

CENTER STRATEGIC 2025-2028



Evolución Humana

HR EXCELLENCE IN RESEARCH

NTRO MACIONAL DE INVESTIGACIÓN SOBRETA EVOLUCIÓNHO





CENIEH STRATEGIC PLAN 2025 - 2028



MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES



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chapter ANALYSIS OF COMPLIANCE WITH THE PREVIOUS STRATEGIC PLAN

The CENIEH Strategic Plan 2021-2024 set four major objectives:

OE.1: To enhance the quality of the scientific and technical production.

OE.2: To strengthen the uniqueness of the infrastructure.

OE.3: To expand and diversify the community to which the CENIEH offers R+D+I.

OE.4. To increase the social impact and visibility of the CENIEH.

The degree of compliance is highly satisfactory. The table below sets out how the values of the indicators proposed in the former Strategic Plan have evolved.

INDICATOR	Starting point	Goal	2024
Number of SCI publications per scientist (four-year average)	2.96	Increase by 5% (3.1)	3.8
Ratio of Q1 and Q2/total SCI (four-year ave- rage)	0.5	0.6	0.8
Number of applications in calls for incorpo- ration of human resources (four-year average)	23	25	33
Number of people hired in calls for incorpo- ration of human resources (four-year average)	5	7	16
Number of competitive projects awarded annually (four-year average) ¹	23	25	25
Increase in % of competitive financing (four- year average)	16% ²	21%	28%
Number of scientific and infrastructure ne- twork projects (four-year average)	3	3	3
% of the ICTS that is open to competitive call	22%	35%	43.4%
International projects related to access re- quests(total for the 4-year period)	100	110	114
PhD directed by staff (average for the four- year period)	20	25	21
Internship staff at the Center (average for the four-year period)	18	20	21
Number of outreach activities organized by the CENIEH annually (four-year average)	6	7	8

Number of followers of CENIEH	15,650	Increase 5%	30% increase
Number of outreach events adapted to remote modality	No	Half of the calendar activities	All the outreach activities of the calendar are par- tially or totally available through streaming
Number of outreach activities adapted to the hearing-impaired	No	Half of the calendar activities	All the outreach events of the calendar are partially or totally provided either with subtitles or with Sign Language Interpretation (SLI)

¹This includes the successful applications of human and economic resources

²An error was detected in the original table in the Strategic Plan 2017-2020. The starting value of the % of competitive funding was 16% no 30%. Since the goal was a 5% increase, the "goal value" was adjusted to 21%. The objective was accomplished since there was an increment of 16%, and the final % of the activity of the center that is sustained in external funding is 28%.

Note: An indicator "Access requests that result in publication annually (four-year average)" was proposed for the 2021-2024 as a measure of the output of our infrastructure's use. However, some accesses derive more than one publication and not always is possible to track the specific access request that is linked to a publication. Furthermore, there is a time lag from the time of the access request until the publication is out, so is extremely difficult to monitor it. This indicator has been removed from the table as we did not find a way to reliably measure it. However, as an indicator of the output, we highlight that about an 80% of the CENIEH publications are related to the use of the ICTS.

During 2021-2024, the CENIEH staff has been involved in **major discoveries in the archaeopalaeontological field**, mostly derived from its leadership in singular research and excavation projects all over the world. The Center's activities are sustained by nearly 30% external, competitive funding from prestigious sources, including the European Research Council (ERC), the Spanish Ministry of Science, the Junta de Castilla y León, and various international foundations. Scientific activity at Sierra de Atapuerca and Orce sites in Spain; Tighennif, Ain Boucherit-Ain Hanech in Algeria; Gona in Ethiopia; Turkana, Lothagam and Panga ya Saidi in Kenia; Olduvai in Tanzania, Hualongdong in China and Sendrayanpalayam in India, among other emblematic localities, have resulted in an outstanding publication record of about 100 SCI publications annually, 80% in Q1/Q2 journals. These works have been featured among the most important scientific discoveries of the year in the annual reports from the most renowned scientific journals.

The CENIEH contribution covers the wide range of disciplines involved in human evolutionary studies, from the characterization of new hominin findings, to the assessment of their behaviour through archaeological and taphonomical analyses, new developments for the chronological constraint of archaeo-palaeontological sites, and the reconstruction of past climate changes and landscapes and their link to specific human and faunal evolutionary events.

Apart from a significant role in the study of the Iberian Peninsula Palaeolithic localities in the frame our strategic interest in studying human evolution in the circum-mediterranean region, the activity of the CENIEH is remarkably international, as evinced by its involvement in fieldwork and research in relevant localities from all over the world. In this context, the CENIEH laboratories and their staff have had a prominent role in the recovery, analysis and interpretation of the palaeontological, archaeological and geological evidence. Our staff has contributed to the characterization of some of the most relevant sites for the investigation of human evolution in Europe, including the chronological assessment of the earliest archaeological sites such as the Sierra de Atapuerca Pleistocene complex and Pirro Nord (Italy), the dating and DNA analysis of the oldest Neanderthals of Europe recovered at Estatuas (Atapuerca), the earliest H. sapiens of the Iberian peninsula from the Tamajón locality (Guadalajara) and the investigation of the life, growth and death of the hominins from Sima de los Huesos sites through taphonomic, morphological and histological approaches. The CENIEH is also present in Africa, contributing to the discovery of the earliest human burial in the continent excavated at the Panga ya Saidi site (Kenya), the earliest Acheulean in Africa, sexual dimorphism in Ardipithecus ramidus and new hominin remains from the Early Pleistocene site of Gona (Ethiopia). The research expands also to Asia, through the characterization of a new hominin lineage in Middle Pleistocene Asia evinced at the Hualongdong site, the dating of rock art in Gobi-Altai mountains in Mongolia or the effects of monsoonal activity in the settlement of *H. sapiens* in China. The discovery and study of new findings goes in parallel with the development of innovative approaches, such as the direct dating of lithic tools with cosmogenics, tried at the Olduvai site (Tanzania), to the applications of psychological models to unveil past hominin behaviours, analysis of visual perception in the use of Palaeolithic tools and the application of trapped charges methods to verify seismic hazards.

Furthermore, is also important to highlight the collaborations and the networking established with other fields, including the **private and industrial sectors**, **favouring technical innovation and knowledge transfer**. All laboratories, with a particular emphasis in those devoted to material characterization, have established fruitful partnerships with the pharmaceutical, medical, industrial and construction sectors. The recognition of the role that the CENIEH plays in the R+D+I development is reflected in the increasing number of requests to use our infrastructure during 2021-2024, with an average of 300 annual requests, 100 more per year than in 2020. This success entails an added merit if we consider that the CENIEH is the only ICTS in the field of Social Sciences and Humanities, and its interaction with the private sector is classically considered to be challenging.

Over 2021-2024, we have witnessed a significant enrichment of the infrastructure, with the implementation of new methodological procedures, research strands and laboratories such as the recent **creation of an Experimental Archaeology and Taphonomy laboratory and a Palaeoproteomics and ancient DNA laboratory.** The number of laboratories recognized as "outstanding facilities" by the Scientific Advisory Board of Unique Infrastructures (CAIS) has increased from 5 to 7, and all of them are currently accessible through the competitive access mode well above the 20% required by the ICTS (Unique Scientific-Technical infrastructure) Map.

A continuous effort has been devoted to the **conservation**, **restoration** and **management of archaeo-palaeontological collections**, **like those from the Sierra de Atapuerca** sites, with more than 250.000 specimens curated in the CENIEH premises. The activity in both the Experimental Archaeology and Taphonomy, and the Prehistoric Technology laboratories, has contributed to increase the CENIEH reference collections, a precious resource open to the scientific community. These lines of action are in accordance to our commitment with the FAIR research guidelines principles (Findability, Accessibility, Interoperability, and **R**euse), a commitment that will be maintained in the coming years though the creation and management of collections and open databases.

With the aim of developing and implementing human resources policies and practices that promote equality and transparency, in 2022 the CENIEH approved its **Gender Equality Plan** and within it, implemented also a **Harassment Prevention Plan**. Furthermore, the CENIEH has fully committed to complying with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers (EU Charter & Code) by developing its **Human Resources Strategy for Researchers (HRS4R)** and through its Open, Transparent, and Merit-based Recruitment policy (OTM-R). As such, at the end of 2024, the CENIEH received the HR Excellence in Research Award from the European Commission and will now commence the two-year process of implementation of the Action Plan. Along the same lines, in the course of the last four years, the CENIEH approved a **Digital Disconnection Protocol**, an **Anti-Fraud Plan**, and created an internal **whistleblower channel** for the protection of persons and transparency in our activity.

Furthermore, we highlight the accomplishment of the **National Security Scheme (NSS)** basic accreditation to guarantee the cybersecurity of our activity, and the recertification to the standard **ISO 9001:2015 of the Quality Management System of the Center**, which applies to health, safety and sustainable science practices such as the implementation of an **Integrated Waste Management Plan** for all laboratories.

Finally, we highlight the involvement of the CENIEH staff in knowledge transfer to the society through the coordination of the Scientific Culture and Innovation Unit (UCC+I) of a regular, multiform and varied outreach calendar, characterised by a strong commitment to inclusiveness, including its adaptation to the hearing-impaired or its recent expansion into the rural areas.



MISSION AND VISION

MISSION: What are we?

The CENIEH is a research center devoted to excellent and interdisciplinary research concerning the biological and cultural evolution of the human lineage and the bidirectional impact of hominins and environment interactions. Through the application of the state-of-the-art methodologies and equipment, the CENIEH aims to reconstruct the impact that landscape, environment and climate changes have had on hominid and other faunal migrations and settlements. This type of research involves supporting excavation projects in unique archaeological and palaeontological sites worldwide. The CENIEH is also responsible for the conservation, restoration and management of archaeological and palaeontological collections, such as those from the UNESCO sites of sierra de Atapuerca. Furthermore, as an ICTS, the CENIEH must act as an open source of resources at the service of the scientific, technological and industrial community, at both national and international level. The CENIEH holds a strong commitment to science outreach, promoting the study of the past as tool for fostering a sustainable and socially responsible future.

VISION: CENIEH 2028

- A pioneer organization in Europe for creating and sharing knowledge on human evolution to the scientific and technical community and society at large.

- A forefront institution that stands out by its multidisciplinary approach to the study of human origins and its leading role in the development and implementation of emerging and cutting-edge techniques for the study of the past.

- A creative research Center that through its excellence and expertise, promotes scientific and technological advances in other fields, including technological and industrial areas.

- An instrumental player in bridging the gap between science and society, advocating for the importance of scientific knowledge in tackling worldwide issues such as environmental sustainability, climate change, cultural heritage preservation and tolerance to diversity.

- A model organization that operates within the highest standards of quality management, fostering a work environment that is tolerant, safe and inclusive, and favours the development of balanced, equal and sustainable relationships with the various parties involved.



Weaknesses

- Lack of sufficient baseline funding that hinders medium and long-term planning.
- Absence of a career path and appropriate incentive system to attract and maintain talent and motivate staff.
- Insufficient critical mass and inability to stabilize positions due to budgetary and administrative rigidity.
- Lack of specific dialogue and understanding of the legal framework and constraints of research consortia with the administration.

Strengths

• CENIEH's consolidation within the map of Singular Scientific-Technical Infrastructures (ICTS), a hallmark of excellence that enhances interaction and collaboration opportunities with a wide range of R&D actors.

• Ability to comprehensively address all essential aspects of human evolution research in one location through its three research programs and unique laboratories.

• High specialization and experience of its staff, enabling methodological innovation and tackling of new scientific challenges including areas of growing social interest such as heritage sciences, climate change, pollution, environmental studies, and development of new materials.

- CENIEH's presence in some of the world's most significant archaeological-palaeontological sites.
- Proximity to prestigious UNESCO sites in the sierra de Atapuerca and the deposition and conservation of their archaeological-palaeontological collections at the Center.

• Social recognition through a comprehensive communication program fostering critical thinking and evidence-based knowledge.

Threats

- Frozen baseline funding until 2028 in a context of global economic instability and hyperinflation.
- Complexity of administrative procedures and excessive bureaucratic burden.
- Frequent change of operational and hiring administrative rules and procedures.

• Challenges in securing funding due to the focus of most funding opportunities on fields that prioritize businessoriented, practical, and quick-return endeavors, while our work is rooted in the Social Sciences and Humanities.

Opportunities

- CENIEH's location in a charismatic territory due to the prominence of the Atapuerca sites and potential synergies with the Museum of Human Evolution and the University of Burgos.
- Participation in European infrastructure networks offering opportunities for synergies, scientific-technical innovation, and international visibility.
- Participation as an ICTS in funding calls such as the European Regional Development Fund (FEDER) or the Recovery, Transformation, and Resilience Plan.

chapter 3

OBJECTIVES FOR THE FOLLOWING FOUR-YEAR PERIOD

3.1 Description of the objectives

For 2025-2028, the CENIEH will continue to build on its excellence by staying at the technological forefront of science and by expanding its foundational approaches with the development and promotion of new research strands. These objectives imply the enhancement and increment of the infrastructure's capabilities, bringing new technological advances to the analysis of fossil materials and their geological, chronological and environmental context. These objectives will be guided by a strong commitment to the **Agenda 2030** especially in relation to **open science** –promoting openness in the access to results, data, collections and resources, and the implementation of **economically and environmentally sustainable practices in science** in a safe, inclusive and democratic ambiance.

The strategic objectives (S.O) are as follows:

- S.O.1 Promote excellence in the scientific and technical output.
- S.O.2 Strengthen the uniqueness of the research infrastructure.
- S.O.3 Increase social impact and visibility
- S.O.4 Nurture an optimal framework for professional development, productivity and sustainability.

Below are the specific objectives (O) to be achieved for each S.O.:

S.O.1 Promote excellence in the scientific and technical output.

O.1 Increase the leadership and quality of the scientific research. This objective requires an effort for increasing the critical mass of researchers and technicians, encouraging the participation in competitive calls of human and financial resources, and promoting a leading role in excellent research and fieldwork projects. Following the principles of Open Science and the **San Francisco Declaration on Research Assessment (DORA)**, the CENIEH will encourage the publication in an expanded list of Open Access journals with the Directory of Open Access Journal (DOAJ) seal of endorsement for quality equivalence alongside the SCI (Science Citation Index) and SSCI (Social Science Citation Index) journals we have traditionally aimed to for publication.

O.2 Expand and diversify the R+D+I areas of CENIEH. In addition to the outstanding activity of the Palaeobiology, Archaeology and Geochronology and Geology programs, the 2025-2028 Strategic Plan observes strategic developments in three new research strands:

i) Molecular Palaeobiology, involving the new lab of Paleoproteomics and ancient DNA. This program aims to lead the application of emerging molecular techniques to study the evolution of past populations, in relation to taxonomy and phylogeny as well as other biological questions such as development, diet, metabolism and health.

ii) Cognitive Archaeology, linked to the activity of the Experimental Archaeology and Taphonomy Lab, seeking to integrate notions from cognitive sciences, psychology and philosophy as well actualistic experimental approaches, to the study of material culture, in order to understand the human mind in the past.

iii) Development of new applications of Isotopic analysis for dating as well as provenance, paleodiet and paleomobility studies. These implies new methodological and infrastructure developments in the Cosmogenic Nuclides and the Uranium Series labs.

S.O.2 Strengthen the uniqueness of the research infrastructure.

The expansion and diversification of the CENIEH R+D+I areas will come necessarily linked to the **strengthening and improvement of the infrastructure.** Several updates, acquisitions and developments are planned for all and each of the laboratories that comprise the ICTS. Most of these initiatives imply a proactive involvement in environmental sustainability and resource efficiency in alignment with CENIEH's goals. This uniqueness is made available to society through a transparent system, which includes **the ICTS competitive access modality**, and that fosters excellences and ensures fair entry to public resources.

0.3 Enhance and increase the capacities of the Uranium Series Laboratory. The Uranium Series Laboratory is currently equipped with a Neptune multi-collector inductively coupled plasma mass spectrometer (MC-ICP MS) and a Thermo Scientific Element Extended Dyamic Range High resolution ICP-MS instruments, facilitating dating, isotope ratios, and multi-elemental analysis in solution mode for archaeological and geological samples. However, there is a recognized need to improve these capabilities with semi-destructive techniques that allow for quantitative isotopic and elemental mapping, preserving more of the sample's surface. The integration of a laser ablation (LA) system with the existing mass spectrometers (LA-MC-ICP-MS) at CENIEH would allow for the precise analysis of major, trace, and rare earth elements (REE) and in different isotopic systems (U-Th, U-Pb, Sr and Ca isotopes) across a variety of sample matrices with minimal sample use, allowing the development of new lines of research. This development will promote the implementation of new in situ geochemical applications for provenance studies of archaeological and geological samples, paleomobility studies through Sr-isotope analyses and paleodiet studies such as measurement of Ca stable isotopes in bioapatite samples. Other in situ radiogenic isotope dating applications with LA-MC-ICP-MS will allow U-Th in situ pre-screening of fossils and carbonates, minimizing sample damage and reducing analysis time, as well as enabling better spatial resolution and correlation between isotope data and chronological information, particularly useful for **paleoclimate** reconstructions. Finally, the implementation of an in-situ U-Pb dating technique will allow dating carbonate samples (speleothems, teeth, and bones) beyond 500 ka old. Notably, the implementation of the LA-MC-ICP-MS supports resource efficiency, minimizing the need for high-purity chemicals, reducing chemical waste and exposure risks. Precise analysis with smaller sample sizes conserves archaeological, geological, and biological materials, aiding in heritage preservation. This approach not only lessens the environmental impact of research but also contributes to climate change mitigation by promoting sustainable practices.

O.4 Enhance and increase the capacities of the Luminescence Laboratory. With five RISO luminescence readers, the **Luminescence Laboratory** at CENIEH represents one of the best equipped facilities of its kind in Europe. This laboratory has been involved in the dating of a wide variety of sedimentary environments from ecological, archaeological and palaeontological contexts and/or constructions of cultural heritage. For 2025-2028, there are plans to improve the stability of the high-resolution gamma spectrometer by implementing a cryogenic system, which will also contribute to a better sustainability of the laboratory procedures by reducing significantly the amount of liquid nitrogen required.

O.5 Enhance and increase the capacities of the Electro Spin Resonance (ESR) Laboratory. Over the last decade or so, the **Electron Spin Resonance (ESR) Laboratory** has been at the forefront of the investigation in Quaternary Geochronology by combining innovative methodological developments and dating numerous key archaeological and palaeoanthropological sites across Europe, Africa and Asia-Pacific regions. The laboratory aims to acquire a new X-band spectrometer to replace the old one in order to maintain the highest analytical standards, and be able to respond to the increasing need of high-quality dating results within the community. With this new instrument, the lab will be able to keep offering the possibility of measuring at both low (~90 K) and room temperatures following the most advanced procedures in the field.

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O.6 Enhance and increase the capacities of the Cosmogenic Nuclides Laboratory. Regarding the Cosmogenic Nuclides Laboratory, the CENIEH aims to establish the routine procedures for the three methods, guartz¹⁰Be-²⁶Al dating, new meteoric¹⁰Be dating and carbonate³⁶Cl dating, in one place, becoming among the unique facilities in Europe, if not, worldwide. Demand for ¹⁰Be-²⁶Al dating is increasing nationally and internationally in recent years, not only in earth science but also in archaeology/palaeoanthropology, allowing direct dating of sites and artifacts and contributing to the reconstruction of paleoclimate and landscape evolution. Meteoric ¹⁰Be is now in the second boom of new applications to continental settings for extended dating ability up to 10 Ma and paleorainfall reconstruction. The ³⁶Cl could expand cosmogenic applications to carbonate-rich landscapes (e.g., in Mediterranean region) and has a great potential in Spain due to the abundance of limestone and caves developed in these limestones massifs. The current laboratory for cosmogenic nuclide sample preparation is too small to accommodate any new development, and the air guality of the room is not suitable for sophisticated analytical chemistry. During 2025-2028 we expect to build a multiple room laboratory, each room dedicated to different methods, including a new clean room in the new location created after the flooring of a double-height central space at CENIEH. By 2028, we expect to have set up the new laboratory and procedures for the guartz dating and the meteoric ¹⁰Be dating, as well as a room for the future implementation of the ³⁶Cl analysis.

O.7 Enhance and increase the capacities of the Archaeomagnetism Laboratory. The **Archaeomagnetism Laboratory** has contributed to the study of an enormous number of sites, by providing a generic temporal framework from which to decide the most appropriate method to obtain absolute dates. The laboratory has undertaken collaborative projects to address palaeontological and palaeoanthropological issues, as well as research projects focused on intrinsic aspects of palaeomagnetism and further exploring this property. For the next four years, this lab plans to expand the facilities to study rock magnetism. With the acquisition of a high-temperature furnace CS4 for the Kappabridge MFK1-FA/A susceptometer it will be possible to measure the temperature variations of the low-field magnetic susceptibility of minerals, rocks, and synthetic materials in the temperature range from room temperature to 700 °C.

O.8 Improve and enhance the capacities of the Collections, Conservation and Restoration Area. The CENIEH houses several collections that represent unique research resources: original archaeopalaeontological collections like those from the Sierra de Atapuerca sites, and reference collections such as Comparative Anatomy Osteological Collection (COAC), a Rock Collection (LITHO) and an Experimental Traceology Collection (CET). For 2025-2028, the **Collections, Conservation and Restoration Area** will continue to preserve and organize these collections, to improve their access through an update of the storage facilities and in-house space for consulting them, an in-deep review and redesign of the Collection Database and a continuous expansion with new specimens and their progressive 3D digitalization. In addition, the CENIEH aims to create an experimental taphonomy collection (TAPHO), to provide a reference sample that allows interpretation of the imprints on the bone surface (marks and fractures) of archaeo-paleontological record based on experimental work under controlled conditions. This strategic initiative will be possible due to the efforts devoted to the development of an Experimental Taphonomy program and the creation of an Experimental Archaeology and Taphonomy Laboratory. To fulfill this mission, it is essential to equip the laboratory with more versatile, faster, and higher resolution imaging equipment.

O.9 Enhance and increase the capacities of the Microscopy and Microtomography Laboratory. The **Microscopy and Computed Microtomography Laboratory** is a versatile unit with great scientific potential and that has been highly demanded by both the scientific and private sectors in a variety of fields such as material science, medicine, geology and palaeoanthropology in relation to microstructural characterization of materials. In 2021, the CENIEH acquired and installed a second scanner for axial computed microtomography (microCT CoreTOM-Tescan) that allows scanning larger pieces, reduces the time of analyses and complements the capabilities of the first microCT scanner by enabling dynamic compression and tensile tests. For 2025-2028, developments will be implemented so the microCT can also carry out bending tests. In addition, with the installation of a second detector (Spectral 2.0) it will be possible to integrate chemical composition analyses of the scanned materials. This application is particularly interesting in fields such as geology or electronics.

O.10 Increase the capacities of the Digital Mapping and 3D Analysis. During the past few years, CENIEH has devoted a significant effort to the creation and implementation of a **Digital Mapping and 3D Analysis Laboratory** with high-precision geomatic equipment and the implementation of geospatial techniques dedicated to geoarchaeological research. This lab allows the digitization and reconstruction of Natural and Cultural Heritage and responds to the universal needs of the archaeo-palaeontological community to understand the site formation processes and landscape evolution. The speed at which digital analysis technology advances, necessitates continuous updating of equipment such as a 3D dynamic portable scanner for areas of difficult access or drone with high-precision laser technology that allows for the removal of significant vegetation cover for geomorphological studies and 3D modelling.

O.11 Update the capacities of transversal laboratories. In line with the Digital Mapping and 3D Analysis infrastructure, other transversal laboratories such as **Archaeometry** and **Geology** will need to update some of their equipment, such as in the thin section laboratory, in order to meet the high demands of the scientific and technical community.

O.12 Enhance the diversification of the community the CENIEH offers its capacities to. In order to promote the diversification of the community utilizing the ICTS and foster the development of new applications and areas of use for our techniques and knowledge, CENIEH will open all its essential laboratories to competitive access, allocating at least 20% of their capacity. Additionally, efforts will be made to seek collaborations within the private or business sector, driving innovation, and enhancing the impact of its work beyond the academic sphere.

S.O.3 Increase social impact and visibility

During the last four years, the CENIEH has contributed to the development of a scientific culture, promoting the involvement of society in the advancement of science and the understanding of its role in today's world and the future. Its social vocation has been reflected in a varied, diverse, and inclusive outreach program that has aimed to reach a broader society with initiatives targeted at people with impaired hearing, people living in rural areas, and people with intellectual disabilities. Through teaching and outreach, CENIEH aims to enhance the impact of science on society, fostering critical and constructive thinking where science is a global tool for the sustainability of our planet and our social awareness.

For 2025-2028, CENIEH aims strengthen its presence and role in society as a source of resources and knowledge in addressing the challenges and dilemmas posed by human impact on our environment. With this aim we expect to:

O.13 Promote CENIEH involvement in training and teaching programs, such as supervision of PhD and master students and internships.

O.14 Enhance the engagement of the CENIEH in science with and for society. This objective implies the celebration of a regular calendar of outreach activities and continued development of **Inclusive Science Communication** initiatives that strengthen the sense of belonging to a global species made up of biologically and culturally different and diverse individuals, whose coexistence is articulated through knowledge and tolerance. To promote synergies and stimulate regional development, we will actively promote collaboration with local stakeholders and institutions.

O.15 Promote the international projection of CENIEH's activity by leading the **organization of relevant scientific events** that highlight the prominent role of the CENIEH in the development of scientific and technical research such as the organization of the European Society for the study of Human Evolution (ESHE) or the contribution to the bid for Burgos as Capital of Culture 2030.

S.O.4 Nurture and optimal framework for professional development, productivity and sustainability.

O.16 Promote quality of procedures and services. The CENIEH seeks to implement policies that promote **equality and transparency** and guarantee the protection of both the people and the information handled in the course of its activity. In 2025-2028, the CENIEH will move forward aiming to get the Medium Category certificate of the NSS standards, ensuring regulatory compliance and protection of classified information. Within the commitment of aligning the human resources policies to the 40 principles of the European Commission Charter & Code, we will work towards the implementation of the HR4RS Action Plan that received the initial positive assessment of the EU. Throughout 2025-2028, the CENIEH will continue to monitor, manage and improve the quality of its service to the scientific and technical community by enhancing the scope of the Quality Management System (ISO 9001:2015 standard) to the infrastructures and guaranteeing security policies in information and communication technologies.

O.17 Promote economic and environmental sustainability. The Center will also conduct transversal analyses of work procedures in the search for resource optimization, sustainability and energy savings. The delicate global situation places significant emphasis on the need to seek for methodological alternatives or the rethinking of processes and routines that enhance the Center's energy efficiency, promote economic and environmental sustainability and responsible progress in fully accordance with the Agenda 2030's objectives.

3.2 and 3.3 Strategies to achieve the objectives and foreseen actions

In the following table, a summary is provided for each of the strategic and specific objectives described earlier, along with the concrete strategies and the breakdown of actions intended to be carried out to achieve these objectives.

Strategic objective	Specific objective	Strategy	Action
S.O.1. Promote excellence in the	O.1. Increase the leadership and quality of the scientific research	S.1. Increase the % of competitive resources	A.1. Promote participation in competitive calls for founds and human resources
scientific and technical output		S.2. Promote high impact and quality scientific publications	A.2. Encourage publication in SCI/ SSCI journals and equivalent Open Access journals
		S.3. Lead and participate in prestigious archaeo- palaeontological excavations	A.3. Encourage leadership at prestigious excavations and related projects
	O.2. Expand and diversify the R+D+I areas of CENIEH	S.4. Promote the development of a Molecular Palaeobiology research strand	A.4. Stablish at CENIEH the regular extraction for LC-MS/MS and MALDI- TOF MS
		S.5. Promote the development of a Cognitive Archaeology and Taphonomy research strand	A.5. Promote attraction of researchers, projects, funds and collaborations within this area
		S.6. Promote the development of new applications of isotopic analyses for dating and for provenance, palaeodiet and palaeomobility analyses	A.6. Stablish at CENIEH the protocols for the new isotopic applications

Strategic objective	Specific objective	Strategy	Action
S.O.2. Strengthen the uniqueness of the research infrastructure	O.3. Enhance and increase the capacities of the Uranium Series Lab	S.7. Develop new in situ geochemical and radiogenic isotope dating applications	A.7. Acquire and integrate a laser ablation system in the mass spectrometer
	O.4. Enhancing the capacities of the Luminescence Laboratory	S.8. Improve the performance of the high-resolution gamma spectrometer	A.8. Purchase and set up a cryogenic system
	O.5. Maintain the capacities of the ESR Lab	S.9. Ensure high-quality ESR measurements at low and room temperatures	A.9. Replace one X-band spectrometer
	O.6. Enhance and increase the capacities of the Cosmogenic Nuclides Lab	S.10. Develop the quartz 10Be- 26Al dating method and the meteoric 10Be dating method	A.10. Expand the Cosmogenic Lab by building a multi-room new lab.
	O.7. Enhance the capacities of the Archaeomagnetism Lab	S.11. Expand research on rock magnetism	A.11. Acquire and install a high- temperature furnace CS4 to the Kappabridge MFK1-FA/A susceptometer
	O.8. Improve and enhance	\$ 12 Enhance the CENIEH	A.12. Expand the COAC with new specimens and 3D scans
	Collections, Conservation and Restoration Area	archaeo-palaeontological and reference collections	A.13. Implement a new Database System for the management of the new specimens/collections
		S.13. Develop a Taphonomic collection	A.14. Acquire a portable high- resolution microscope equipment
	O.9. Enhance and increase the capacities of the Microscopy and Microtomography Lab	S.14. Integrate chemical composition analyses to microCT imaging	A.15. Purchase a second detector for the microCT (Spectral 2.0)
		S.15. Set-up the microCT to carry out bending tests	A.16. Design, manufacture and install new system in the loading cell
	O.10. Increase the capacities of the Digital Mapping and 3D Analysis	S.16. Improve methodological applications for 3D data acquisition, analysis and modelling	A.17. Update the lab equipment and acquire new 3D scanning and analysis hardware and software
	O.11. Update the capacities of transversal laboratories	S.17. Maintain the capacities of the Archaeometry and Geology laboratories	A.18. Update and renew the lab equipment if needed to attend the demands of the scientific and technical community
	O.12. Enhance the diversification of the community the CENIEH offers its capacities to	S.18. Promote the openness of the laboratories through the ICTS competitive-access modality	A.19. Keep an offer above 20% of the outstanding labs' capacities to competitive access modality
		S.19. Promote the diversification of CENIEH's activity through its involvement in infrastructure networks and collaborations with industrial/ private/heritage sectors	A.20. Encourage participation in infrastructure networks or collaborations with industrial/private/ heritage sectors

Strategic objective	Specific objective	Strategy	Action
S.O.3. Increase social impact and visibility	O.13. Promote CENIEH involvement in training and teaching programs	S.20. Promote the participation in training and teaching programs	A.21. Encourage direction/supervision of studentsA.22. Encourage supervision of
			internships
	O.14. Enhance engagement in science with and for society	S.21. Design and implement outreach activities within the	A.23. Celebrate a regular calendar of outreach activities
		Citizen Science framework	A.24. Encourage the participation of CENIEH staff in outreach activities
			A.25. Establish collaboration with partners in the nearby environment such as Foundations, University and Museums in Burgos
		S.22. Further develop Inclusive Science Communication activities	A.26. Adapt the main events of the outreach calendar to less-favoured collectives (rural areas, disabilities)
		S.23. Develop and implement a communication transformation plan	A.27. Improve facilities for audiovisual recording and the development of other communication formats (podcasts, radio, workshops)
	O.15. Promote the international projection of CENIEH's activity	S.24. Promote a leading role in the celebration of international scientific events	A.28. Encourage the organization of renown scientific meetings at CENIEH
S.O.4. Nurture an optimal framework for professional	O.16. Promote quality of procedures and services	S.25. Align the human resources policies to the 40 principles of the European Commission Charter & Code	A.29. Implement the Action approved by the EU within the "HR Excellence in Research Award"
development, productivity and sustainability		S.26. Ensure regulatory compliance and protection of classified information in accordance with National Security Scheme (ENS) standards	A.30. Certify the CENIEH security policies with the requirements of the ENS - Medium Category
		S.27. Monitor, manage and improve the quality of the ICTS service its service to	A.31. Renew the ISO 9001:2015 certificate
		the scientific and technical community by enhancing the scope of the Quality Management System (ISO 9001:2015 standard) to the infrastructures and associated processes	A.32. Enhance the scope of the quality management system to all laboratories that provide service and associated processes
		S.28. Monitor and promote health and safety at work	A.33 Review and update the infrastructures to comply with current health and safety regulations
	O.17. Promote economic and environmental sustainability	S.29. Explore methodological alternatives or work procedures for resource optimization, sustainability and energy savings	A.34. Develop and implement measure for energy saving and sustainability

3.4 Resources

	20	2020		2021		2022		2023		2024	
	F	Μ	F	Μ	F	Μ	F	Μ	F	Μ	
Researchers	8	15	8	11	8	12	8	12	12	12	
Pre-doctoral researchers	5	2	4	2	3	2	4	3	1	3	
Technicians	16	6	13	6	11	9	20	14	19	11	
Communication	1	0	1	0	2	0	2	0	3	0	
Administration	6	4	9	4	11	5	10	4	18	5	
Total by genter	36	27	35	23	35	28	44	33	45	31	
Total	6	3	5	8	6	3	7	7	70	5	

The following table shows the evolution of the human resources for the 2021-2024 period.

In 2022, the CENIEH approved a Gender Equality Plan and during these years, we have positively accomplished gender balance including **prominent roles for women at leading positions** such as the center direction, general laboratories management, human resources and leading scientists in laboratories and research projects. **By the end of 2024, the proportion was 59.2% females and 40.8% males**.

One of the main problems regarding human resources is the high rate of temporariness. As of 31/12/2023, 51.3% of positions are of a temporary nature. This situation hinders the development of medium to long-term projects and strategic plans.

For the optimal implementation of the present Strategic Plan, it will be necessary to raise the number of human resources at the Center, especially for the development of projects aimed to reinforce the uniqueness of the CENIEH and the development of new research strands. In general terms, the basic structure needed to guarantee the activity and the services provided by each laboratory is to have at least one researcher and one technician in each of them, a situation that is not achieved within the Archaeomagnetism, Cosmogenic Nuclides and Digital Mapping and 3D Analysis laboratories. In addition, due to the high demand of the scientific and technological-industrial sector, and the new capacities, an additional technician in Microscopy and Microtomography laboratory is needed. The plan of creating new reference collections and promoting its openness to the scientific and technical community would also require additional support in the Collections Area. Finally, due to the high turnover of the scientific staff, a researcher in the Palaeobiology Program is needed to continue the prolific activity of this area.

1. Specialized technician in Cosmogenic Nuclides Laboratory

- 2.Specialized technician in Archaeomagnetism Laboratory
- 3.Researcher for Digital Mapping and 3D Analysis Laboratory
- 4.Technician for Collections
- 5. Technician in Microscopy and Microtomography Laboratory
- 6.Research Scientist in Palaeobiology



Schedule and follow-up indicators

4.1 Schedule

	2025 - I	2025 - II	2026 - I	2026 - II	2027 - I	2027 - II	2028 - I	2028 - II
A1								
A2								
A3								
A4								
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A32								
A33								
A34								

4.2 Follow-up indicators

Strategic objective	Specific objective	Follow-up indicator
	0.1	-Number of applications to competitive calls/year (average of 20) -Number of scientific articles/year (>92) and % OA (60%) -Number of excavations (average of 24)
S.O.1	O.2	-Acquisition of MALDI-TOF MS -Research output derived from the Cognitive Archaeology line -% of Experimental Archaeology and Taphonomy lab capacity demanded by users (above 20% of capacity) -Research output in paleomobility, provenance and diet lines of research from U-series lab
	O.3	-Acquisition of the laser ablation system for U-series lab
	0.4	-Acquisition of the cryogenic system
	0.5	-Acquisition of new X-band spectrometer
	0.6	-Setting up of the new multi-room Cosmogenic Lab
	O.7	-Acquisition of a a high-temperature furnace CS4 to the Kappabridge MFK1-FA/A susceptometer.
S.O.2	O.8	-Increase of the number of specimens in reference collections -Development and implemention of new Database System for collections -Acquisition of a high portable-high resolution microscope equipment
	O.9	-Acquisition and implementation of second detector for microCT -Acquisition and implementaiton of new system in the loading cell of microCT
	O.10	-Acquisition and functionality of new equipment for Digital Mapping and 3D Analysis lab
	0.11	-Update and renewal of the lab equipment for Archaeometry and Geology labs as needed
	O.12	-% of the lab capacity open to competitive access (above 20% annually) -Number of infrastructure networks CENIEH is involved in and related activity
	O.13	-Number of people supervised/trained by CENIEH staff
S.O. 3	O.14	-Celebration of all activities of regular outreach calendar and number of CENIEH staff involved -Number of collaborations active with local partners for outreach/training -Adaptation of the outreach calendar to less-favoured collectives (at least half activities) -Update of the CENIEH audio-visual facilities
	O.15	-Involvement of CENIEH in organization of relevant scientific meetings
S.O.4	O.16	-Implementation of the HSR4R Action Plan -Development of actions to achieve the ENS- Medium Category certificate -Development of actions to achieve the renewal of the ISO 9001:2015 and to increase the number of labs and procedures under QMS -Proactive and regular activity of the Safety Committee and implementation of measures when needed
	O.17	-Continuous reassessment of procedures and routines to optimize energy saving and sustainability and implementation of measures







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