Buy offsets for business trips flight CO_2 emission	Senior management	Cost	Highlight benefit to sustainable positioning and marketing	Ability to claim net-zero emission for business flights
6.1	Disincentivize personal ICE vehicle use, incentivize low/no-carbon modes	All staff	Lack of convenience, lack of alternatives	Work with staff to find out alternatives, offer electric scooters to replace ICE vehicles	Achieve GHG reduction
6.2	Facilitate carpooling among staff	All staff	Schedule, convenience	Staff communication, incentives	Achieve GHG reduction
6.3	Buy offsets for staff commute CO_2 emissions	Senior management	Cost	Highlight benefit to sustainable positioning and marketing	Ability to claim net-zero emission for business flights

Table 5 - Community-based social marketing strategy recommendations

SUSTAINABILITY CAPITAL RESERVE

The concept of Sustainability Capital Reserve is similar to that of a sinking fund: “a fund established by an economic entity by setting aside revenue over a period of time to fund a future capital expense, or repayment of a long-term debt” (Wikipedia, 2019).

Particularly in the case of the Sustainability Capital Reserve the setting aside part comes from the savings generated by sustainability actions taken at Centro San Girolamo. The future capital expenses to be funded are further investment in sustainable measures.

A key point of a Sustainability Capital Reserve is that the funds saved from previously enacted sustainability actions should be accounted separately from general OPEX or CAPEX budget, to ensure the provenance of the funds is clear. This can increase the potential for the funds in the Sustainability Capital Reserve to be moated against use in other areas of the business.

A second enticing characteristic of the concept of Sustainability Capital Reserve is that it can start a virtuous, self-reinforcing cycle. Investing the savings generated from enacted sustainability actions in other improvements to an organization’s sustainability adds to the savings. More sustainability actions means more savings, and the cycle compounds into what can become large reserves, at which point it would be logical to think they could be spent to support, entirely or in part, larger capital projects that might otherwise never have found enough resources to be planned.

In the case of Energy Fisioterapia S.r.l. the annual savings from the recommended sustainability practices amount to approximately € 1,000 per year (Table 6).

There are opportunities for even greater savings in the future through the execution of projects requiring greater up-front capital, and with longer payback times, for instance the installation of a solar PV system rooftop or a geothermal heating system.

A portion of the initial capital required can come from the Sustainability Capital Reserve. If the savings are accumulated for say two years, the capital reserve account would hold more € 2,000, which would for instance offset approximately 10% of the initial capital cost required for the installation of a PV system.

ID	Action	Expected GHG Reduction [mt CO_2e]	Cost	Return (p.a.)	Payback [Month]
1.1	Reduce set temperature for heating	1.55	€ 0	€ 185	Immediate
1.2	Increase set temperature for cooling	0.178	€ 0	€ 190	Immediate
1.3	Establish thermal saving behavior				
1.4	Survey to confirm thermal comfort	Nil			
2.1	Re-lamping project	0.423	€ 315	€ 450	8
2.2	Reduction of idle loads	0.111	€ 20	€ 120	2
3.1	Characterize hazardous and non-hazardous waste streams	Nil	€ 0	€ 0	N/A
3.2	Medical waste offtake reduction				
4.1	Paper use reduction	Nil			
5.1	Replace business travel mode	25% of air business travel	€ 0	€ 0	N/A
5.2	Buy offsets for business trips flight CO_2 emission	1.5++	€ 100-200 p.a.	N/A	N/A
6.1	Disincentivize personal ICE vehicle use, incentivize low/no-carbon modes			€ 0	
6.2	Facilitate carpooling among staff			€ 0	
6.3	Buy offsets for staff commute CO_2 emissions		€ 100-200 p.a.	N/A	N/A

Table 6 - Summary savings to allocate to sustainability capital reserve

PERFORMANCE METRICS & REPORTING

Emission reduction indicator selection

The first requirement for this SAP is to measure the GHG emission of the organization for the reporting period of 2018., which we have done in "R1 – GREENHOUSE GAS INVENTORY"

Once the measurement and calculations are done, the GHG inventory is also a powerful tool to track changes in emissions over time caused by the sustainability actions undertaken.

There are two ways to measure change in emission: relative to an activity measure, or in absolute terms. The warming effect on the planet's atmosphere depends on the absolute amount in metric tons of CO_2 emitted. Hence considering the absolute amount of CO_2 is the correct approach to establishing an emission reduction target.

However, since the company is growing rapidly, and plans to add new facilities, it is more realistic to target a reduction in GHG emitted relative to an activity metric. In the case of Centro San Girolamo, the candidates are GHG emission per square meter of real estate in use; or GHG emission per patient visit.

Given the complexity and overhead necessary to measure the latter, we suggest using emission per square meter of real estate in use as a key metric for measuring sustainability performance improvement for Energy Fisioterapia S.r.l.

While setting relative reduction goals is realistic, senior management mandated this SAP to serve as a blueprint towards net-zero emissions for the company.

We should therefore combine both a relative reduction target, which serves as a guide for the month-to-month and year-to-year reduction, and a more ambitious absolute reduction target, which may require longer and more capital-intensive project to be achieved. Examples for the latter are the geothermal HVAC or solar PV system installation. These will contribute towards an absolute reduction of GHG emissions but may require multiple years to be implemented.

Base year

We also need to identify a "base year". A base year allows for like to like comparisons over time and for tracking progress to a given target.

Since we want a baseline which accurately reflects the level of business activity, given the fast growth the company is experiencing, the base year of Energy Fisioterapia S.r.l. for the purposes of reporting Greenhouse Gas Emissions is 2018.

In case of non-organic growth events (i.e.: acquisitions or mergers) that will significantly alter the organization's emissions profile, like to like comparisons may be impossible. In such cases, the base year and previous emissions must be recalculated. The base year recalculation threshold, i.e.: the level of non-organic change that would trigger a base year recalculation for Energy Fisioterapia S.r.l. is

set at 100% increase in available clinic square footage by non-organic transactions.

Emission reduction target

With the above considerations we suggest aiming for a yearly reduction of 10% in emission per square meter of real estate in use, combined with an absolute emission reduction of 80% over the 2018 baseline by 2025.

Progress towards these goals will be measured using the yearly refresh of the GHG inventory.

Other performance metrics and targets

Throughout this SAP we examined other aspect of sustainability besides the reduction in GHG emissions, for instance, water use, waste generation and paper use reduction.

While these factors will be progressively included in GHG inventory's Scope 3, we suggest setting target for them immediately as shown in Table 7. This will bring focus on these material flows that collectively contribute to the increase or decrease of the organization's footprint.

Metric	Goal
Water consumption	Reduce by 20% from 2018 baseline
Paper	Switch to 100% recycled content by end 2019
Bed covers	Switch to 100% recycled content by end 2019
Waste	100% capture of recyclables by end 2019
Composting	100% use of compostable single use cups for water/snack dispenser unit by end 2019

Table 7 - Metrics and targets in addition to GHG reduction

The performance against such additional targets shall be measured with appropriate tracking spreadsheets maintained by the operations support staff.

FUTURE INITIATIVES

This Sustainability Action plan should not be a one-time effort. As we have mentioned throughout this report, there are several opportunities to decrease Energy Fisioterapia S.r.l.'s impact, as the organization embarks in future growth.

The following sections summarize the suggested future initiatives and their rationale.

Extend the initial GHG inventory

Commit to complete the initial basic GHG accounting project generated in this SAP. This should include:

(a) Add to the operational control scope the full year of operations of the Rubiera center starting in 2019.

(b) Add in Scope 3 single use supply (i.e.: gloves) and identify the reduction in impact from adopting the low impact supplies identified in this SAP.

(c) Increase quality of data by directly measuring consumption of electricity for different loads.

(d) Add to the GHG inventory any new centers opened by the company in upcoming years.

The maintenance and expansion of the GHG inventory can be partially, or entirely, funded from the savings generated from the impact reduction actions recommended in this SAP.

Undertake capital project to improve Parma center's energy efficiency

the thermal performance of the building currently used in the Parma center are less than optimal, as highlighted in the GHG inventory portion of this report.

Every building in Italy is required to perform a professional review of its energy efficiency and the results are reported on a building energy use scorecard called "Attestato di Prestazione Energetica" or APE. The APE ranks buildings from the most efficient "Classe A4" to the least efficient "Classe G".

Centro San Girolamo's building in Stradello San Girolamo sadly is classified in the worst energy efficiency class, "Classe G" (Figure 15).

It is therefore important to look at how to improve the building energy performance to achieve a substantial reduction in GHG emissions.

Possible actions include increase wall and roof insulation, seal and caulk window boxes, and apply light-filtering films on windows glass panes, among others.

Since such interventions require specialized knowledge and execution capabilities, the company should engage the service of experts in this type of energy conservation intervention to identify and scope which projects to undertake.

Use SAP's recommendations to select buildings and landlords for future centers.

Energy Fisioterapia S.r.l. should use the results and recommendations of this SAP to help with the selection of new locations for opening additional centers.

Since we have identified building energy consumption as the largest driver of GHG emissions, it will be important in the future to select prospective landlords willing to increase the sustainability of their building,

for instance by undertaking the investments suggested in this report for the center in Parma (solar rooftop self-generation, insulation, use of "teleriscaldamento", etc.).

In fact, the company management should use this SAP report and its recommendation to create selection criteria for rental locations that will host new centers in the future.

Investigate geothermal for heating and cooling

Geothermal heat pump or ground-source heat pump is a central heating and/or cooling system that transfers heat to or from the ground. It uses the earth as a heat source in the winter, or a heat sink in the summer, as the temperature few meters below surface is constantly at between 10°C and 15°C (Wikipedia, 2019).

Heat pumps extract heat from the ground via heat-carrying fluid, usually refrigerant or a mixture of water and anti-freeze, that is circulated in vertical or horizontal exchangers underground, typically HDPE pipes (Wikipedia, 2019).

Dimensioning and pricing a ground-source heat pump is quite complex, as there are many variables to consider, including the type of soil under the building in consideration, the heating/cooling capacity needed, etc. However, rough order of magnitude estimates put the price for a system supporting a single-family dwelling with a surface of 120-150 m^2 at approximately €20,000-€25,000 (Serafini, 2017).

Considering that Centro San Girolamo's spent close to € 5,000 to procure natural gas in 2018, and most likely this cost is bound to increase, the payback period could be shorter than 5-7 years.

Additionally, Italy made available in 2017 tax incentives of up to 65% of the cost of geothermal systems to incentivize the adoption of renewable energy in buildings, thus further shortening the payback period.

In light of these facts we recommend conducting a feasibility study for the installation of a geothermal heat pump system, as this seems financially viable in rough terms, and would cause a drastic reduction in GHG emissions.

Investigate option to connect to "teleriscaldamento"

IREN S.p.a., the company running energy and waste management services in the Parma area, operates a waste-to-energy plant at the Polo Ambientale Integrato (IREN S.p.a., 2019).

This plant co-generates electricity and heat. The heat generated is distributed across the city for district heating, or "teleriscaldamento".

Centro San Girolamo should investigate the option to connect its heating system to the district heating network offered in Parma. Information on the technical requirements for such connection are available on IREN's website at (IREN S.p.a., 2019).

Offer electric scooters for personnel daily commute

Investigate offering electric scooter for staff to use for their daily commute in lieu of personal ICE vehicles. The company could purchase a few electric scooters and make them available to staff willing to replace their personal vehicle for daily commute.

The scooters can be recharged using the zero-CO_2 electricity generated or purchased, therefore displacing a portion of the GHG emissions otherwise generated by employees using personal ICEs to commute to and from the workplace.

ROADMAP AND ACTION PLAN

A PLAN WITHOUT EXECUTION IS JUST WISHFUL THINKING. THE ROADMAP BELOW PROVIDES AN ACTIONABLE GUIDE TO ACHIEVE THE CLIENT'S SUSTAINABLE GOALS.

		2019		2020				2021			
ID	Action	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1.1	Reduce set temperature for heating										
1.2	Increase set temperature for cooling										
1.3	Establish thermal saving behavior										
1.4	Survey to confirm thermal comfort										
2.1	Re-lamping project										
2.2	Reduction of idle loads										
3.1	Characterize hazardous and non-hazardous waste streams										
3.2	Medical waste offtake reduction										
4.1	Paper use reduction										
5.1	Replace business travel mode										
5.2	Buy offsets for business trips flight CO_2 emission										
6.1	Disincentivize personal ICE vehicle use, incentivize low/no-carbon modes										
6.2	Facilitate carpooling among staff										
6.3	Buy offsets for staff commute CO_2 emissions										
	Biodegradable material for insole 3D printing										
	Materials optimization										
	develop self-generation plan										
	Extend and complete GHG inventory										
	Capital improvement to thermal envelop - Parma										
	Use SAP recimmendations to shortlist/select future buildings										
	Investigate geothermal for heating and cooling										
	Investigate option to connect to "teleriscaldamento"										
	Offer electric scooters for personnel daily commute										

Figure 11 - Action plan for next three years

ANNEXURES

GHG ACCOUNTING DATA

Energy Fisioterapia S.r.l. - GHG Report Data Collection												
Site Name:	Centro San Girolamo		**Location:**	Stradello San Girolamo 6A - Parma, Italy		**Facility type**	Health Center	**Building Status:**	Rented	**Inventory Standard:**	Climate Registry
	Scope 1: direct GHG emissions							**Scope 2: indirect GHG emissions**		**Scope 3: other indirect GHG emissions**	
	Natural Gas					**R407C**	**R32**	**Electricity**	**Electricity**	**Business travel**	**Employee Commute**
Month	**[€/m³]**	**[€]**	**[m³]**	**Coefficient**	**[Sm³]**	**[Kg]**	**[Kg]**	**[€]**	**[kWh]**	**[mtCO₂e]**	**[mtCO₂e]**
Jan-18	0.63	795	1,262	1.037011	1,309			350.5	969		
Feb-18	0.65	956	1,471	1.037011	1,525			346.7	940		
Mar-18	0.65	936	1,440	1.037011	1,493			328.3	848		
Apr-18	0.44	218	495	1.037011	513			468.2	1,080		
May-18	0.44	4	10	1.037011	10			329.2	989		
Jun-18	15.60	62	4	1.037011	4			254.0	754		
Jul-18	15.60	47	3	1.037011	3			255.6	608		
Aug-18	10.80	22	2	1.037011	2			663.3	1,681		
Sep-18	10.80	11	1	1.037011	1			782.0	2,445		
Oct-18	0.74	138	186	1.037011	193			556.4	2,196		
Nov-18	0.74	633	855	1.037011	887			146.6	1,076		
Dec-18	0.69	867	1,256	1.037011	1,302			278.4	821		
Total		**4,688**	**6,985**		**7,244**	**7.70**	**1.15**	**4,759**	**14,407**	**1.75**	**7.80**

Table 8 - Data collection for GHG inventory

DETAILED CALCULATIONS - SCOPE 1

Id	Activity	Emission Source	Description	Unit	2018 Quantity
1	Heating	Natural gas static combustion	Used in CSG furnace	m^3	6,985

Unit conversion		
From	**To**	**Source**
1 m^3 (natural gas)	1.037011 Sm^3	Google unit converter
1 TJ =	1000 GJ	Google unit converter
1 Kg =	0.001 mt	Google unit converter
1 GJ =	277.778 kWh	Google unit converter
Gross calorific value	0.039131 GJ/Sm^3	Irena gas bill

Emission factors				
Source	**Gas**	**Value**	**Units**	**Source**
Natural gas	CO_2	56,100.00	Kg CO_2/TJ	The Climate Registry Default Emission Factors Table B.1.
Natural gas	CH_4	5.00	Kg CH_4/TJ	The Climate Registry Default Emission Factors Table B.1.
Natural gas	N_2O	0.10	Kg N_2O/TJ	The Climate Registry Default Emission Factors Table B.1.

Gas	GWP	Source
CO_2 (AR5)	1	WRI Emission Factors Table 1: Stationary Combustion - CO2 Emission Factors by Fuel
CH_4 (AR5)	28	WRI Emission Factors Table 2: Stationary Combustion - CH4 Emission Factors by Fuel
N_2O (AR5)	265	WRI Emission Factors Table 3: Stationary Combustion - N2O Emission Factors by Fuel

Gas	Activity TJ	Emission factor	Units	Emission Kg	Emissions mt	GWP	Emissions $mtCO_2e$
CO_2	0.28	56,100.00	Kg CO_2/TJ	15,901.33	15.90	1	15.90
CH_4	0.28	5.00	Kg CH_4/TJ	1.42	1.42E-03	28	0.04
N_2O	0.28	0.10	Kg N_2O/TJ	0.03	2.83E-05	265	0.01
					Total $mtCO_2e$		**15.95**

Table 9 - On-site combustion detailed calculations

Id	Activity	Emission Source	Description	Unit	2018 Quantity
2	Refrigeration plant Parma	R407C fugitive emissions	Refrigerant	kg	8

Unit conversion		
From	To	Source
1 Kg =	0.001 mt	Google unit converter
Operating emission factor	10%	The Climate Registry Table 16.2. Default Emission Factors for Refrigeration/Air Conditioning Equipment

Gas	GWP	Source
R407C (AR5)	1,624	The Climate Registry Default Emission Factors Table B.2. Global Warming Potentials of Refrigerant Blends

Refrigerant	Fugitive gas [kg]	GWP	Emissions [Kg]	Emissions $mtCO_2e$
R407C (AR5)	0.77	1,624	1,250	1.25
			Total $mtCO_2e$	1.25

Table 10 - Fugitive refrigerant detailed calculations

DETAILED CALCULATIONS - SCOPE 2

Gas serra	2005	2010	2015	2016	2017
			[g CO_2eq/kWh]		
Anidride carbonica - CO_2	464.7	388.4	314.3	313.1	308.1
Metano - CH_4	0.463	0.495	0.651	0.671	0.656
Protossido di azoto - N_2O	1.396	1.464	1.617	1.612	1.503
GHG	**466.53**	**390.33**	**316.57**	**315.38**	**310.30**

Table 11 - Estimated emission factors for electricity consumption (ISPRA, 2018)

Id	Activity	Unit	2017 Quantity
Scope 2	Purchased electricity	kWh	14,407

Unit conversion			
From	To		Source
1 Kg =	0.001	mt	Google unit converter

Emission factors			
Gas	Value	Units	Source
CO_2	0.31	Kg CO_2/kWh	ISPRA. (2018).
CH_4	2.34E-05	Kg CH_4/kWh	ISPRA. (2018).
N_2O	5.67E-06	Kg N_2O/kWh	ISPRA. (2018).

Gas	GWP	Source
CO_2 (AR5)	1	Table B.1. (The Climate Registry, 2017)
CH_4 (AR5)	28	Table B.1. (The Climate Registry, 2017)
N_2O (AR5)	265	Table B.1. (The Climate Registry, 2017)

Gas	Activity kWh	Emission factor	Units	Emission Kg	Emissions mt	GWP	Emissions $mtCO_2e$
CO_2	14,407	0.31	Kg CO_2/kWh	4,439	4.44	1	4.44
CH_4	14,407	2.34E-05	Kg CH_4/kWh	0.34	0.0003	28	0.01
N_2O	14,407	5.67E-06	Kg N_2O/kWh	0.08	0.0001	265	0.02
					Total $mtCO_2e$		4.47

Table 12 - Purchased electricity detailed calculations

DETAILED CALCULATIONS - SCOPE 3

						Distance			Emissions				
Name	Date	From	To	Mode	ICE vehicle make and model	One-way [km]	Total [km]	Source	CO_2 [g/km]	CH_4 [g/km]	N_2O [g/km]	Emission factor source	Total CO_2e [mt]
Chiampo	10-Jan-18	Parma, IT	Bergamo, IT	Car	Citroen C3 1.3 CNG (Euro 5)	146	292	[1]	181.04	0.0616	0.00128	[2]	0.053
Notari	10-Jan-18	Parma, IT	Bergamo, IT	Car	Citroen C3 1.3 CNG (Euro 5)								
Chiampo	10-Jan-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Notari	10-Jan-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Chiampo	10-Jan-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Notari	10-Jan-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Chiampo	13-Jul-18	Parma, IT	Bergamo, IT	Car	Citroen C3 1.3 CNG (Euro 5)	146	292	[1]	181.04	0.0616	0.00128	[2]	0.053
Notari	13-Jul-18	Parma, IT	Bergamo, IT	Car	Citroen C3 1.3 CNG (Euro 5)								
Chiampo	13-Jul-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Notari	13-Jul-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Chiampo	13-Jul-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Notari	13-Jul-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Chiampo	20-Sep-18	Parma, IT	Bergamo, IT	Car	Fiat Punto 1.4 gasoline (Euro 5)	146	292	[1]	176.95	0.0177	0.00116	[2]	0.052
Notari	20-Sep-18	Parma, IT	Bergamo, IT	Car	Fiat Punto 1.4 gasoline (Euro 5)								
Masera	20-Sep-18	Parma, IT	Bergamo, IT	Car	Fiat Punto 1.4 gasoline (Euro 5)								
Ganapini	20-Sep-18	Parma, IT	Bergamo, IT	Car	Fiat Punto 1.4 gasoline (Euro 5)								
Chiampo	20-Sep-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Notari	20-Sep-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Masera	20-Sep-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Ganapini	20-Sep-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Chiampo	20-Sep-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Notari	20-Sep-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Masera	20-Sep-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Ganapini	20-Sep-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Masera	10-Oct-18	Parma, IT	Bergamo, IT	Car	Fiat Punto 1.4 gasoline (Euro 5)	146	292	[1]	176.95	0.0177	0.00116	[2]	0.052
Ganapini	10-Oct-18	Parma, IT	Bergamo, IT	Car	Fiat Punto 1.4 gasoline (Euro 5)								
Masera	10-Oct-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Ganapini	10-Oct-18	Bergamo, IT	Colonia, DE	Plane		610	1220	[3]				[4]	0.146
Masera	10-Oct-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Ganapini	10-Oct-18	Colonia, DE	Bochum, DE	Train								[5]	0.008
Masera	20-Oct-18	Bochum, DE	Bochum, DE	City bus								[6]	0.000
Ganapini	20-Oct-18	Bochum, DE	Bochum, DE	City bus									0.000
												Grand total	1.751

Scope 3 – Category 6: business travel

Sources:

[1] Google Maps directions from Parma to Bergamo Orio al Serio airport
[2] http://www.sinanet.isprambiente.it/it/sia-ispra/fetransp
[3] Webflyer online calculator for flight distance Bergamo to Cologne, Germany
[4] https://www.icao.int/environmental-protection/carbonoffset/pages/default.aspx
[5] http://www.ecopassenger.org/bin/query.exe/en?ld=uic-eco&L=vs_uic&OK#focus
[6] https://ghgprotocol.org/calculation-tools#cross_sector_tools_id

One Way/Round Trip	Cabin Class	Number of Passengers
Round Trip	Economy	1

Leg	From City/Airport	To City/Airport
1	BGY	CGN
Delete All Location(s)	Delete Leg	Add New Leg

Reset | Compute

Metric (KG / KM) | **Standard** (LBS / MI)

Total

Dep Airport	Arr Airport	Number of passengers	Cabin Class	Trip	Aircraft Fuel Burn/journey (KG)[ab]	Total passengers' CO2/journey (KG)[c]
BGY	CGN	1	Economy	Round Trip	7488.6	146.2

Flight Stage Detail

Dep Airport	Arr Airport	Distance (KM)	Aircraft	Aircraft Fuel Burn/leg (KG)[a]	Passenger CO_2/pax/leg (KG)
BGY	CGN	605.0	73H	3744.3	73.1
CGN	BGY	605.0	73H	3744.3	73.1

a. Fuel Burn information provided are for 1 aircraft per leg

b. Aircraft Fuel Burn/journey = ∑Aircraft Fuel Burn/leg

c. Total passengers' CO2/journey = ∑Passenger CO2/pax/leg×Number of pax

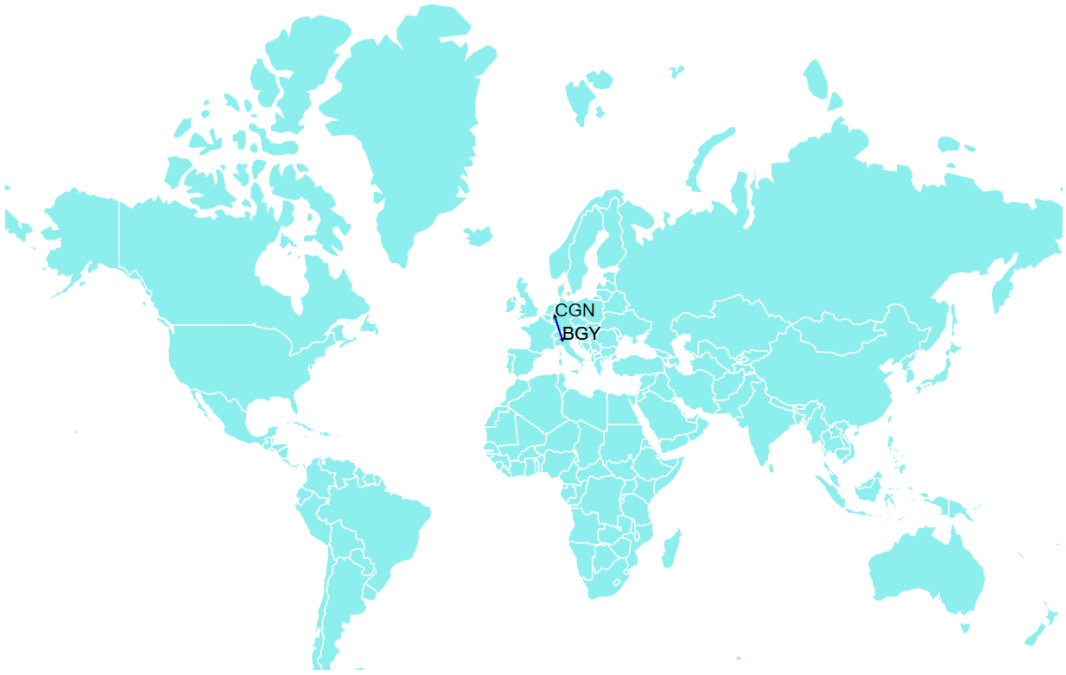


Figure 12 - Air travel carbon emission calculation BGY to CGN

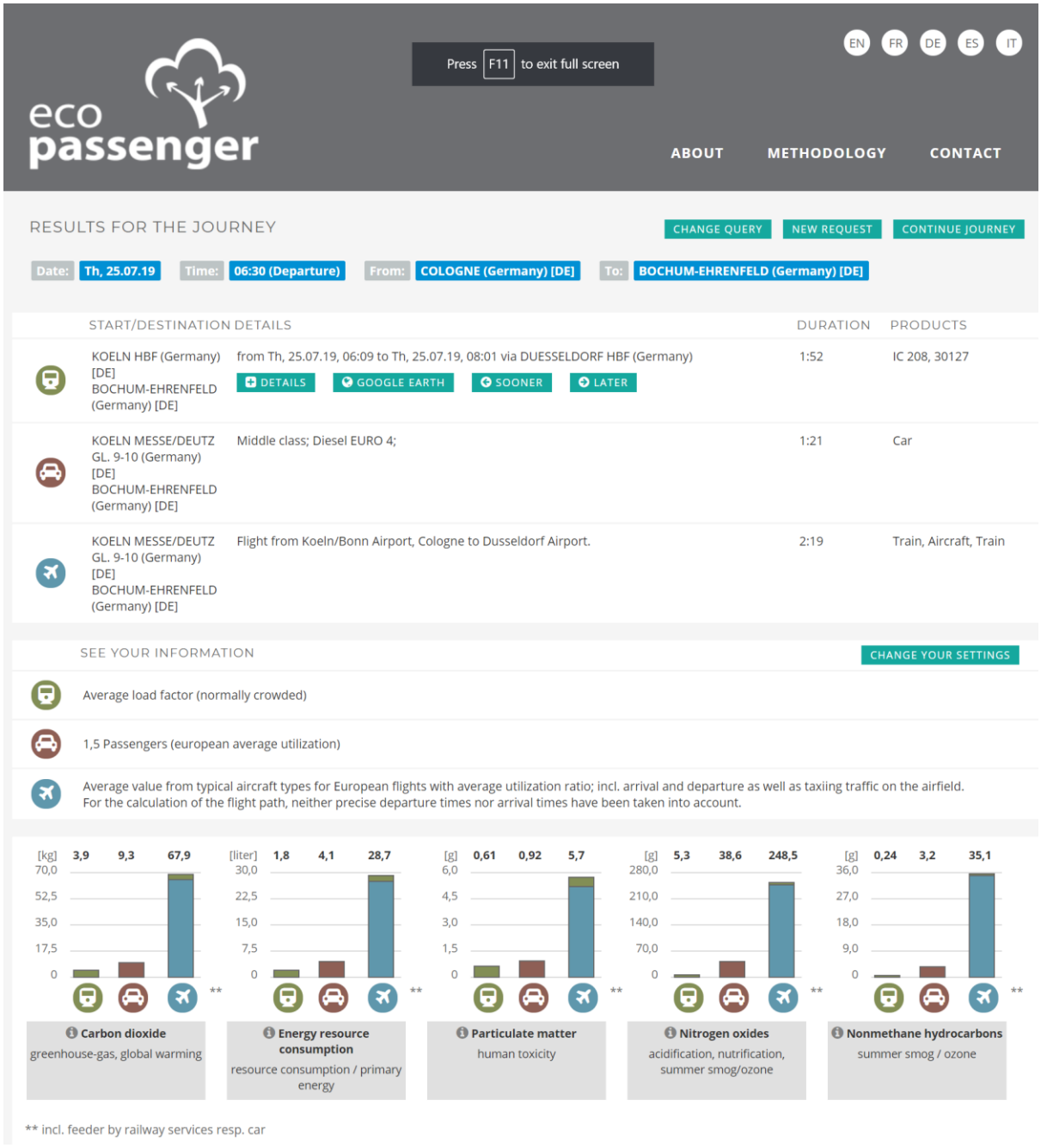


Figure 13 - Ecopassenger emission calculator for Cologne to Bochum train travel

id	Employee	Bus			Car			Moped/motorbike		
		Times/ wk	Return distance [km]	Total distance [km/yr]	Times/ wk	Return distance [km]	Km/yr	Times/ wk	Return distance [km]	Km/yr
1	Francesco Chiampo							6	2	600
2	Francesca Arrigoni				2	8	800	1	8	400
3	Giulia Latino				3	10	1,500			
4	Taira Lussu	5	4.4	1,100						
5	Ilaria Masera				6	22	6,050			
6	Mariam Parmiggiani				5	48	10,800			
7	Lodovica Rampinelli				5	7	1,750			
8	Mahi Tavabrghavami									
9	Margherita Tomasi				5	10	2,500			
10	Simone Fronzuti				3	18	2,700			
11	Filippo Rinaldi							2	44	4,400
12	Filippo Rinaldi				2	44	4,400			

Table 13 - Scope 3 employee commute summary

GREENHOUSE GAS PROTOCOL

Total GHG	7.799

The default emission factors are sourced from the US EPA Climate Leaders program or from the UK DEFRA (for air travel only).

Activity Data

Source Description	Mode of Transport	Type of Activity Data	Activity Data					GHG Emissions
			Vehicle Type (For air transport, see footnote)	Distance Travelled	# of Passenger	Units of Measurement	N_2O [kg]	Total GHG Emissions, exclude Biofuel CO_2 [mt CO_2e]
Francesco Chiampo commute - moped	Road	Vehicle Distance (e.g. Road Transport)	Motorbike - Control Unknown	600		km		0.076
Francesca Arrigoni commute - car diesel	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Diesel - Year 1983-present	800		km		0.224
Francesca Arrigoni commute - moped	Road	Vehicle Distance (e.g. Road Transport)	Motorbike - Control Unknown	400		km		0.050
Taira Lussu - bus	Road	Passenger Distance (e.g. Public Transport)	Bus - Local Bus	1100	1	Passenger km	3.418E-04	0.073
Ilaria Masera - commute car	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	6050		km		1.437
Mariam Parmiggiani - commute car	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	10800		km		2.565
Ilaria Masera - commute car	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	1750		km		0.416
Margherita Tomasi - commute car	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	2500		km		0.594
Simone Fronzuti - commute car	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	2700		km		0.641
Filippo Rinaldi - commute car	Road	Vehicle Distance (e.g. Road Transport)	Passenger Car - Gasoline - Year 2005-present	4400		km		1.045
Filippo Rinaldi - commute motorbike	Road	Vehicle Distance (e.g. Road Transport)	Motorbike - Control Unknown	5400		km		0.680

Table 14 - Scope 3 GHG calculation (Greenhouse Gas Protocol, 2019)

30RA		017	021	026	033
Net cooling capacity*	kW	17.70	21.60	25.80	31.70
Operating weight					
without hydronic module	kg	200	220	250	285
with hydronic module	kg	220	240	280	315
Refrigerant charge R-407C	**kg**	**4.80**	**5.13**	**6.41**	**7.70**
Compressor		One scroll compressor			
Evaporator		One plate heat exchanger			
Net water volume	l	1.50	1.88	2.16	2.82
Water connections (MPT gas)	inches	1	1	1-1/4	1-1/4
Maximum water pressure (unit without hydronic module)	kPa	1000	1000	1000	1000
Hydronic module		Pump, mesh filter, expansion tank, flow switch, pressure gauges, automatic air purge valve and drain plug, flow control valve and safety valve.			
Pump		One single-speed pump			
Available pressure**	kPa	138	126	150	138
Water inlet connection (MPT gas)	inches	1-1/4	1-1/4	1-1/4	1-1/4
Water outlet connection (MPT gas)	inches	1	1	1-1/4	1-1/4
Closed expansion tank water volume	l	8	8	8	8
Water fill system (option)					
Inlet/outlet diameter (MPT gas)	inches	1/2	1/2	1/2	1/2
Condenser		One, copper tubes and aluminium fins			
Tube diameter	inches	3/8	3/8	3/8	3/8
No. of rows		2	3	2	3
Tubes/row		52	52	60	60
Fin spacing	mm	1.81	1.81	1.81	1.81
Fan		Two,axial type with two speeds			
Diameter	mm	500	500	610	610
No. of blades		5	5	5	5
Air flow (high speed)	l/s	2450	2222	3278	3000
Fan speed (high speed)	r/s	12.83	12.91	11.05	10.96

* The ratings indicated refer to an evaporator entering/leaving temperature of 12/7 °C,and air entering the condenser at 35 °C.
** At nominal water flow rate.

Table 15 - Air conditioning unit technical specs (Carrier, 2019)

Id	Location	Light point	Bulb type	Bulb qty.	Bulb [W]	Tot. [W]	Avg. usage hour/day	Yearly use [hr]	Yearly use [kWh]	Yearly energy cost	Action	Repl.	Repl. Watt [1]	Repl. bulb unit cost [2] [3]	Repl. Bulb tot. cost	Repl. energy use yrly [kWh]	Repl. energy cost	Yearly energy savings [kWh]	Yearly energy savings	Bulb lifespan savings	Payback period (yr)
1	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
2	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
3	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
4	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
5	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
6	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
7	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
8	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
9	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
10	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
11	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
12	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
13	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
14	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
15	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
16	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
17	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
18	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
19	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
20	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
21	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
22	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
23	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
24	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
25	Parma	Ceiling recessed	LED	2	12	24	5	1560	37.44	€ 12.51	N/A										
26	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
27	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
28	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
29	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
30	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
31	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
32	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
33	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
34	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
35	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
36	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
37	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
38	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
39	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
40	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
41	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
42	Parma	Sconce	CFL	2	35	70	5	1560	109.2	€ 36.48	Re-lamp	LED	28	€ 6.47	€ 12.94	43.68	€ 14.59	65.52	€ 21.89	€ 6.47	0.57
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
43	Parma	Sconce	LED	1	20	20	5	1560	31.2	€ 10.42	N/A	LED									
44	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
45	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
46	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
47	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
48	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
49	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
50	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
51	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
52	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
53	Parma	High bay	Fluor. tube	1	26	26	5	1560	40.56	€ 13.55	Re-lamp	LED	10	€ 9.36	€ 9.36	15.6	€ 5.21	24.96	€ 8.34	€ 4.68	1.06
															€ 313.58			1363.44	€ 455.47	€ 156.79	
																		Payback period in Months:		**8.0**	

Table 16 - Light point census, recommended actions, and expected savings

Sources:

- [1] Lumen per watt data from https://ledpro.it/tabella-comparazione-led/
- [2] Replacement led price from price from https://www.lampadadiretta.it/osram-dulux-d-led-5w-830-luce-calda-2-pin-sostituto-13w
- [3] Replacement fluorescent tube with LED tube price https://www.lampadadiretta.it/lampadine-led/tubi-led-neon-a-led?tube_length=43974

ELECTRONIC DEVICES AND IDLE LOADS

id	Loc.	Description	Model No.	Power rating [W]	Source	Est. idle consump. [%]	Est. idle consump. [W]	Source	Use [hr/d]	Est. idle consump. [kWh/yr]	Est. idle power cost [€/yr]	Note
1	A	Technogym stepper	Step Excite 700	100	OEM tech specs	2%	2	Consultant est.	4	14.6	4.86	
2	B	Technogym static bike	700 VISIOWEB Exercise Bike	50	OEM tech specs	2%	1	Consultant est.	4	7.3	2.43	
3	C	Technogym upper body	Excite 700 VISIOWEB Cardio Upper Body	100	OEM tech specs	2%	2	Consultant est.	4	14.6	4.86	
4	D	Technogym recumbent bike	700 VISIOWEB Recumbent Recline Bike	50	OEM tech specs	2%	1	Consultant est.	4	7.3	2.43	
5	E	Desktop PC		200	Consultant est.	2%	4	Consultant est.	4	29.1	9.73	
6	F	Technogym Unity Standalone console		50	OEM tech specs	2%	1	Consultant est.	4	7.3	2.43	
7	G	Technogym treadmill	700 Visioweb	500	Consultant est.	1%	5	Consultant est.	4	36.4	12.16	
8	H	Technogym treadmill	700 Visioweb	500	Consultant est.	1%	5	Consultant est.	4	36.4	12.16	
9	I	Technogym elliptical	Excite 700 VISIOWEB elliptical	100	OEM tech specs	2%	2	Consultant est.	4	14.6	4.86	
10	L	Linak actuator and control box	Linak 311589-00	50	OEM tech specs	2%	1	Consultant est.	1	8.4	2.80	
11	M	Linak actuator and control box	Linak 311589-00	50	OEM tech specs	2%	1	Consultant est.	1	8.4	2.80	
12	N	Linak actuator and control box	Linak 311589-00	50	OEM tech specs	2%	1	Consultant est.	1	8.4	2.80	
13	O	Vending and coffee machine	Necta Minisnakky + Brio Up	1200	OEM tech specs	0.2%	2.4	Consultant est.	1	20.1	6.71	Refrigerator consumption included in electricity bill
14	P	Sound system		100	Consultant est.	1%	1	Consultant est.	1	8.4	2.80	
15	Q	Portable ultrasound machine		100	Consultant est.	0%	0	Consultant est.	1	0.0	0.00	Device switch cuts off power completely
16	R	LG Flat screen 32 in					1.5	Consultant est.	0	13.1	4.38	
17	S	Plasma TV screen - waiting room					2.5	Consultant est.	0	21.8	7.30	
18	T	Printer/scanner	Brother DCP9020 CDW		[1]		1.4	[1]	1	11.7	3.92	
19	U	iMac 2009 model					1.94	[2]	1	16.2	5.43	
20	V	Spinometry PC and control unit					4	Consultant est.	1	33.5	11.19	
21	W	Spinometry treadmill		500	Consultant est.	1%	5	Consultant est.	2	40.0	13.38	
										357.46	**119.41**	

Table 17 - IT devices census, recommended actions, and expected savings

Sources:

[1] https://support.brother.com/g/b/spec.aspx?c=eu_ot&lang=en&prod=dcp9020cdw_eu

[2] http://images.apple.com/environment/reports/docs/iMac_21_5_inch_Environmental_Report_2009.pdf

L' edificio è usufruibile interamente da una persona disabile, si sviluppa solamente a piano terra senza dislivelli e i suoi tre accessi sono totalmente in piano o con dislivello inferiore o uguale a 2,5 cm con porte a doppio battente con luce netta di passaggio maggiore di 80 cm.
La presente Scia è stata inoltrata per realizzare un nuovo bagno e rispettivo antibagno destinato ai clienti della struttura posto nella zona ingresso - ambulatori in totale rispetto delle prescrizioni della legge 13/1989.
Tutti i disimpegni, corridoi e spazi di manovra sono in piano , comodi e facilmente fruibili anche da soggetto in carrozzina.

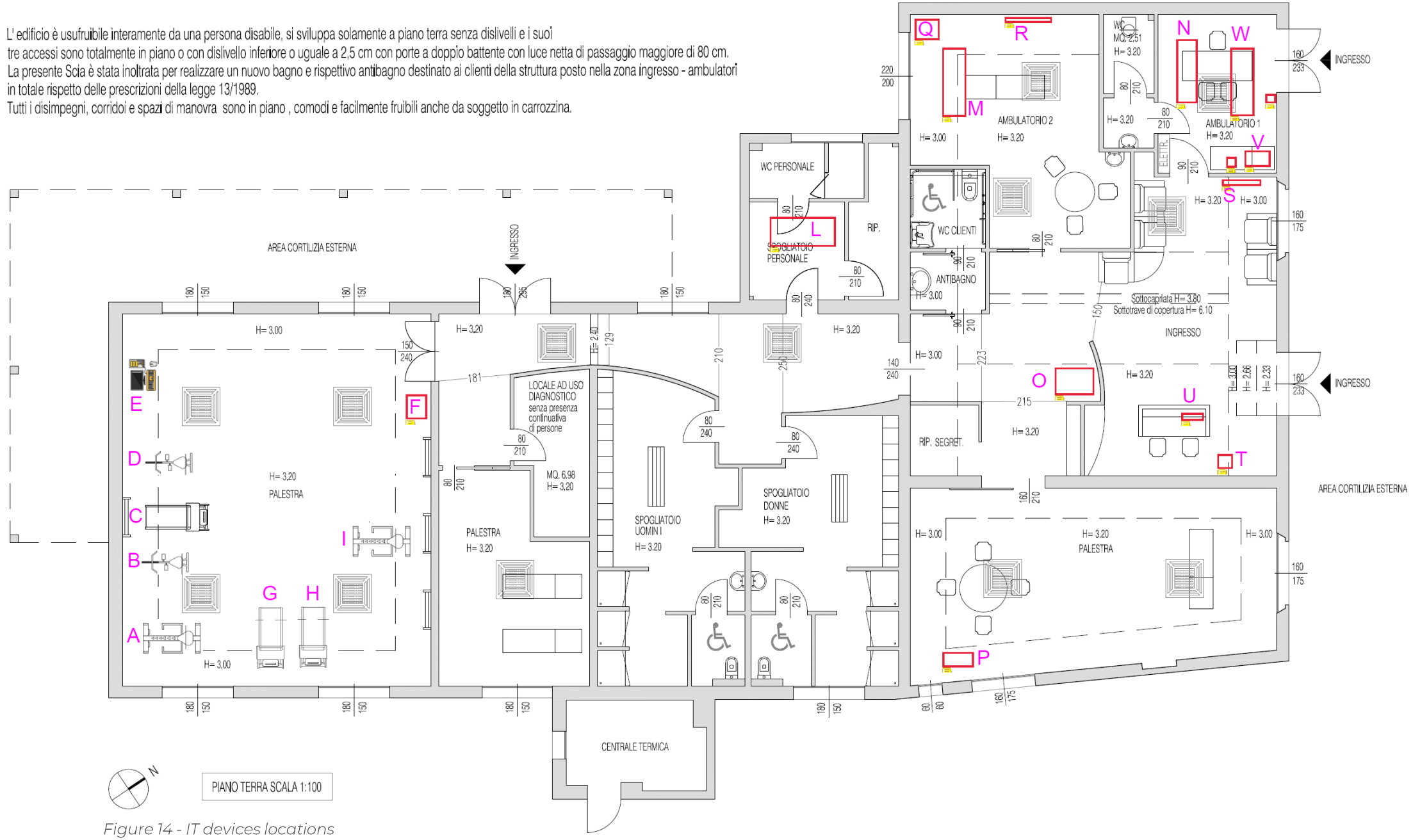


Figure 14 - IT devices locations

EMISSION REDUCTION ESTIMATES

Id	Activity	Unit	2018 Quantity
Scope 1	Natural gas - heating	Sm^3	7,244
	% gas used for heating		95%
	Savings from thermostat setback		4%
	Naturral gas savings	Sm^3	275

Unit conversion			
From	To		Source
1 TJ =	1000	GJ	Google unit converter
1 Kg =	0.001	mt	Google unit converter
1 GJ =	0	kWh	Google unit converter
Gross calorific value	0.1	GJ/Sm^3	Irena gas bill

Emission factors			
Gas	Value	Units	Source
CO_2	56,100	Kg CO_2/TJ	The Climate Registry Default Emission Factors Table B.1.
CH_4	5.0	Kg CH_4/TJ	The Climate Registry Default Emission Factors Table B.1.
N_2O	0.10	Kg N_2O/TJ	The Climate Registry Default Emission Factors Table B.1.

Gas	GWP	Source
CO_2 (AR5)	1	WRI Emission Factors Table 1: Stationary Combustion - CO2 Emission Factors by Fuel
CH_4 (AR5)	28	WRI Emission Factors Table 2: Stationary Combustion - CH4 Emission Factors by Fuel
N_2O (AR5)	265	WRI Emission Factors Table 3: Stationary Combustion - N2O Emission Factors by Fuel

Gas	Activity [TJ]	Emission factor	Units	Emission Kg	Emissions mt	GWP	Emissions $mtCO_2e$
CO_2	0.03	56,100	Kg CO_2/Tj	1,544	1.54	1	1.54
CH_4	0.03	5.00	Kg CO_2/Tj	1.38E-01	1.38E-04	28	0.0039
N_2O	0.03	0.10	Kg CO_2/Tj	2.75E-03	2.75E-06	265	0.0007
					Total $mtCO_2e$		**1.55**

Table 18 - Emission reduction from heating temperature setback

Id	Activity	Unit	2018 Quantity
Scope 2	Total electricity consumption	kWh	14,407
	Percentage electricity used for cooling		57%
	Savings from thermostat setback		7%
	Consumption reduction due to higher AC set temp	kWh	575

Unit conversion			
From	To		Source
1 Kg =	0.001	mt	Google unit converter

Emission factors			
Gas	Value	Units	Source
CO_2	0.30810	Kg CO_2/kWh	ISPRA. (2018).
CH_4	2.34E-05	Kg CH_4/kWh	ISPRA. (2018).
N_2O	5.67E-06	Kg N_2O/kWh	ISPRA. (2018).

Gas	GWP	Source
CO_2 (AR5)	1	Table B.1. (The Climate Registry, 2017)
CH_4 (AR5)	28	Table B.1. (The Climate Registry, 2017)
N_2O (AR5)	265	Table B.1. (The Climate Registry, 2017)

Gas	Activity kWh	Emission factor	Units	Emission Kg	Emissions mt	GWP	Emissions $mtCO_2e$
CO_2	575	0.31	Kg CO_2/kWh	177	0.18	1	0.1771
CH_4	575	2.34E-05	Kg CH_4/kWh	0	0.00001	28	0.0004
N_2O	575	5.67E-06	Kg N_2O/kWh	0	0.00000	265	0.0009
					Total $mtCO_2e$		**0.178**

Table 19 - Emission reduction from cooling set temperature increase

Id	Activity	Unit	2018 Quantity
Scope 2	Consumption reduction due to relamping	kWh	1,363

Unit conversion				
From		To		Source
1	Kg =	0.001	mt	Google unit converter

Emission factors			
Gas	Value	Units	Source
CO_2	0.30810	Kg CO_2/kWh	ISPRA. (2018).
CH_4	2.34E-05	Kg CH_4/kWh	ISPRA. (2018).
N_2O	5.67E-06	Kg N_2O/kWh	ISPRA. (2018).

Gas	GWP	Source
CO_2 (AR5)	1	Table B.1. (The Climate Registry, 2017)
CH_4 (AR5)	28	Table B.1. (The Climate Registry, 2017)
N_2O (AR5)	265	Table B.1. (The Climate Registry, 2017)

Gas	Activity kWh	Emission factor	Units	Emission Kg	Emissions mt	GWP	Emissions $mtCO_2e$
CO_2	1,363	0.31	Kg CO_2/kWh	420	0.42	1	0.4201
CH_4	1,363	2.34E-05	Kg CH_4/kWh	0	0.00003	28	0.0009
N_2O	1,363	5.67E-06	Kg N_2O/kWh	0	0.00001	265	0.0020
					Total $mtCO_2e$		0.423

Table 20 - Emission reduction from re-lamping

Id	Activity	Unit	2018 Quantity
Scope 2	Consumption reduction due to idle load elimination	kWh	337

Unit conversion				
From		To		Source
1	Kg =	0.001	mt	Google unit converter

Emission factors			
Gas	Value	Units	Source
CO_2	0.30810	Kg CO_2/kWh	ISPRA. (2018).
CH_4	2.34E-05	Kg CH_4/kWh	ISPRA. (2018).
N_2O	5.67E-06	Kg N_2O/kWh	ISPRA. (2018).

Gas	GWP	Source
CO_2 (AR5)	1	Table B.1. (The Climate Registry, 2017)
CH_4 (AR5)	28	Table B.1. (The Climate Registry, 2017)
N_2O (AR5)	265	Table B.1. (The Climate Registry, 2017)

Gas	Activity kWh	Emission factor	Units	Emission Kg	Emissions mt	GWP	Emissions $mtCO_2e$
CO_2	337	0.31	Kg CO_2/kWh	104	0.10	1	0.1039
CH_4	337	2.34E-05	Kg CH_4/kWh	0	0.00001	28	0.0002
N_2O	337	5.67E-06	Kg N_2O/kWh	0	0.00000	265	0.0005
					Total $mtCO_2e$		0.105

Table 21 - Emission reduction from idle load elimination

ATTESTATO DI PRESTAZIONE ENERGETICA

Regione Emilia-Romagna

SISTEMA DI CERTIFICAZIONE ENERGETICA

RILASCIATO IL 12/03/2014
VALIDO FINO AL 12/03/2024

N°00484-035617-2014

ATTESTATO DI PRESTAZIONE ENERGETICA

DATI DELL'IMMOBILE

- **Comune:** G337 PARMA (PR)
- **Indirizzo:** STRADELLO SAN GIROLAMO N.6/A
- **Piano-Interno:** Terra-/
- **Foglio-Particella-Sub:** (33-489-2)
- **Proprietario:** -vedi foglio 3-
- **Destinazione d'uso:** E6 - Edifici adibiti a palestre e assimilabili

DATI GENERALI

- **Zona Climatica:** E
- **Gradi Giorno:** 2502,00
- **Volume lordo riscaldato:** 1521,00 m³
- **Superficie utile riscaldata:** 320,75 m²
- **Superficie disperdente:** 1127,81 m²
- **Rapporto S/V:** 0,74

CLASSE ENERGETICA

G

A $EP_{tot}<8$
B $8 \le EP_{tot}<16$
C $16 \le EP_{tot}<30$
D $30 \le EP_{tot}<44$
E $44 \le EP_{tot}<60$
F $60 \le EP_{tot}<80$
$EP_{tot} \ge 80$

EP_{tot} = 121,33 kWh/m³/anno

INDICI DI PRESTAZIONE ENERGETICA

INDICE	VALORE (kWh/m³/anno)		LIMITE (kWh/m³/anno)	
TOTALE (EP_{inv} + EP_{est} + EP_{acs} + EP_{il})	EP_{tot}	121,33	$EP_{tot-lim}$	27,17
CLIMATIZZAZIONE INVERNALE	EP_{inv}	110,76	$EP_{inv-lim}$	21,93
PRODUZIONE ACQUA CALDA SANITARIA	EP_{acs}	10,57	$EP_{acs-lim}$	5,24
CLIMATIZZAZIONE ESTIVA (non calcolata)	EP_{est}	0,00	$EP_{est-lim}$	0,00
ILLUMINAZIONE (non calcolata)	EP_{il}	0,00	EP_{il-lim}	0,00

EVENTUALI INTERVENTI MIGLIORATIVI DEL SISTEMA EDIFICIO/IMPIANTI

TIPO INTERVENTI	STIMA RITORNO INVESTIMENTO (ANNI)	ENERGIA PRIMARIA RISPARMIATA (kWh/m²/anno)	EMISSIONI CO2 RISPARMIATE (Kg/anno)
Coibentazione copertura	10	-	-

SOGGETTO CERTIFICATORE

00484 DOTT.ING. BENASSI DAVIDE

Timbro e Firma(1)

TECNICI PREPOSTI

00484 DOTT.ING. DAVIDE BENASSI

Timbro e Firma(2)

(1) Con la sottoscrizione del presente Attestato, il Soggetto Certificatore assume le responsabilità di legge per quanto concerne:
- conformità del presente Attestato alle disposizioni vigenti in materia di certificazione energetica degli edifici
- asseverazione dei dati di propria competenza riportati nel presente attestato
- dichiarazione della esistenza delle condizioni di indipendenza e imparzialità di giudizio

(2) Con la sottoscrizione del presente Attestato, i Tecnici preposti alla determinazione della prestazione energetica assumono le responsabilità di legge in relazione:
- all'asseverazione dei dati di propria competenza riportati nel presente attestato
- alla dichiarazione della esistenza delle condizioni di indipendenza e imparzialità di giudizio

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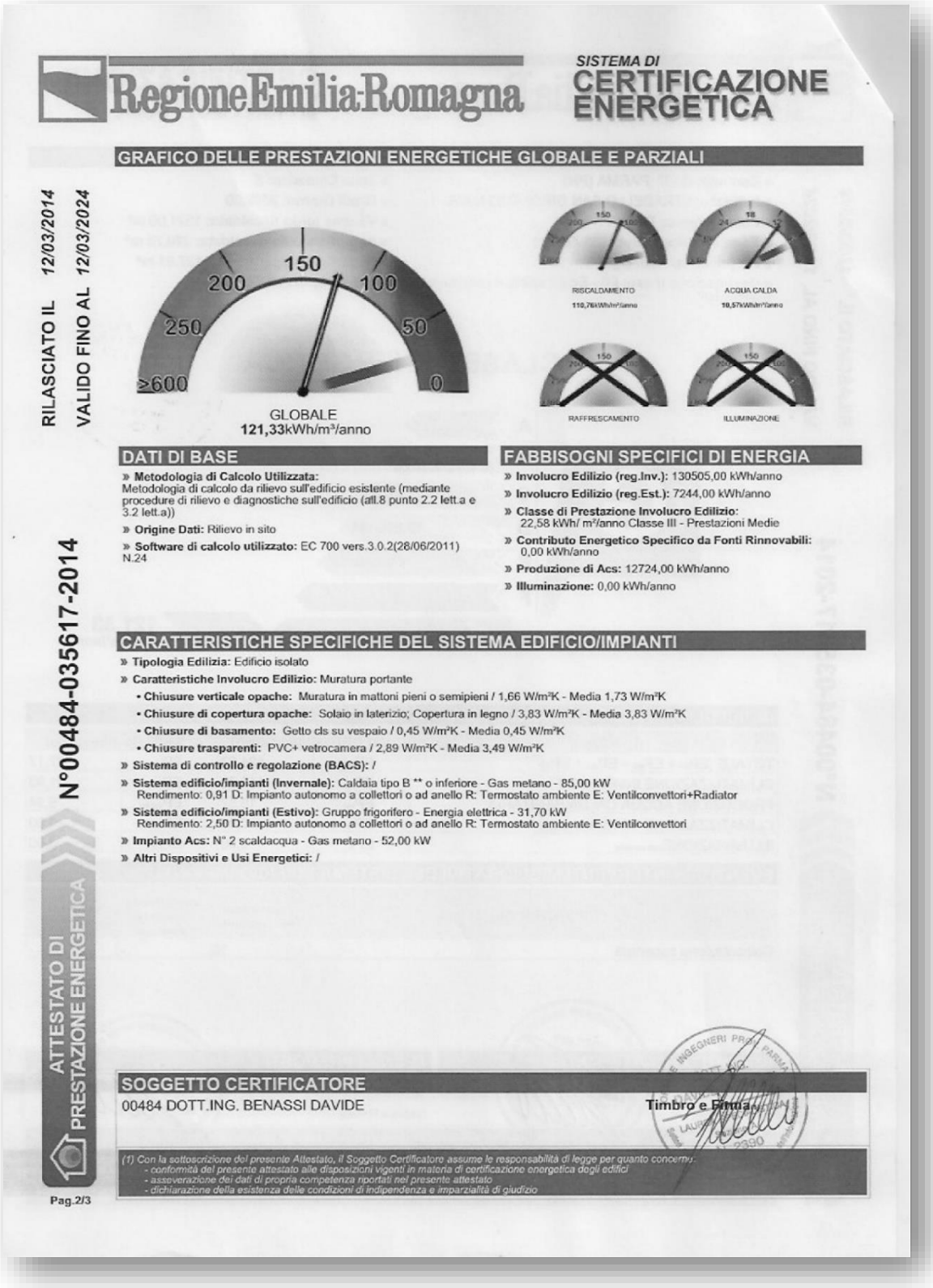


Regione Emilia-Romagna

SISTEMA DI CERTIFICAZIONE ENERGETICA

RILASCIATO IL 12/03/2014
VALIDO FINO AL 12/03/2024

N°00484-035617-2014

ATTESTATO DI PRESTAZIONE ENERGETICA

GRAFICO DELLE PRESTAZIONI ENERGETICHE GLOBALE E PARZIALI

GLOBALE
121,33kWh/m²/anno

RISCALDAMENTO
110,76kWh/m²/anno

ACQUA CALDA
10,57kWh/m²/anno

RAFFRESCAMENTO

ILLUMINAZIONE

DATI DI BASE

» **Metodologia di Calcolo Utilizzata:**
Metodologia di calcolo da rilievo sull'edificio esistente (mediante procedure di rilievo e diagnostiche sull'edificio (all.8 punto 2.2 lett.a e 3.2 lett.a))

» **Origine Dati:** Rilievo in sito

» **Software di calcolo utilizzato:** EC 700 vers.3.0.2(28/06/2011) N.24

FABBISOGNI SPECIFICI DI ENERGIA

» **Involucro Edilizio (reg.Inv.):** 130505,00 kWh/anno

» **Involucro Edilizio (reg.Est.):** 7244,00 kWh/anno

» **Classe di Prestazione Involucro Edilizio:**
22,58 kWh/ m²/anno Classe III - Prestazioni Medie

» **Contributo Energetico Specifico da Fonti Rinnovabili:**
0,00 kWh/anno

» **Produzione di Acs:** 12724,00 kWh/anno

» **Illuminazione:** 0,00 kWh/anno

CARATTERISTICHE SPECIFICHE DEL SISTEMA EDIFICIO/IMPIANTI

» **Tipologia Edilizia:** Edificio isolato

» **Caratteristiche Involucro Edilizio:** Muratura portante

- **Chiusure verticale opache:** Muratura in mattoni pieni o semipieni / 1,66 W/m²K - Media 1,73 W/m²K
- **Chiusure di copertura opache:** Solaio in laterizio; Copertura in legno / 3,83 W/m²K - Media 3,83 W/m²K
- **Chiusure di basamento:** Getto cls su vespaio / 0,45 W/m²K - Media 0,45 W/m²K
- **Chiusure trasparenti:** PVC+ vetrocamera / 2,89 W/m²K - Media 3,49 W/m²K

» **Sistema di controllo e regolazione (BACS):** /

» **Sistema edificio/impianti (Invernale):** Caldaia tipo B ** o inferiore - Gas metano - 85,00 kW
Rendimento: 0,91 D: Impianto autonomo a collettori o ad anello R: Termostato ambiente E: Ventilconvettori+Radiator

» **Sistema edificio/impianti (Estivo):** Gruppo frigorifero - Energia elettrica - 31,70 kW
Rendimento: 2,50 D: Impianto autonomo a collettori o ad anello R: Termostato ambiente E: Ventilconvettori

» **Impianto Acs:** N° 2 scaldacqua - Gas metano - 52,00 kW

» **Altri Dispositivi e Usi Energetici:** /

SOGGETTO CERTIFICATORE

00484 DOTT.ING. BENASSI DAVIDE

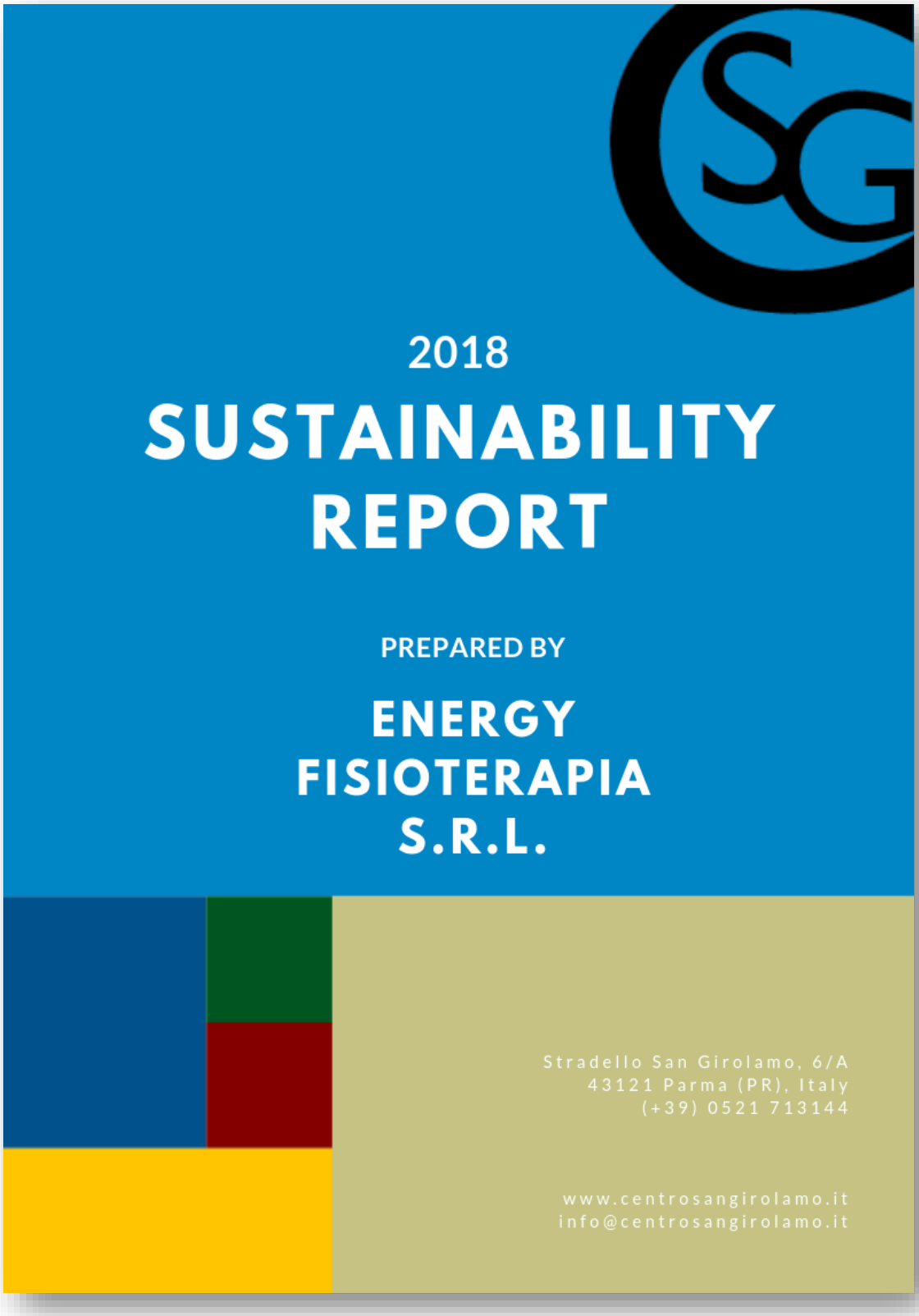
Timbro e Firma:

(1) Con la sottoscrizione del presente Attestato, il Soggetto Certificatore assume le responsabilità di legge per quanto concerne:
- conformità del presente attestato alle disposizioni vigenti in materia di certificazione energetica degli edifici
- asseverazione dei dati di propria competenza riportati nel presente attestato
- dichiarazione della esistenza delle condizioni di indipendenza e imparzialità di giudizio

Pag.2/3

Figure 15 - CSG's "Attestato prestazione energetica" (APE)

CORPORATE SUSTAINABILITY REPORT 2018



From the desk of the Managing Director

Dear colleagues, patients, staff and collaborators:

Sustainability has been front and center in the ethos of Energy Fisioterapia S.r.l. from the startup of our first center in Parma. However, until now we have not made sustainability an explicit part of our strategic development plan.

I am pleased to announce that beginning this year we are committing to measure our sustainability, and to take actions to reduce the impact of our operations year over year.

This report summarizes the initiative we have taken so far and details several actions we are going to take in the coming years towards our goal of reducing our overall emissions by 80% by 2025 over the 2018 baseline, while continuing to provide the highest level of care to our patients.

I am confident that with cooperation of all of you we will succeed in achieving this ambitious goal.

Sincerely yours,

Francesco Chiampo

SUSTAINABILITY AT CENTRO SAN GIROLAMO

In the past three years we have completed several activities to limit our use of resources we require to offer our services, including:

- Segregated waste streams and maximized our recycling, in compliance with the requirement for medical waste disposal.
- Reduced the use of paper in the center to the minimum required by Ministry of Health rules.
- Raised summer thermostat set temperature to reduce electricity consumption on air conditioning, and therefore emissions.
- Lowered thermostat set temperature in the winter during off hours to reduce emissions from burning natural gas for heating.
- Switched two-thirds of the light points to LED technology, a much more efficient source than incandescent bulbs or neon/CFL tubes.

Even though these initiatives set us on the right path, we needed to do more to support our aspiration to bring the net impact of the operations close to zero and to be recognized as a leader in sustainable practices by industry participants, employees and associates, and by the broader patient population.

To achieve this, we have reviewed holistically all aspects of Centro San Girolamo's operations, identified areas where impact can be reduced, and developed a plan to minimize our impact.

Increasing our sustainability makes also sound business sense - we can achieve the same, or better, results using fewer resources and therefore reducing our costs.

The areas of action, with related key metrics and objectives, are detailed in the next section.

We started from quantitatively assessing where the center stands as far as sustainability.

Today's baseline is the starting point from which to establish reduction goals in the medium- and long-term, and to measure the effect of the proposed actions.

Using the baseline calculation, we identified specific actions to reduce greenhouse gas emissions, grouped in three main areas of intervention:

- Material and energy reduction plan
- Supply chain optimization
- Development of electricity self-generation plan

INITIATIVES

For Impact Reduction

Develop Greenhouse Gas Inventory

Material and Energy Reduction Plan

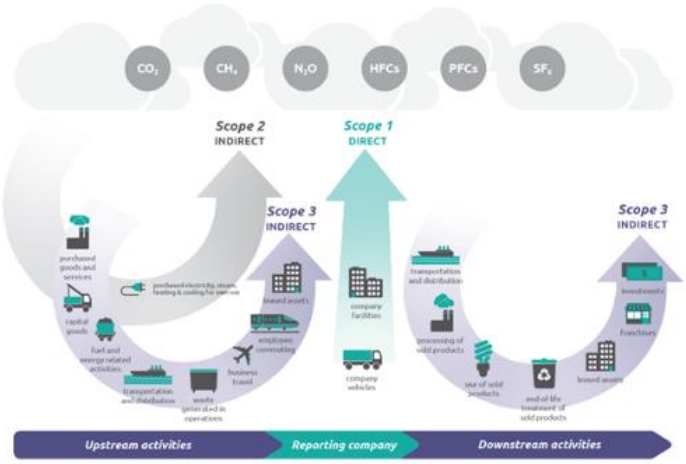
Supply Chain Optimization

Develop Electricity Self-Generation Plan

GHG INVENTORY

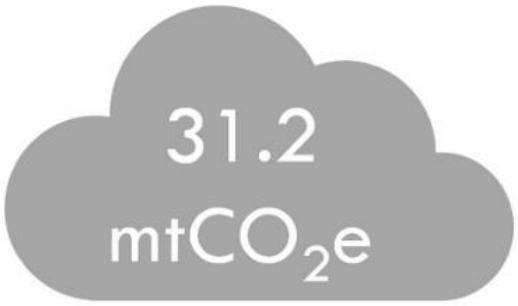
The most accurate way to measure the baseline of the Center's material and energy flows, in a way that makes comparison across time and operational areas meaningful, is through the completion of a greenhouse gas (GHG) inventory exercise. The process used follows the guidelines detailed in the General Reporting Protocol (GRP) Version 2.1 published by the World Resource Institute.

Energy Fisioterapia S.r.l.'s operational boundaries for this inventory include all direct (Scope 1) and indirect (Scope 2) emissions of six out of the seven internationally recognized GHGs (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride). In this first iteration of GHG inventory, we consider only employee commute and business travel.



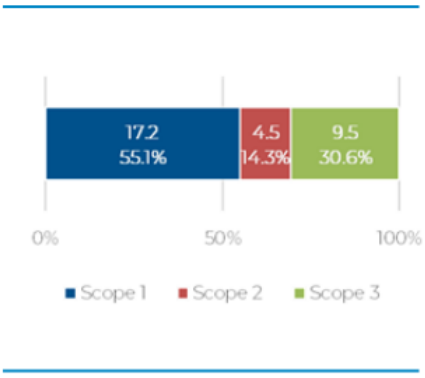
The GHG inventory exercise reported 31 metric tons of CO2e emitted in 2018. Heating and cooling of the buildings contribute close to two-thirds of total emissions.

Total Emissions 2018

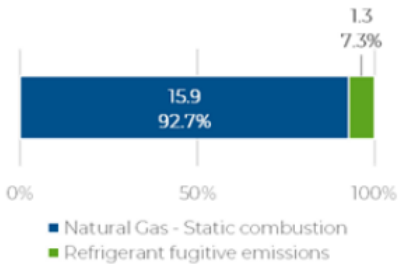


2018 EMISSION BY SCOPE

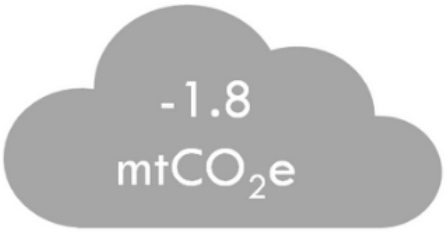
The GHG inventory provides important insights to guide the sustainability actions for the organization.
Combustion of natural gas for heating is the largest single contributor to our 2018 GHG emissions. Electricity consumption represents a meaningful, but not large, contributor to overall GHG emissions. Finally, Scope 3 emissions are already significant in this initial inventory and should be further investigated to gain a more thorough picture of the total emissions from the Center's operations.



EMISSION BREAKDOWN SCOPE 2 & 3



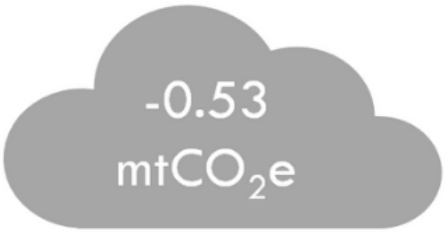
REDUCTION PLAN



Scope 1 Recommendations

- Set back heating temperature by 1°C during working hours, 5°C during off hours
- Increase set temperature by 2°C for summer air conditioning
- Implement behavior changes to prevent energy losses (close doors, windows, etc.)

Potential reduction: 1.8 mtCO2e



Scope 2 Recommendations

- Replace all light bulbs with LEDs
- Eliminate idle loads by disconnecting completely all electric devices

Potential reduction: 0.53 mtCO2e

Scope 3 Recommendations

- Reduce emissions from business travel by replacing air travel whenever feasible
- Lend electric scooters as alternative to the use of personal ICEs for staff commute
- If not practical, buy offset to reduce emissions from business travel and commute

Potential reduction: 1.5+ mtCO2e

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