



SUSTAINABILITY PLAN

Building a sustainable culture
in the ICN2



2024-2026

FRAMEWORK

Sustainability is a core value of ICN2. As a research centre we have the duty to minimize the impact of all our activities, scientific and beyond. Therefore, we have created the first version of a sustainability plan, a strategic proposal considering different issues that are relevant to both ICN2 centre and community, aiming to minimize its environmental impact. This document aims to be rather a commitment for meeting targets, while at the same time we have developed an annual sustainability action plan.

Sustainability can be defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs (Mrcap, 1988). To align ICN2's sustainable plan with most of the Sustainable Development Goals (SDGs), we need to embed this value, not only in our research achievements (Annex III), but in all activities of the centre, that is, developing a holistic sustainability action plan that considers different areas of action where different key stakeholders also take part.

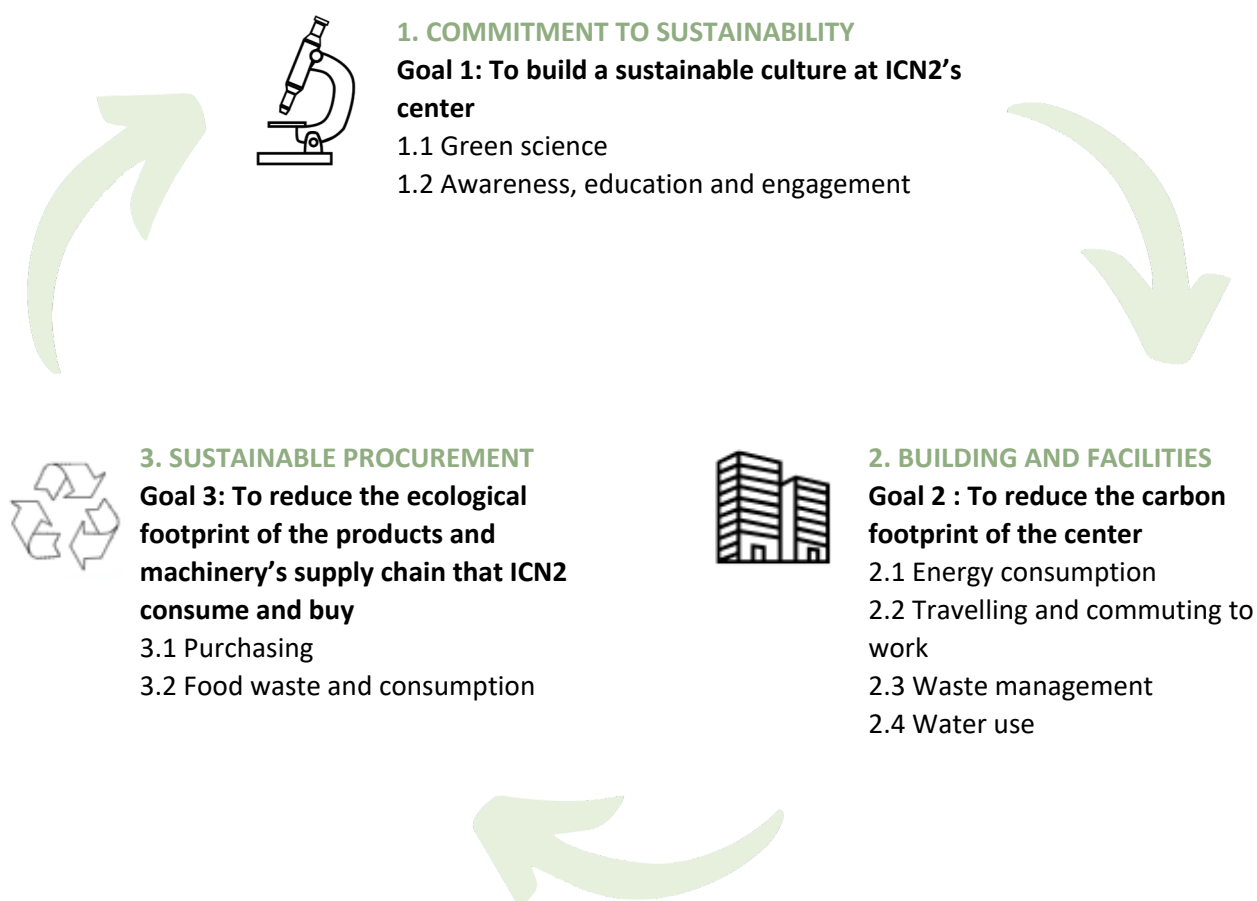
ICN2 started its commitment to sustainability in September 2019, when taking part in the statement in support of a global call to action to confront climate change, launched by the Climate Change Strike movement, together with other members of the Barcelona Institute for Science and Technology (BIST). As part of the BIST sustainability working group, ICN2 has co-created a sustainability Handbook to guide and help BIST community members to reduce their environmental impacts. In addition, ICN2 is also part of a Sustainable Research Network (SuRe), a group of Catalan research centres who meet periodically to support each other with the collective aim of achieving sustainability in research and of creating a sustainability culture at the centres through periodically hybrid seminars.

In addition, we are leading a national network of sustainable nanotechnology called Spanish Network on Safe and Sustainable Nanotechnologies, (SustainableNano) together with leading Spanish research centres working on nanoscale research and development. The aim is to advance towards generating safe, sustainable, and societally beneficial N&N, involving sustainability criteria along the whole process. Such aim is aligned with the following sustainability plan.

Moreover, we are part of the International Network for Sustainable Nanotechnology (also known as "International Network4Sustainable Nanotechnology"), a consortium of leading organizations in the field of nanotechnology, representing institutes, universities, non-profit and governmental agencies. The purpose and focus of N4SNano is to promote discovery and advancements in nanotechnology and applications as key mechanisms for sustainability – to bring positive and impactful solutions to society in line with the United Nations Sustainable Development Goals (UNSDG).



The Plan is built around three axes: commitment to sustainability, building and facilities, and sustainable procurement. Each one of the three axes has distinctive goals and consists of 8 areas of activity, while each area includes its specific objectives and metrics. They will be evaluated, and updated, if necessary, by June 2025 and they are planned to be achieved by the end of the two years period of this plan, June 2026.



Scheme:





1. COMMITMENT TO SUSTAINABILITY

Goal 1: To build a sustainable culture at ICN2's center

Commitment to sustainability requires embodying strong sustainable values and ethics at the corporate culture, in order to incorporate it throughout all centre activities. Being involved as a centre, with national and international sustainable initiatives such as taking part of BIST, SuRe and SustainableNano, will help us achieve our sustainability goals as well as provide us with platforms where to seek opportunities for funding and collaboration.

It is also important that members from different departments and groups from ICN2 engage in sustainability issues to collectively move forward towards it in all aspects of the centre, whether through daily sustainable practices in the offices or while doing research. That's why we will create an awareness, education, and engagement action plan.

Moreover, we aim to certify all of our wetlabs (14 of the 19 research groups laboratories) through an and internationally recognized certification (Annex I), to directly tackle with the daily unsustainable scientific practices and help us to start building a sustainability culture in the laboratories . With this commitment, we will, at the same time, achieve some of the objectives related to the reduction of water use, waste generation, energy consumption, travelling and purchasing responsibly.

1.1 Green science

1

To implement sustainable behaviour and practices during research.

100%

of research groups
certified that have
wetlabs

1.2 Awareness, education, and engagement

2

To engage ICN2's community in sustainability issues

5

effective
communication
campaigns related
to sustainability
issues



2. BUILDING AND FACILITIES

Goal 2: To reduce the carbon footprint of the centre

We aim to establish concrete actions to reduce water use and waste production, to improve the management of waste, and the energy efficiency. We also advance in decarbonizing our energy sources, and incentivize the ICN2 community to use sustainable transportation during work trips and commuting to work, in order to decrease our carbon footprint.

2.1 Energy consumption

3

To improve the facilities energy efficiency

7%

reduction of
KgCO₂/m² related to
energy usage

2.2 Traveling and commuting

4

To reduce the carbon footprint related to transport used by the ICN2 community

5%

reduction of ICN2's
transport TCO₂'s
emissions

2.3 Waste management

5

To reduce the amount of hazardous and non-hazardous waste produced in laboratories

4%

reduction of ICN2's Tn
of hazardous waste
generation

2.4 Water use

6

To reduce the quantity of water consumption of the centre

3%

reduction of ICN2's
m³ of consumed
water



3. SUSTAINABLE PROCUREMENT

Goal 3: To reduce the ecological footprint of the products and machinery supply chain that ICN2 consumes and buys

The Ecological Footprint[®] tracks the use of productive surface areas. Typically, these areas are: cropland, grazing land, fishing grounds, built-up land, forest area, and carbon demand on land. If a population's Ecological Footprint[®] exceeds the region's biocapacity, that region runs a biocapacity deficit. Taking this concept into account serves as a core base to tackle two relevant environmental issues, which come along with the supply chain of the products, food and machinery that we buy and consume at ICN2: purchasing, and food waste and consumption, a sector which contributes as well to CO₂ emissions. So, we aim to promote sustainability during catering events and enhance green purchase.

3.1 Purchasing

7

To enhance green purchase

10%

of suppliers
analyzed on their
sustainable product
programs

3.2 Food waste and consumption

8

Promote sustainability during catering events

50%

of catering services
that include
sustainable options
in their products
and services



ANNEX I

GREEN LAB CERTIFICATION

Laboratories are resource intensive spaces, they use 10x more energy than office spaces, 4x more water than office spaces and they produce 5 billion kg of plastic waste each year in the USA (My Green Lab, n.d.). They use large amounts of energy and produce a lot more of hazardous and non-hazardous waste than other spaces, among other aspects. Therefore, as a research centre, we aim to reduce the environmental impact of research practices.

Scientific innovation and environmental responsibility go hand in hand, so as part of the SO3 project (from the ERA2 Nanofabrication and Nanomaterials WG) and aligned with our current strategic plan, we will undergo a (certification) process to review and improve wet laboratory processes and practices from an environmental sustainability point of view. We will be assessed by the globally recognized standard for laboratory sustainability: My Green Lab certification. This program will help to reduce our carbon footprint tackling all the aspects of research in our centre (Image 1). The programme's kick off takes place on the 28th of May 2024 and it will last one year, see the timeline below (Image 2.)

Topics covered

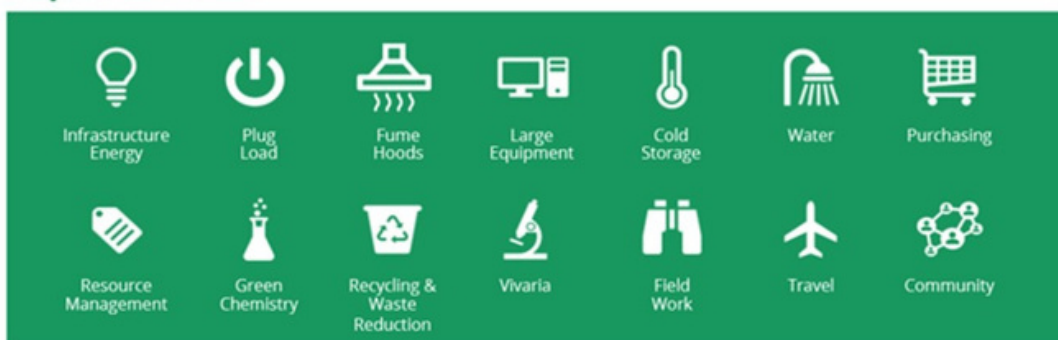


Image 1: Topics covered for My Green Lab certification programme, Source: My Green Lab, n.d.

Certification Process

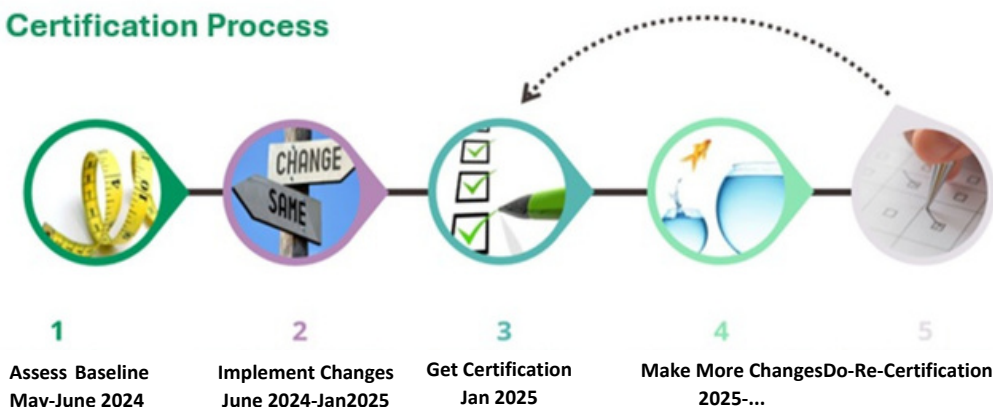


Image 2: Time line of My Green Lab certification programme at ICN2, Source: My Green Lab, n.d.

ANNEX II

ICN2'S CARBON FOOTPRINT

The carbon footprint is a tool which serves as an indicator of the environmental impact of a centre in terms of greenhouse gases (GHG). Moreover, it aims to reduce the costs of lighting, climatization, heating, water use, waste production and transport, as well as strengthening the environmental consciousness of the centre's community, enhancing ICN2's reputation, compliance with regulations and showing transparency.

We have calculated the carbon footprint using the ScopeCO2 tool (scopeco2.org, n.d.). **The study has shown that ICN2 emitted 1.442,13 Tn of CO2 in 2022 (6,77/employee) and 1.843,33 Tn of CO2 in 2023 (7,95/employee).** This indicator will help us to not only set numerical targets to our Sustainability Plan, but also be transparent with the actions we are going to undertake so we avoid greenwashing. Reducing the carbon footprint will serve us as well to save money, energy, natural gas, and water use. In the future, it will help us comply with regulations, besides opening doors to certain funds for R&D.

As shown in the graphics (Image 3, Image 4), the most important aspects in terms of carbon footprint at the institute are: **first electricity consumption and professional traveling by plane, and second natural fuels and journeys in itinerant**, in descending order.

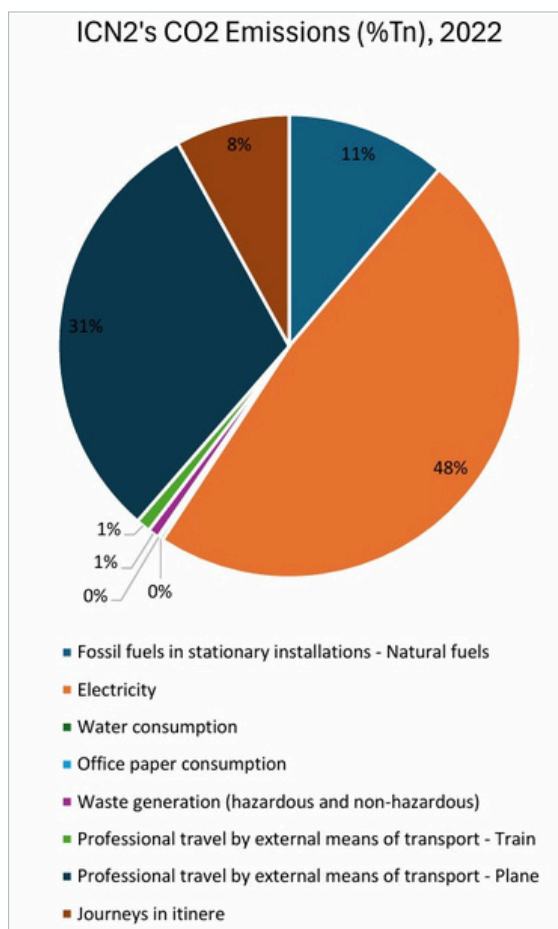


Image 3: Distribution (%) of Tco2 AT icn2, 2022.
Source: H&S - ICN2

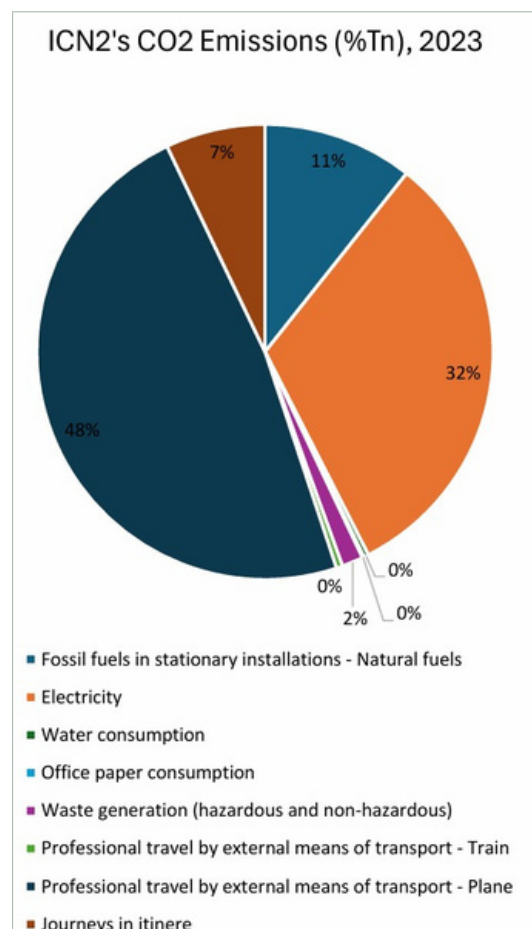


Image 4: Distribution (%) of Tco2 AT icn2, 2023.
Source: H&S - ICN2

• Energy consumption

The latest report published by the United Nation's Intergovernmental Panel on Climate Change (IPCC) in 2023, clearly sets out that human activities are the primary cause of global warming since the start of the industrial era. The report also states that the past and present global greenhouse gas emissions come from unsustainable energy use and consumption among others sources. Therefore, in April 2023, ICN2 proceed with the auditing of facilities, throughout which the environmental impact of the building's energy consumption was calculated in terms of Tn of CO₂ stating that on 2023 ICN2 consumed 2.500.000 kWh/year of Electricity and 887.600 kWh/year of Natural Gas. The air-conditioning system carries the greatest weight (Image 5). Since the air-conditioning installation is correct, improvements should be made in the installation of aerothermal energy and photovoltaic panels, in this way the building will considerably reduce air-conditioning costs (Audit ICN2, April 2023) for the first version of this plan.

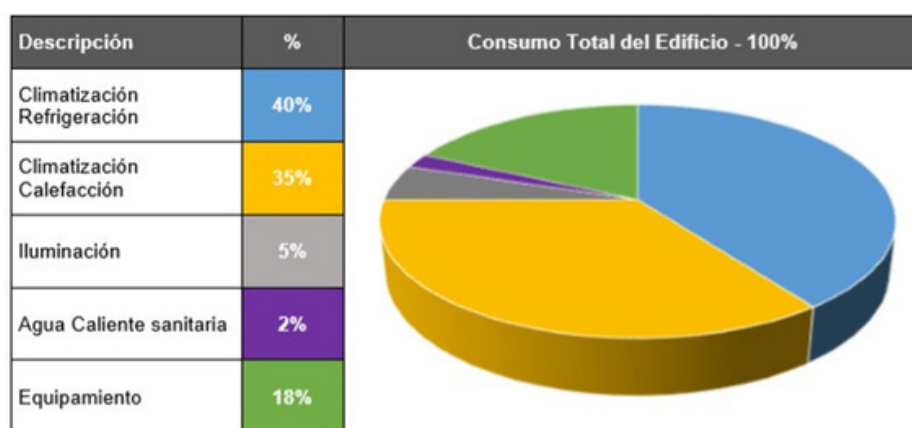


Image 5: Total building consumption, Source: Audit ICN2, April 2023

• Water use

Water is a precious and limited natural resource, and globally there is a high demand. The average "hydric footprint" in the western world is around 5,400 litres per person per day, which is equivalent to the consumption of an Olympic swimming pool per person per year. ICN2's water consumption on 2022 was 8.803 m³/year and in 2023 was 8.600m³/year. Moreover, Catalonia is currently facing a state of emergency due to a severe drought. In response to this situation and being a public institution, ICN2 has taken necessary measures in alignment with the directives issued by the Generalitat de Catalunya, some of which are: loosening tap pressure and exclusive watering of trees. We have also created a drought emergency communication campaign. This plan, therefore, already covers water conservation measures.

• Traveling and commuting

Scientific studies have uncovered **environmental impacts of research activities**, and **most of them showed that 74% of the emissions are attributed to transport** -including commuting (Achten et al.,2013). At ICN2, around 40% of CO₂ of emissions come from transport and commuting, and a big part from flights, which consume a big amount of fossil fuels and increase air pollution, thus affecting climate change. Around 20% of work trips are done by train and 80% of work trips by plane; 73,5% of which are EU, 18,6% National, and 7,8% International (outside the EU) (Image 6). On a daily basis at our institute , more than 50% of the employees commute to work with a sustainable transport (mainly train and bike), however still half of the personnel use the car (Image 7). Therefore, through this plan we aim to reduce both flight frequency and itinerant transport emissions per ICN2's employees, by including sustainability in the travel policy and promoting awareness campaigns.

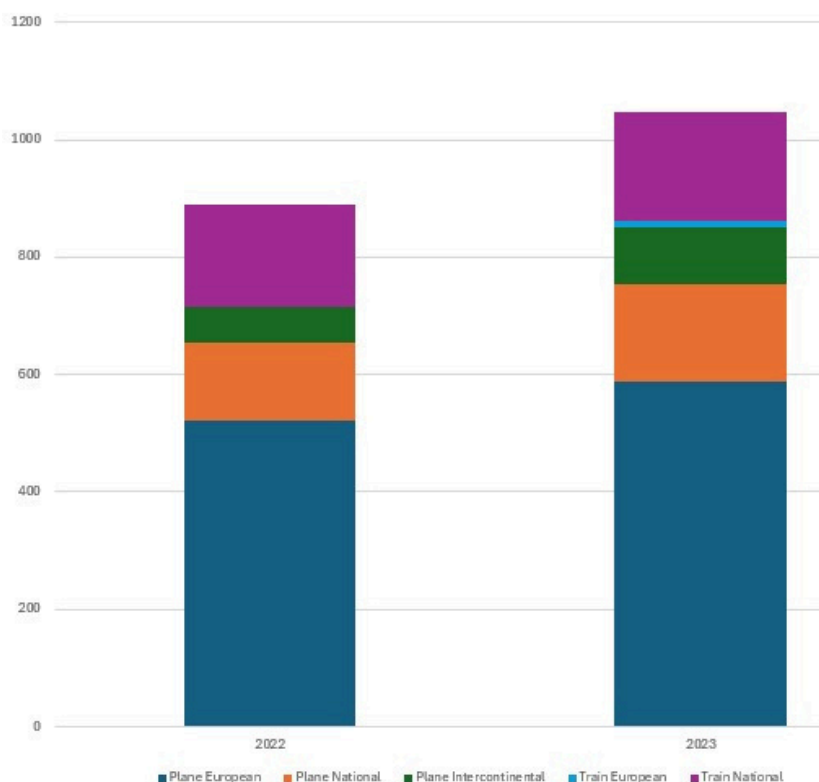


Image 6: Type of Work-trips (transportation and destination) on 2022 & 2023. Source: H&S-ICN2



Image 7: Distribution of journeys in itinerant from ICN2's employees, Source: H&S-ICN2

- Purchasing

We aim to increase environmentally preferable purchases and encourage behaviour change, including the elimination of unnecessary purchases of goods and services, consolidating orders to reduce packaging, and purchasing locally and sustainably. ICN2 will incorporate life-cycle environmental impacts into product purchasing. New goods will be purchased only when necessary, with existing materials reused whenever possible.

- Food waste and consumption

Sustainable food systems play an important role in building resilience in communities responding to a rapidly changing global environment. Therefore, as a public research institution committed to the good of society, we must become more sustainable in this area. We first need to set the difference between an ecologic product and a sustainable product. The first one means that all their phases of production are developed in nature without any artificial intervention, weather the second concept considers, not only a respect for the natural environment, but also a social and economic component, using the resources in a most efficient and responsible way during its process of production. At ICN2 we contract Catering Services from two main companies who offer more sustainable options when it comes to their services and food-products (local products, natural ingredients, and some sustainable packaging options). We also need to formalize procedures for supporting, promoting, and finally achieving 0% of food leftovers during catering events and increasing sustainable criteria for Catering Services.

• Waste management

Since 2018, ICN2 made recycling easier by adopting single stream recycling across its buildings, meaning all recyclable materials can be segregated in different bins contributing to increase the number of recyclables we divert from the waste stream. We also started counting the amount of hazardous waste (chemical, biological and cytotoxic) and bulky waste (batteries, fluorescent lights, furniture, wooden pallets, and electronic items) at the centre, an amount that has fluctuated from year to year (Image.8, Image.9). In addition, the waste management guide for both hazardous and non-hazardous waste has been updated this year (2024) and we are currently providing training for laboratory's waste management to research groups so that they improve practices and decrease the number of non-hazardous waste going to hazardous dedicated containers, currently a big problem. As we can see in the graphics, at ICN2 big amounts of Absorbents waste are produced (Image 10), the containers of which are sometimes misused as non-hazardous waste in the laboratories, which means that we are counting and treating non-hazardous waste as hazardous. This waste costs large amounts of energy and water to be subsequently treated, so we need to change this behaviours in the labs.



Image 8: Kg/year of hazardous waste at ICN2.
Source: H&S -ICN2

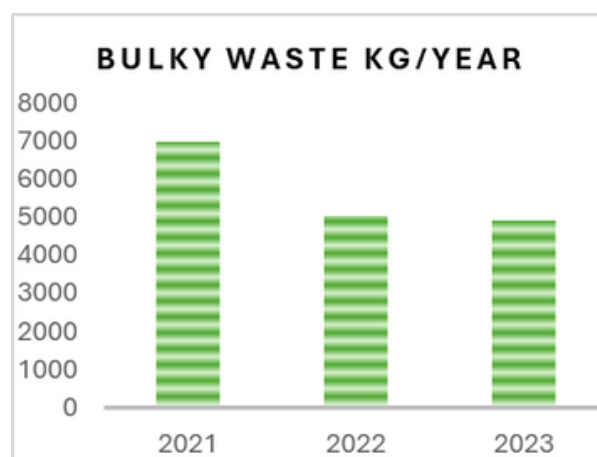


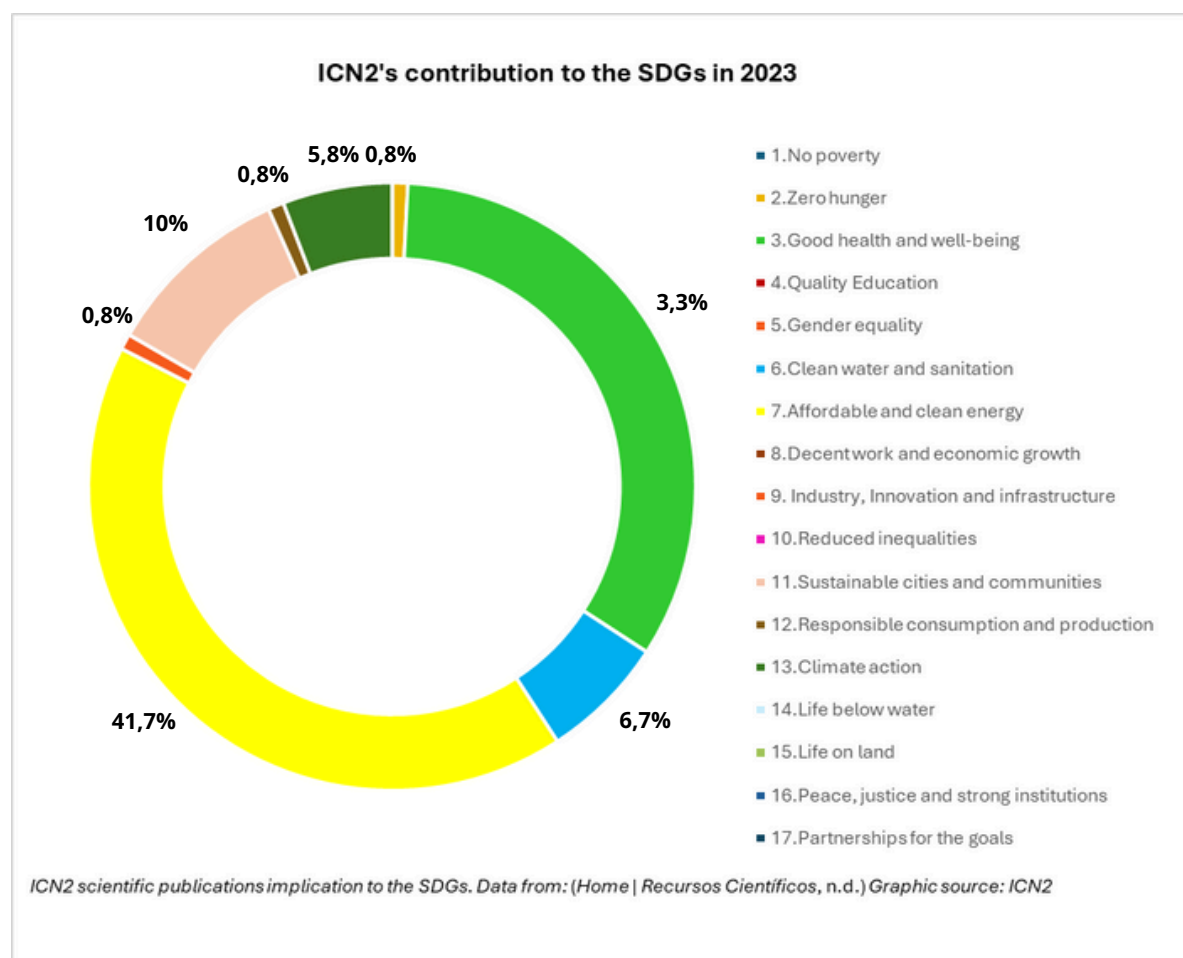
Image 9: Kg/year of non-hazardous waste at ICN2. Source: H&S -ICN2



Image 10: Kg/year of hazardous depending on the typology at ICN2,2023. Source: H&S -ICN2

ANNEX III

ICN2 RESEARCH GROUPS PUBLICATION'S IMPLICATION ON SDG



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