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introduction

BACK TO NORMALITY

Barely a week before the decree of confinement, in March 2020, the Spanish Nuclear Society held its traditional Conference of Operational Experiences in the auditorium of the School of Industrial Engineering of the Polytechnic University of Madrid.

Three years later, the Society has been able to return to normality in person at this Conference, which has been a benchmark in the Spanish nuclear sector since 1989, and has done so coinciding with the presentation of the "Manifesto in defense of nuclear power plants as a source of strategic energy in Spain."

The meeting featured a special session, which addressed a sociological approach to energy transition, by researchers from the world of science and sociology.

The meeting included a different special session, in which a sociological approach to the energy transition was addressed by researchers from the world of science and sociology.

The directors of the power plants once again presented the results of their facilities, reinforcing the message of effort, continuous improvement and communication to society.

As for the operation of the Spanish nuclear fleet during 2022, it was once again outstanding. The seven operating reactors produced around 56,000 GWh, an increase of 3.6 % compared to the energy produced in 2021.

Nuclear energy contributed 20.3 % of the electricity consumed in the country during 2022, operating 7866 hours with an approximate cost of 55 € MWh, of which 25 € are fees and taxes.

Thanks to its operating factor, nuclear can provide more than 20% of the electricity consumed in Spain with only 6% of the installed power, and its operation avoids the emission of 20 million tons of CO_2, equivalent to removing a third of the Spanish car fleet from circulation, and now 1.5 billion euros per year in emission rights. These figures summarize the excellent performance of the Spanish nuclear power plants, whose operational experiences in 2022 are summarized in this special issue of NUCLEAR ESPAÑA.

"The Spanish Nuclear Society is a fundamental agent in our country for the promotion of knowledge of nuclear science and technology. And this conference is a magnificent example of this". This is how the president of the Nuclear Safety Council closed this 34th edition.

DRAFTING COMMITTEE

EMILIO MÍNGUEZ

President of the Spanish Nuclear Society

Texto: MATILDE PELEGRÍ Fotos: GRUPO SENDA

THE SNE

The General Assembly of the Spanish Nuclear Society held on 2 March ratified his appointment as chairman of the Board of Directors, following his two-year term as vice-chairman and following the current Statutes.

After several terms in office, a representative of the university world has taken over the presidency of the Board of Directors of the SNE, the Association that brings together professionals in the sector and of which you are an active member. What does this election represent from a personal point of view?

Firstly, it is a challenge to represent all nuclear professionals during these two years, one of which, 2024, coincides with the 50th anniversary of the Society. In addition, there are also important decisions to be taken next year regarding nuclear power plants. So for me, it is a challenge.

And from a professional and academic perspective?

Professionally, it means continuing to promote contact between academia and the nuclear business sector because this is where we have the incubator of professionals. It is a critical moment to maintain the knowledge and not lose it through indecision because if we do not have a good base of young people, we can lose all the ability in a few years. This is a significant challenge, not only for me as president in these two years but also for subsequent terms.

In your time as vice president, the SNE has completed the digitization process. What is your analysis of the evolution of the Society in recent years?

Society has evolved with the times, adapting to different situations. I have always detected a good union between all the professionals in the sector, manifested in the annual meetings, the Operational Experiences Day, and the activities carried out by the different commissions. A climate is also created throughout all the boards of directors, in some of which I have participated, which allows for a very positive evolution, promoting novelties and initiatives, and with the participation of young professionals who help with the necessary renewal.

This is an essential aspect maintained throughout the 50 years of the Society.

What are the objectives of the new Board for the period 2023-2025?

The evolution of the Company is perfect. Therefore, the reasonable thing to do is to maintain a line of continuity, as I stated

when I took office at the General Assembly on 2 March. The two previous boards of directors have given great importance to communication, which is fundamental, especially at this time, guidelines in which I have participated in the previous period. Over the last year, the launch of the Manifesto in favor of nuclear energy, presented at the Operational Experience Day, and the series of informative documentaries have been excellent.

The work with the media has also been vital, and it is essential to maintain this relationship. To this end, having a group of experts who can respond to media requests on particular issues will be beneficial.

I would also like to refer to the Society's Working Committees. They are working very well, with many activities and new proposals. I want to thank them for their constant and high-quality work.

AN EXCEPTIONAL ANNIVERSARY

In 2024, the SNE will celebrate its 50th anniversary. Is a program of activities for this celebration already planned?

Once the new Board has been formed, the first step is to create a working group comprising members of the various committees and members with experience organizing previous anniversaries.

I remember celebrating the 25th anniversary when a concert was organized with the Escuela Superior de Música Reina Sofía in the Auditorio Nacional. I love classical music, and I thought it was an exciting initiative. But, as I said, this working group will propose the initiatives to be developed, with the fundamental objective of uniting professionals of all generations in this important celebration.

RELATIONS WITH OTHER ORGANIZATIONS

The relationship with other entities, such as the Spanish Society for Radiological Protection, Foro Nuclear, or the Nuclear Safety Council, is a constant for the SNE. What initiatives do you consider relevant in this regard?

Indeed, the Society has maintained a straightforward relationship with other organizations for years, particularly the SEPR, with which we have renewed our collaboration agreement. It should be borne in mind that many professionals participate in both societies.

We also have agreements with various nuclear societies worldwide, such as the US NSA, the Mexican NSA, and the Chinese NSA, with which we will maintain joint actions.

In short, the Company is open to any agreement, always respecting our objectives and strategic lines, to promote nuclear energy.

You have been president of the European Nuclear Society; what are the advantages for the SNE and Spain of participating in the ENS?

It was a difficult time for me because I started my presidency in April 2020, during the pandemic, so we had to hold all Board meetings virtually.

PROFESSIONAL PROFILE

Emilio Mínguez Torres is a recognized expert in nuclear engineering with an extensive professional and academic career at the Universidad Politécnica de Madrid (UPM). He holds a Ph.D. in Industrial Engineering from the UPM. He has held various university management positions, such as professor of Nuclear Technology, director of the School of Industrial Engineering, and vice-rector of the Polytechnic University of Madrid, where he is currently professor emeritus.

He began his research activity at the Nuclear Energy Board in 1973, and in 1981 he was a founding member of the Nuclear Fusion Institute of the UPM. He has participated as principal investigator in the EU Framework Programmes projects and collaborated with American and European research centers.

He has also been secretary general and director of the Official Central Electrotechnical Laboratory of the Foundation for the Promotion of Industrial Innovation and vice-president and founding member of the European nuclear training network ENEN. He has been a member of the Euratom Scientific Technical Committee and the High Scientific Council of the European Nuclear Society, of which he was president from 2020 to 2022.

Mínguez has received several awards, such as the Jan Runermark Prize awarded by the European Nuclear Youth, and has been president of the Publications Committee launched by NUCLEAR ESPAÑA.

Mínguez is an active member of the SNE, having been a member of the Board of Directors for two terms, and participated in various committees organizing the Annual Meeting. He is also a member of the Committee of Experts of the Nuclear Safety Council, president of the Association of Industrial Engineers of Madrid (AIIM), member of the Governing Board of the Official College of Industrial Engineers of Madrid (COIIM), and rector of the University of the Caribbean (UniCaribe) since last January.

In March 2023, he was elected president of the Spanish Nuclear Society.

Despite this, we maintained the relationship between all nuclear societies, and our 2020 Virtual Meeting confirmed that we could move forward with activities. In addition, the role of ENS and other European entities in incorporating nuclear energy into the European green taxonomy has been crucial.

It is worth remembering that the SNE was one of the founding societies of the ENS. Currently, the treasurer Pablo León is a member of the Board, and we have many votes. The SNE has managed to organize ENS's meetings, the most recent being "Top Fuel." It is also important to have joint activities. In this regard, at the Cartagena Annual Meeting, we invited the president of the ENS, and we will do so again in Toledo.

THE MAGAZINE

In 2022 the magazine NUCLEAR ESPAÑA celebrated the 40th anniversary of its first issue. How do you assess this anniversary? You were part of the Publications Commission that made it possible.

I was sorry not to be able to participate in the meeting of the Commission presidents. We should all congratulate ourselves on this anniversary because it is an important milestone. When we were planning to launch the journal in 1982, we were asked by the ENS whether we were sure to make it monthly because theirs was bimonthly. Shortly afterward, the journal of the European Nuclear Society ceased to be published, and yet our publication has survived until today, and this is thanks to all those who have made it possible, from the authors and the companies that support it with advertising and the availability of their professionals to all the members of the Commission and the publishing company Senda.

> **"The newspaper library will allow universities to obtain important data not only from a technical point of view but also from a sociological point of view, which will be very useful for doctoral theses"**

And the transformation of the magazine into a web portal?

The magazine's opening to the internet has allowed the articles to be read by many more people from different media, such as mobile phones, making it an essential means of dissemination. Many countries around the world also consult it.

And in this line of digitalization, I refer to the newspaper library, which constitutes an essential collection of historical and technical knowledge. From here, it should be disseminated among universities because it will allow them to obtain crucial data not only from a technical point of view but also from a sociological point of view, for example, for doctoral theses. The challenge now is to disseminate the newspaper library to all those who might be interested.

THE PARTNERS

The SNE comprises individual and collective members. What initiatives will the Society develop to maintain services to its members or to promote others according to the demands of the moment?

In the line of continuity indicated above, it is essential to continue decentralizing the Society's activities, for example,

those organized by the Programmes Commission. We want to involve all professionals, especially those in nuclear power plants.

Commissions such as Young Nuclear and Women in Nuclear (WiN) have communication as one of their objectives. How do you analyze the role of both in promoting nuclear energy?

WiN and Jóvenes Nucleares are undoubtedly vital because they promote recruitment work. For example, in the School of Industrial Engineers of the UPM, the number of students in the master's degree has doubled, exceeding twenty. We would have to analyze the reasons for this, but I believe the communication work and promoting young nuclear have been relevant.

Students know the global geostrategic and energy situation, which defines their preferences. It is interesting to see how students are attracted to topics such as modular reactors or hydrogen generation. They are competent students, and I predict an excellent professional future.

THE UNIVERSITY WORLD

You have held relevant responsibilities at the Polytechnic University of Madrid and ENEN (European Nuclear Education Network). What role does ENEN play in the management of young talent?

ENEN is a reference as a nuclear training network. During my vice president years, several Spanish universities joined, such as the Polytechnic Universities of Madrid, Catalonia, and Valencia. This has allowed us to have a strong relationship with the European university world, with student mobility, specialized summer courses, and joint projects.

There are other similar networks in Asia, Africa, and Latin America. We actively participate in the latter from Spain, supporting its creation; it has the participation of most of the countries in the region and has allowed many groups to receive funding to participate in congresses and current projects.

A report presented at the Ceiden General Assembly indicates that companies in the nuclear sector will require around 1500 graduates in the next five years. Are university programs aligned with the needs of the industry, specifically in the energy sector?

The fact that students are taking the Master's degree is a sign that the needs of the labor market are being met.

In this regard, the future of the nuclear sector and the country in general, of the industry and of the economy, depends on having trained professionals. For this reason, it is essential to promote quality training in scientific and technological areas and to provide suitable career opportunities.

THE IBERO-AMERICAN EXPERIENCE

Last July, you were elected Rector of the Universidad del Caribe. A new challenge in your extensive university career. How are you experiencing these first months in this responsibility?

I am very interested. UniCaribe is a private university aimed at students from the lower middle class who are working and with a very different teaching model to the one we know, in which the course starts every month, with online classes and some face-to-face classes on Saturdays, so that those who are working can attend. We currently have about 16,000 students, which is growing mainly because of the interest during the pandemic to take online classes.

IN SINGULAR

- **The book is on your bedside table:** Arturo Pérez-Reverte's "The Italian" and Nouriel Roubini's "Mega Threats."
- **A landscape to which I always return:** Any sea with warmth, which I now enjoy in Santo Domingo.
- **Favorite music:** Beethoven's piano concertos and jazz, as always, such as Marco Mesquida, Bill Evans, or Roberta Flack.

What challenges do universities in the region, and specifically UniCaribe, face?

There are two lines on which we will be working intensively shortly. On the one hand, it is necessary to promote research. The Government of the Dominican Republic will launch a call for proposals in various research areas. We will undoubtedly boost the lines dedicated to modular reactors and hydrogen from the University.

We also plan to incorporate the analysis of radiation applications in sectors such as agriculture and medicine and the management of the waste generated.

This new stage allows me to apply my experience in a university project with a great future.

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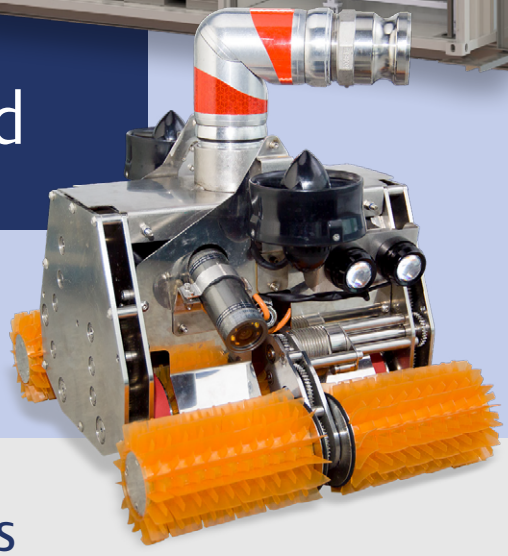

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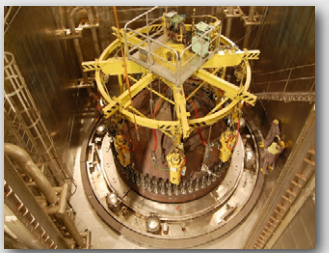



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OPENING SESSION

ÓSCAR GARCÍA

DIRECTOR OF THE SCHOOL OF INDUSTRIAL ENGINEERING OF THE POLYTECHNIC UNIVERSITY OF MADRID

Welcome. Thank you very much for being here. I want to welcome you all to the Escuela Técnica Superior de Ingenieros Industriales Universidad Politécnica de Madrid, which is your home to host another year of this conference to share experiences in the nuclear sector.

There is no need to say much here in favor of the nuclear sector; far from it, we are all in line. But I would like to congratulate everyone in the room, the whole industry, for the change in perspective that has taken place in the appreciation of the nuclear industry by society in general in recent years. An excellent job has been done raising awareness and showing that it is clean energy. This has been recognized in some countries as ale promotion of fusion. Many things have changed my perspective, and I am pleased. And, of course, in this House, we have always been committed to being there. This is a booming sector in the world, and we will contribute what we can in this line.

I also know that apart from professionals and people with a lot of responsibility at the headquarters, we have students from home in the audience. I want to take this opportunity to tell them to take advantage of the day to listen to the presentations and talk to the people speaking to network in the cafés, which is another essential part of these events. I encourage you to do so with the people you meet here because they will bring a lot.

I want to pass the floor to the President of the Spanish Nuclear Society

"Spain cannot afford to do without nuclear energy amid the energy transition. Because the cost of the alternative is unaffordable"

and thank you all for your attendance in the hope it will be a very productive day. And finally, to take up only a little bit of time. Thank you very much.

HÉCTOR DOMINGUIS

PRESIDENT OF THE SNE*

Welcome to the thirty-fourth Operational Experience Day, a classic SNE meeting with the operation of our plants as the protagonist.

Finally, after three years of holding this event in a virtual format, we met physically, recovering the value of personal relationships in this meeting.

On behalf of myself and the Board of the Spanish Nuclear Society, I would like to thank everyone who made this event possible, especially all the members of our Programmes Committee.

I would also like to thank the Escuela de Industriales, and its director, Óscar García, for the magnificent welcome and all the facilities that, once again this year, they have given us to hold this conference.

I would also like to thank José Manuel Redondo, Deputy Director General for Nuclear Energy of the Ministry for Ecological Transition and Demographic Challenge, for joining us again this year at this opening ceremony.

And, of course, thanks to all the directors and heads of headquarters who are taking part today as the main protagonists of this meeting.

Before giving way to Jose Manuel Redondo, I would like to share with you some reflections...

If recent turbulent years have taught us anything, it is the IMPORTANCE of factors such as external dependence and the RELEVANCE of a balanced mix.

With everything we have experienced since 2019 (a pandemic, a supply crisis, extreme weather events, geopolitical crises, and a war in Europe with global consequences and repercussions...), one realizes how weak and exposed a country can be without proper energy strategy.

We have seen how energy prices have increased 20-fold in just a few months. How extreme weather conditions have called into question the security of power supply in our homes, and how dependence on fossil fuels has led to the need for power rationing in some countries and has strained the electricity system across Europe.

And all this at a time when we face the challenge of curbing global warming, reducing CO_2 emissions, and promoting the use of low-carbon energy.

Given this situation and the events of the last two years, it seems that the world and Europe are reacting by complementing their plans to install renewable energy with plans to extend the life of their nuclear reactors, announcing new reactors, and accelerating programs to develop new technologies (mainly SMR and fusion) as a strategy to reduce energy dependence, competitively guarantee electricity supply and meet decarbonization objectives.

But in Spain, we find it more complex. We continue to defend a National Integrated Energy and Climate Plan that was defined in a very different context to the one we live in today, a plan that, if it remains unchanged, will jeopardize the competitiveness of our system and the fulfillment of the decarbonization objectives.

As we have said repeatedly, Spain

*The Operational Experiences Day was Hector Dominguis' last act as president of the Spanish Nuclear Society, a position which, following the General Assembly held on the same day, is now owned by Emilio Mínguez.

“The SNE has drawn up a manifesto in which nuclear professionals confirm our commitment to work in a safe, reliable, and sustainable manner in the operation of the facilities to maintain their operating capacity for decades to come”

cannot afford to do without nuclear energy amid the energy transition. Because the cost of the alternative is unaffordable.

For this reason, the Board of Directors of the Spanish Nuclear Society has drawn up a manifesto in defense of nuclear power plants as a strategic energy source in Spain.

A manifesto that was presented yesterday at a press conference and which you can all access to read, disseminate and support from the website of the Spanish Nuclear Society (www.sne.es).

A document in which nuclear professionals recall and confirm our commitment to work safely, reliably, and sustainably in operating the facilities to maintain their operating capacity for decades to come.

And in which at the same time, we request the following:

1. The contribution of nuclear energy to the PNIEC should be reviewed.
2. Creating a stable and adequate economic, fiscal, and regulatory framework allows the continuity of the nuclear fleet in Spain.
3. Recognition of the critical role of nuclear power plants in the production of baseload power that complements and supports the growth of renewables.
4. To end the opposition to nuclear power plants on the grounds of generating radioactive waste when there are proven technological solutions for both temporary and permanent management.
5. Public and political recognition should be given to the role played by Spanish nuclear power plants in providing a necessary and strategic asset such as electricity in a stable manner.

I wish that this message is heard and that the necessary measures are adopted for its fulfillment since I consider the continuity of the Spanish nuclear fleet to be a matter of the utmost importance for the future of our country. Thank you very much.

And now, I would like to give way to Jose Manuel Redondo, who once again this year honors us with his presence at this Operational Experiences Day.

JOSÉ MANUEL REDONDO

DEPUTY DIRECTOR GENERAL FOR NUCLEAR ENERGY IN THE MINISTRY FOR ECOLOGIC TRANSITION AND DEMOGRAPHIC CHALLENGE

First, I would like to thank the SNE for inviting me to participate again this year, on behalf of the Ministry for Ecological Transition and the Demographic Challenge, in this conference on the experiences and perspectives of Spanish nuclear power plants.

Once again, with their contribution of 20.2 % of the electricity generated, Spanish nuclear power plants once again played a vital role in the Spanish electricity supply.

Indeed, in 2022, after the production of combined cycle plants, which accounted for 24.7%, and wind energy, whose contribution was 22.2%, nuclear power came in third place with a contribution of 20.2%, maintaining the leading role it has played in recent years in guaranteeing the supply to Spaniards of something as fundamental as electricity.

There is no doubt that these production levels of our nuclear power plants - bearing in mind that their installed capacity is barely 6% of the total, as well as the fact that, more and more frequently, they are asked to reduce their load due to network operation-

Concerning the decommissioning of Garoña, we are awaiting the CSN report and the issuing of the EIS, which must be before authorizing phase 1 of the decommissioning of this plant and authorization for the transfer of ownership from Nuclenor to Enresa

al issues - are once again the result of the excellent work carried out by the professionals who form part of the Spanish nuclear industry, some of whom I have the honor of sharing this podium with today.

RPSRI

I am now going to make the usual reference to the most relevant issues that, since the last Conference on experiences and perspectives, have taken place in the Subdirectorate General for Nuclear Energy.

On 21 December last, Royal Decree 1029/2022 of 20 December was published in the Official State Gazette (BOE), approving the Regulation on health protection against the risks arising from exposure to ionizing radiation, which largely transposes Directive 2013/59/Euratom, establishing basic safety standards for protection against the dangers arising from exposure to ionizing radiation.

- As regards the impact of this new regulation on the operation of nuclear power plants, the following should be noted:
  - The reduction of the equivalent dose limit for the crystalline lens in occupational exposure from 150 to 50 mSv/year should be highlighted. About exposed workers, the practical dose limit is reduced from 50 to 20 mSv/year. It is now permitted to average over five years to ensure compliance with this limit, as was previously possible.
  - It is guaranteed that subcontracted workers receive the same protection as the workers who form part of the plant's staff, repealing Royal Decree 413/1997, on the operational safety of external workers at risk of exposure to ionizing radiations due to intervention in a controlled area.
- For workers in industries processing materials containing naturally occurring radionuclides, such as oil and gas production; coal-fired power generation; geothermal power generation, mining, and processing of phosphate rock; use of thoriated tungsten electrodes in arc welding; ceramic industry: or mining and processing of metallic ores other than uranium, these exposures are to be managed in the same regulatory framework as, for example, radioactive installations.
- The average radon gas concentration value for workers is lowered by setting the weight of 300 Bq/m3 in terms of the annual average radon concentration in the air for workplaces.
- It is foreseen that operators of workplaces in underground workplaces such as construction sites, tunnels, mines, or caves; workplaces where groundwater is processed, handled, or used, such as thermal activities and spas; and in all workplaces located at ground or first-floor level in priority municipalities, shall estimate the annual average radon concentration in air in all areas of the workplace where workers are required to stay or to which they have access because of their work, excluding open-air areas.
- Regarding cosmic radiation exposure of aircraft crew personnel, air carriers must establish a radiation protection program when aircraft crew personnel may receive a dose over 1 mSv/year.
- On the other hand, as far as members of the public are concerned, it should be noted that:
  - The current adequate dose limits for members of the public are maintained (1 mSv/year), and the current acceptable dose limits for members of the people (1 mSv/year) are supported,
  - Protection from radon exposure in enclosed areas such as dwellings and publicly accessible buildings is included as a new feature.

REVIEW OF THE RINR

Furthermore, a Draft Royal Decree is being processed to approve the Regulation of nuclear and radioactive facilities and other activities related to exposure to ionizing radiation, which will replace the current RINR.

This new Regulation, analogous to what has been done to date in the RINR, will regulate the system of administrative authorizations, both for nuclear and radioactive facilities and for other activities relating to ionizing radiations; the design of personnel accreditations and the obligations of the licensees of such facilities or activities; as well as their inspection and control systems.

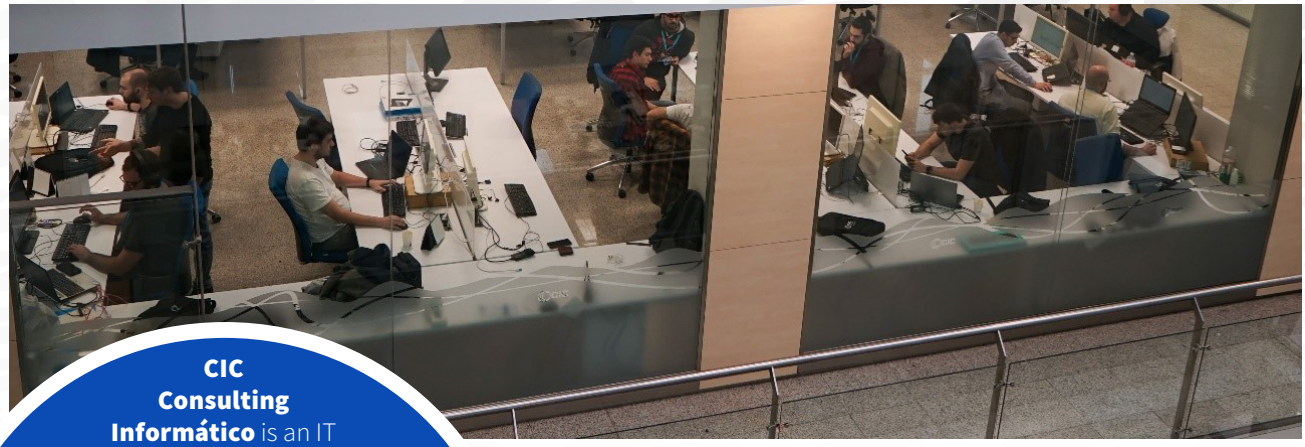
The adoption of this Regulation is based on the following grounds:

- The need to complete the regulatory framework related to nuclear energy, transposing the aspects of Directive 2013/59/Euratom on radiation protection regarding authorization procedures for the facilities mentioned above and activities.
- The harmonization of the provisions of this Regulation with the requirements of:
  - The Regulation on nuclear safety at nuclear installations, approved by Royal Decree 1400/2018, of 23 November, which transposes Directive 2014/87/Euratom, amending Directive 2009/71/Euratom, establishing a Community framework for the nuclear safety of nuclear installations and,
  - The recently adopted Regulation on health protection against risks from ionizing radiation exposure.
- The desirability of building on the experience gained in implementing the RINR hitherto in force.

The CSN and the Ministry are assessing the 400 allegations submitted during the public information process, which took place between 25th October and 22nd November.

SYSTEMS DEVELOPMENT AND INTEGRATION FOR THE NUCLEAR SECTOR

CIC has over thirty years of experience in the nuclear sector. With a highly qualified and experienced workforce we have worked on very important projects in the sector.



CIC Consulting Informático is an IT consulting, engineering and project development, and communications company. Our mission is analyzing our customer´s needs, building products and implementing information technology services and solutions that help our clients achieve their business objectives.

With a team of over 300 highly qualified professionals, CIC provides experienced and efficient solutions whilst always maintaining the highest quality and safety.

INTERNATIONAL GROWTH

CIC works in more than 40 countries. This has allowed us to acquire expertise and specialization in such diverse sectors such as Energy and Utilities, Transport and Logistics, Industry, Critical Infrastructure Management and the Public Sector. Internationally, CIC bases its strategy on the sale of proprietary products, such as SGRwin and IDboxRT, through a growing network of partners.

CIC's goal is not only to develop projects that add value and offer quality service to our clients, but also **continue improving and innovating in their goals of decarbonization and extending the lifespan of nuclear power plants**.

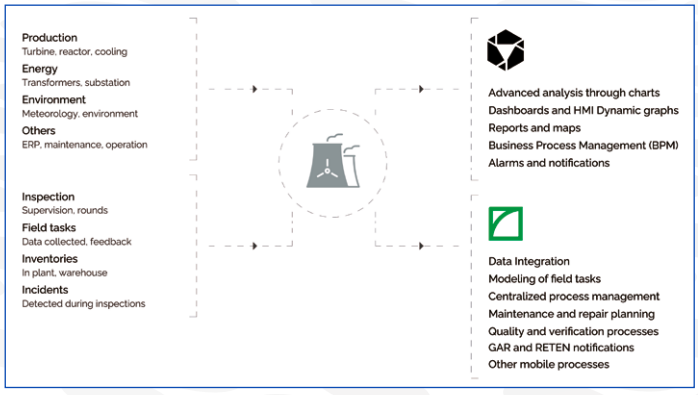
CIC AND THE NUCLEAR SECTOR

Since its inception, CIC has focused a large part of its activity on the nuclear sector. It has extensive experience in the development of technologies that are present throughout the nuclear energy value chain.

CIC has created services and software solutions that optimize the operation and maintenance of the Nuclear Industry, maximizing the safety, reliability and efficiency of a nuclear facility, all the while assisting in the maintenance of the highest safety levels.

MANAGEMENT INFORMATION SYSTEMS, CUSTOMIZED DEVELOPMENTS AND CONSULTING SERVICES

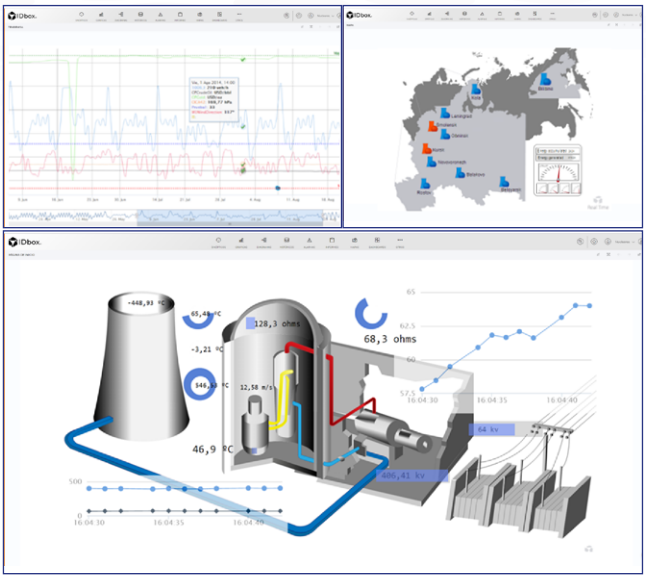
The nuclear sector is a highly regulated, high-tech industry that requires precise and efficient management of information. The tools developed by CIC in this area cover all the management processes required by the industry: Document Management, Digital Signature and document scanning, employee portals, Business Intelligence, attendance control, procurement, effluents, etc.



CIC has the experience and expertise in consulting and development services that the Nuclear Industry needs. In addition, CIC has developed LUCA BDS, a platform that provides the greatest guarantees of success in sector related projects, allowing for the analysis of large datasets in real time from different data sources. This software makes it possible to identify patterns and trends, visualize information in a clear and concise way on a single platform, where each individual user has a personal area, that he/she can use, including any queries and reports of great use for their work.

PROCESS COMPUTING

CIC has carried out numerous projects, both in Spain and abroad, in the field of monitoring and control, through its artificial intelligence product IDboxRT.



In nuclear power plants, it is essential to have a tool that provides a global view of all systems in real time. This product allows you to monitor the critical processes of large networks. IDboxRT is being used in the nuclear power plants of Garoña, Ascó, Vandellós, Almaraz and Trillo in Spain.

At nuclear power plants, IDboxRT:

- Integrates and displays all the plant´s operating information in a cohesive, unified and standardized way, by using graphs, dashboards and HMI synoptics.
- Increases productivity by allowing to reduce time in the decision making process (Business Process Management).
- Serves as a tool that plant personnel can use to access data from a fixed or mobile device.

IDboxRT, in Constant Evolution

Two years ago IDboxRT 3.0 was launched. This new version, in addition to incorporating improvements in the management of information, also provides a new TESSA inventory management module. It supplements the signal data with the possibility of managing the rest of the information of the associated physical components: contracts, suppliers, preventive check ups...

IDboxRT is characterized for the speed that it can process large volumes of information (Big Data) and the use of its modern user interface based on web technology.

SGRwin and Critical Network Management

CIC has another very successful product directed at the critical services sector: SGRwin, a network management system, based on FCAPS, which is currently being used by 180 customers worldwide and supports more than 150 manufacturers. A multi-manufacturer and multi-technology tool, which consolidates the management of “legacy networks” and future generation networks, allowing for the convergence of OT & IT. It gives you the information you need on the performance of the entire network, allowing you to perform whatever activity you want.

SGRwin offers you a suite of solutions for all the requirements that the nuclear industry may have for the management and monitoring of their complex networks.

Furthermore, SGRwin provides alarms, that integrated with IDboxRT, form a single system in which the management of both plant data and network information is possible, as well as from other important networks.

MOBILITY AND NUCLEAR ENERGY

Mobility has revolutionized the way field data is collected in a nuclear power plant.

CIC has created FIELDEAS. It is, as its name suggests, a mobility product that optimizes the operation and maintenance of field work and maintenance. FIELDEAS permits for a correct integration of information to be achieved, the modeling of field tasks, efficient centralized management of processes, administration planning, GAR and RETEN notifications, among others.

INFORMATION SECURITY PROJECTS

CIC has developed a full solution for the integrated safety strategy of nuclear power plants. With FOR3, a complete management of information security is included. Also, network perimeter security, Cyber Defense and Monitoring and End Point Security are featured.

The projects developed by CIC always comply with and are guaranteed by the security standards established and accepted by ISO 27001, ISO 27001, ISO 27001 and ISO 27001.

GAROÑA DECOMMISSIONING AUTHORIZATION

Outside the regulatory sphere, as regards the decommissioning of Garoña, we are awaiting the CSN report and the issuing of the EIS by the Directorate General for Environmental Quality and Assessment of the Secretariat of State for the Environment, which must precede the granting of authorization for phase 1 of the decommissioning of this plant and the approval for the transfer of ownership from Nuclenor to Enresa. In principle, this authorization is expected to be granted in the first four months of this year.

Previously, on 11th April 2022, the Spent Fuel Management Plan was approved, which, by the provisions of the RINR, allows for the granting of the decommissioning permit without the fuel having been unloaded from the pool.

Phase 1 is expected to last three years, and the main activities to be carried out in this phase will be loading the spent fuel into containers and transferring it from the pool to the plant's ATI. The dismantling of the turbine building to be fitted out as an auxiliary decommissioning building is necessary for the execution of phase 2.

Subsequently, phase 2 of the decommissioning will have to be authorized, which will also have an associated Environmental Impact Assessment and is expected to begin in 2026, with an estimated duration of 7 years. Phase 2 will include dismantling the reactor and the rest of the buildings with radiological implications, followed by the decontamination, declassification, and demolition of buildings, concluding with the restoration of the site.

EXPANSION OF EL CABRIL

On the other hand, as contemplated in the 7th GRWP project, which I will discuss later, the expansion of El Cabril is planned since, with the 28 cells currently available for the storage of low and intermediate-level waste, it does not have sufficient capacity to store the scraps of this type that are expected to be generated in Spain. New cells will therefore be needed by 2028.

This project involves constructing a new platform (Plataforma Sureste) with 27 storage cells. The project will be developed in two phases: 12 cells will be built in the first phase and 15 in the second.

From 21 December to 6 February, the enlargement project and its environmental impact study were submitted to the public information procedure.

SUBMISSION OF TRILLO'S RENEWAL APPLICATION

In addition, the operator of Trillo has to submit its application for the renewal of the operating authorization by 31 March next.

I remind you that, initially, in the 2014 Order granting the renewal of the authorization of this plant until 17 November 2024, its owner had to submit the renewal application three years earlier, i.e., before 17 November 2021.

However, as this date approached, CNAT asked the Ministry, taking into account the precedents of the other plants about the deadlines between the submission of the renewal application and the expiry date of the authorizations, to take the necessary steps to ensure that the application for renewal of the approval could be submitted "only one year in advance." CNAT also referred to the uncertainties it faced regarding the plant's economic viability for the period for which renewal was sought, i.e., ten years.

Taking this request into account, by Order of 15 November 2021, it was established that CNAT might submit the renewal request on the occasion of the submission of the Periodic Safety Review of the plant-based by the Nuclear Safety Council on 31 March 2023 - i.e., just over one year and seven months before the expiry date of the current authorization.

PROCESSING OF THE 7th PGRR

As regards the procedure for approval of the 7th GRWP, following submission of the initial version, along with its Strategic Environmental Assessment, to the process of public information and

consultation with the affected public administrations and interested parties, which took place between April 12th and June 16th last year, and subsequently to a report by the Nuclear Safety Council and the Autonomous Communities, On 13th February last, the Directorate General for Energy Policy and Mines sent to the Directorate General for Environmental Quality and Assessment the file containing the final version of the 7th GRWP, along with the Strategic Environmental Study, for the Secretariat of State for the Environment to issue the corresponding Strategic Environmental Statement.

Once this Strategic Environmental Statement is available, the proposal for the 7th GRWP will be submitted to the Council of Ministers for approval. Subsequently, this Plan will be forwarded to the Spanish Parliament and the European Commission to comply with Directive 2011/70/Euratom, which establishes a Community framework for the responsible and safe management of spent nuclear fuel and radioactive waste.

The final version of this 7th PGRR envisages a baseline scenario that includes the following:

- A planning horizon from 2022 to 2100.
- The cessation of nuclear power plant operation between 2027 and 2035, consistent with the National Integrated Energy and Climate Plan 2021-2030 (PNIEC) and the Protocol for the orderly cessation of nuclear power plant operation, was signed in March 2019 between Enresa and their owners.
- As regards the decommissioning and dismantling of nuclear power plants, it is envisaged:

Immediate full decommissioning of nuclear power plants after they have ceased operation.

A forecast of the start of preparatory work for decommissioning: 3 to preferably five years before cessation.

A projected start of decommissioning of at least three years after cessation.

  - An expected decommissioning duration of 10 years.
  - In the case of Vandellós I, the last phase of its decommissioning will be carried out in 2030, with a planned duration of 15 years.

- The extension of the El Cabril installations, which I have already referred to, is envisaged regarding managing low and intermediate-level waste.
- About the temporary management of spent fuel, it is envisaged:

  - The continuity of actions to extend the capacity of the Individualised Temporary Storage Facilities for spent fuel at nuclear power plants to allow for their operation and decommissioning.
  - The start-up of seven Decentralised Temporary Storage Facilities at the plant sites for spent fuel and high-level waste until their transfer to the disposal facility. These ATDs should have complementary facilities or additional measures to maintain the spent fuel casks.
    In these facilities, consideration will have to be given to the introduction of the concept of recoverability required by the CSN and to guarantee this recoverability at the fuel assembly level when there are no longer any pools at the nuclear power plants as their dismantling progresses, the necessary means will have to be available at the site of one of the plants, including a hot cell, such that recoverability at fuel assembly level will be ensured, as a contingency measure, by transferring the cask to the facility with the hot cell.
  - As regards the temporary storage of wastes resulting from the reprocessing in France of spent

"Regarding the procedure for the approval of the 7th GRWP, after the initial version was submitted to the public information and consultation procedure with the affected public administrations and interested parties, and subsequently to a report by the CSN and the autonomous communities in the field of land use planning and the environment, the procedure continues to be processed"

fuel from Vandellós I and, where appropriate, special wastes from dismantling the plant, the start-up of a temporary storage facility on the site of this plant is contemplated for 2027.

- Regarding the definitive management of spent fuel and high-level waste, the commissioning of a Deep Geological Disposal Facility is envisaged for 2073. However, it is pointed out that the total duration of the program for its entry into operation could be shortened depending on the time of the stages to be completed with the selection of the site.

I would not want to fail to refer to the abandonment of a facility which, until now, has been contemplated in all the GRWP: I am referring to the ATC.

As stated in the latest version of the 7th GRWP, "after consideration of the allegations made during the public information and consultation period, the difficulties encountered in achieving the necessary degree of social, political and institutional consensus for the construction of a facility of this nature have become apparent, and it is therefore considered unfeasible to have a CTS facility."

Independently of this argumentation, I would like to make some additional considerations:

1. Although the existence of a CTS has been contemplated since the 1st GRWP, approved in 1987, in the initial version of the Strategic Environmental Study of this 7th GRWP, the CTS was considered to be the best option from all points of view; it is clear that the evolution of the needs relating to the temporary management of spent fuel from the nuclear power plants has meant that at present they all have a CTS on site, except Vandellós 2, which has planned to build its own by 2027.

   This situation means that a CTS as a temporary storage facility, initially intended to allow the continued operation of nuclear power plants when their pools were saturated and their decommissioning, has lost its meaning.

   From the densification of the pools, through the 1st PGRR, in which it was foreseen that this facility would come into operation in 1993; then this date was delayed to 2010, in the 5th PGRR; and in the 6th PGRR, approved in 2006, it was envisaged that this facility would be available in 2011.

   Given this background, I think it can be said that the time has come to a stop kicking the can down the road because another date for the start-up of an ATC may be set, and, for one reason or another, it will not be possible to achieve it again.

   An ATC facility becomes available, and this installation cannot be used due to the impossibility of transporting containers, which could jeopardize the continued operation of a plant.

2. All of the above leads to the conclusion that, from the point of view of guaranteeing the operation of the plants for the planned time, the best solution is the ATD solution.

FAREWELL

It is evident that, since the last celebration of this Day of experiences and perspectives, something that was then very difficult to imagine, such as the invasion of Ukraine by Russia, has led to a radical change in the geopolitical context, which has had as one of its consequences the energy crisis that we are trying to get around as best we can, and which has meant that security of supply has come to the forefront of the energy supply objectives of many countries, demonstrating, as they say now, "a change of paradigm."

This has highlighted the importance of diversification of supply sources, particularly in the case of countries that are highly dependent on conventional energy resources from abroad, as is the point of Spain.

And to conclude, it only remains for me to reiterate my recognition of the workers in the Spanish nuclear sector who, over the past year, have contributed with their work, their knowledge, and their dedication and, in short, their professionalism to atomic energy once again becoming - it could be said - a fundamental backbone of the Spanish electricity supply. Thank you very much.

ALMARAZ TRILLO

Una alternativa limpia, segura y competitiva

En continuo proceso de mejora, actualización y modernización

SPECIAL SESSION

A SOCIOLOGICAL APPROACH TO ENERGY TRANSITION

The Special Session, A sociological approach to the Energy Transition, has been conceived as a colloquium to be addressed by two social researchers. Dr. Ana Romero de Pablos, Senior Scientist at CSIC and researcher in Philosophy of Science and Technology, and Dr. Jesús Gamero, a researcher at the Sociology of Climate Change and Sustainable Development Group of the Carlos III University of Madrid.

The Intergovernmental Panel on Climate Change (IPCC) rules, the European Green Pact of 2019, the European Climate Law of 2021, and the Spanish Law 7/2021 of 20 May on climate change and energy transition require the energy transition to achieve the objectives indicated therein.

In addition to the economic and climate aspects, the Green Pact includes the sociological part, which will be discussed in this session.

We will frame the issue in four areas of analysis:

1. Economic growth, human development, and ecological footprint.
2. Spatial and temporal inequalities and social justice.
3. Human factors and uncertainty.
4. Adaptation through social awareness and governance and public policy.

Moderated by

JESÚS FORNIELES

VOCAL OF THE SNE

ANA ROMERO DE PABLOS

SENIOR SCIENTIST AT CSIC AND RESEARCHER IN PHILOSOPHY OF SCIENCE AND TECHNOLOGY

ECONOMIC GROWTH, HUMAN DEVELOPMENT, AND ECOLOGICAL FOOTPRINT

Figure 1 shows the Human Development Index (HDI) as a method of comparing the well-being of countries, not only economically. The index is made up of indices for per capita income, education, and health. The graph shows how the HDI increases with increasing energy consumption up to a specific value that becomes almost asymptotic at very high consumptions. Another perspective is the evolution of the HDI over time. It can be seen that the average value of the HDI has been increasing in the world since the beginning of its edition in 1990, except for a drop in the COVID-19 period.

Is infinite growth possible? How can we reconcile the satisfaction of human needs and rights with the planet's resources? Do we need new growth indicators? How can we understand the dynamics of energy consumption and its socio-technical implications?

Ana Romero (Ana R.): We know that no energy source, neither traditional nor new, can cover the world's current energy demand equitably. That is why we must control current energy needs rather than create new ones. This idea of the search for a clean, cheap, and inexhaustible energy source to solve humanity's problems has been, as we all know, the subject of science fiction, but nothing could be further from the truth.

We must rethink energy needs, both individually and collectively. Until now, we have taken it for granted that energy will always be there and is inexhaustible.

But we have a recent experiences, such as COVID-19, which have shown how energy consumption can be reduced dramatically quickly. This indeed occurred under particular circumstances and at high socio-economic costs. But we could draw lessons from this experience to think of new ways of structuring economic systems, more in line with social needs that are more in line with a redistribution of resources and increasingly distant from accelerated growth at any price.

The Humanities and Social Sciences have been working for some time now on analyzing behavior related to individual and domestic energy consumption and that of industry, commerce, transport, and public services. To make human needs compatible with the planet's resources, we must first try to understand the many ways in which we interact with technologies and the interpretations we make of the different energy sources.

Thinking about energy needs means thinking about the finiteness of resources. A historical example of this can be found in the 1950s, with the decline in world water resources, which led us to think of other energy alternatives. This is where nuclear energy found its place, among others. We are holding this meeting today, convened by the Spanish Nuclear Society.

Jesús Gamero (Jesús G.): The Meadows Report - The Limits to Growth, 1972 concludes that, without substantial changes in resource consumption, "the most likely outcome will be a rather sudden and uncontrollable decline in both population and industrial capacity."

Current trends of global population growth, industrialization, pollution, food production, and resource depletion continue unabated, leading us to believe that we are very close to exceeding planetary boundaries.

It is possible to alter these growth trends and establish a condition of ecological and economic stability that is sustainable into the future so that the basic material needs of every person on earth are met and they have an equal opportunity to achieve their human potential.

The great acceleration. The data show that the Earth system from 1950 to the present has moved to a new state.

The 'Anthropocene' is a term widely used since Paul Crutzen and Eugene Stoermer coined it in 2000 to denote the current geological time interval, in which many conditions and processes on Earth are profoundly altered by human impact.

One of the most common dates for the beginning of the Anthropocene is the mid-20th century, linked to the Great Acceleration, i.e., after World War II, when human signals in sediments and ice become synchronous and global.

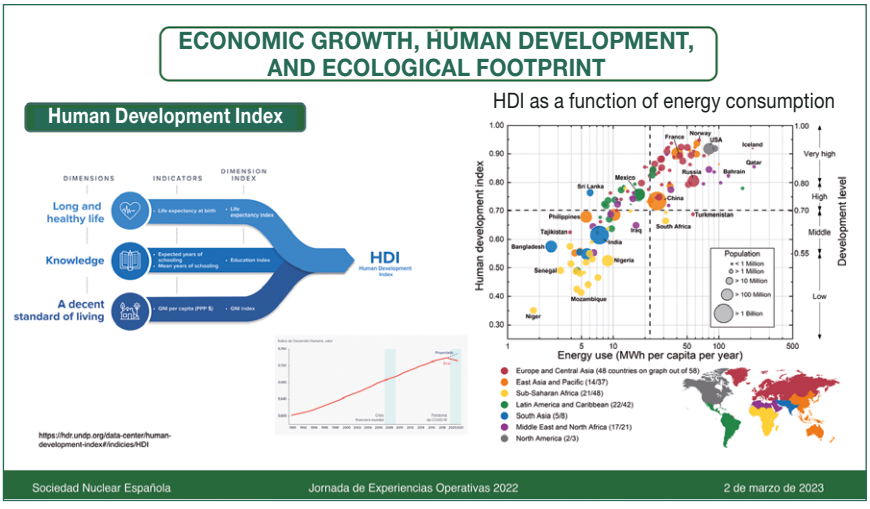


Figure 1.

JESÚS GAMERO

RESEARCHER AT THE SOCIOLOGY OF CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT GROUP OF THE CARLOS III UNIVERSITY OF MADRID

SPATIAL AND TEMPORAL INEQUALITIES AND SOCIAL JUSTICE

Spatial inequalities

Figure 2 shows the global climate risk index with the countries most affected by extreme weather events. The colors range from the mildest to the strongest, indicating the highest risk.

About spatial inequalities, how does the energy transition affect the creation of a new mapping of both human and non-human mobility?

Jesús G.: Climate change, considering its impacts on human societies, can weaken and jeopardise the functioning of our economic, political, and social systems.

When we talk about climate migration, we may imagine developing countries where large masses of people move to escape abrupt climate events such as hurricanes or floods and situations of longer-term impacts such as extreme droughts or rising sea levels.

These processes of human mobility will be accompanied by a degradation of, for example, economic conditions, with a progressive increase in poverty for the populations concerned, who will ultimately have no choice but to leave their places of origin.

In this sense, we must consider not whether such displacements will occur in Spain, which given the evolution of climate change, will happen in one way or another, but how we prepare our political, social, or organisational structures to propose proactive plans for relocation and resettlement.

However, we cannot imagine such situations in countries such as Spain, but it is interesting to consider these scenarios as a reflection.

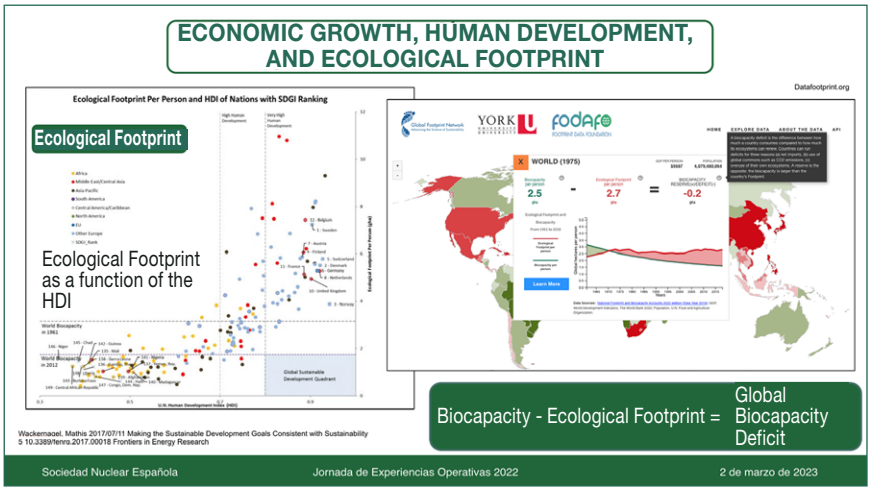


Figure 2.

Temporal inequalities

Figure 3 represents the results of studies on the degree of anxiety of the younger generations concerning climate change, showing their high level of concern.

How does each generation cope with climate change?

Jesús G.: Intergenerational responsibility. We can articulate these narratives based on legacy and long-term thinking beyond our lifetimes.

Firstly, with an important issue: contemporary humans, especially those of the rich nations, have colonized the future; we have taken it over and "usurped" it from future generations who are the ones who should live it. That is why we must imagine the future with a transcendental goal for humanity in mind and from a sense of intergenerational justice that leads us to plan for it beyond our own lives and personal interests.

Therefore, our approaches must lead us to ensure that later generations can meet their basic needs, and climate change may make it difficult to achieve these goals at this point.

The point is that we need to start sowing the seeds of long-term thinking values and practices now.

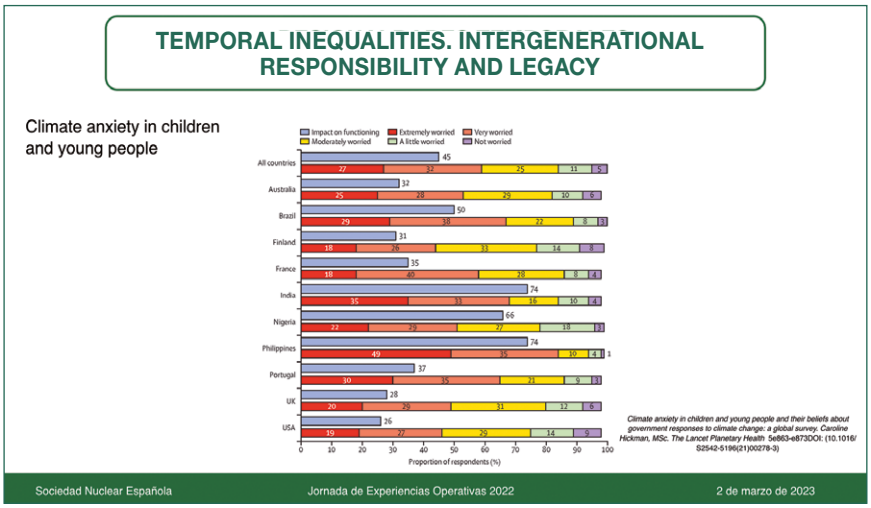


Figure 3.

HUMAN FACTORS AND UNCERTAINTY

Figure 4 shows a picture of the conjunction of uncertainties with new types of luck, such as the Anthropocene effect, social transformations, and intensifying polarisation added to the everyday uncertainty. Projections of the impact of climate change have enormous tension.

How do we, as individuals and as a society globally, deal with the uncertainty associated with climate change? What role do the press and international forums play?

Jesús G.: Regarding uncertainty, sometimes journalistic equidistance, misunderstood, leads on numerous occasions to confront denialists and scientists as equals. This subliminally increases tension instead of showing a broad consensus among the scientific community.

We do not like to deal with uncertainty, and we need certainties to ensure our well-being, which makes it easier in times of high tension for discourses aimed at ensuring this condition of tranquillity and stability in the short term to triumph.

In the face of uncertainty, we must adopt the measures of the precautionary principle, which is precisely part of the nuclear culture.

Ana R.: Uncertainty, which I mentioned earlier, has a lot to do with the confidence that the institutions provide in relation to the emerging issues concerning climate change and the energy transition.

Institutions, companies, and technology industries, national and international, involved in the energy transition should try to understand each other to convey trust; they should become reliable interlocutors and not opponents of collectives and organizations that question the new technologies.

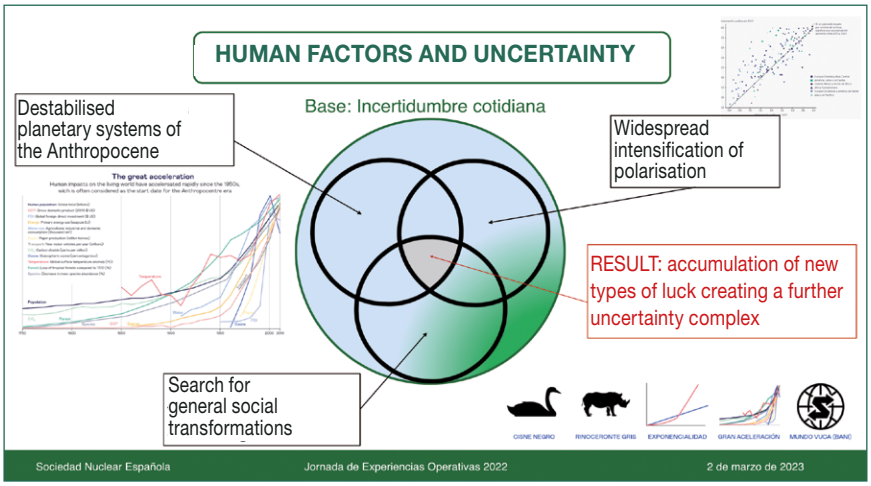


Figure 4.

ADAPTATION THROUGH SOCIAL AWARENESS AND GOVERNANCE AND PUBLIC POLICY

Adaptation through social awareness

The Elcano Royal Institute surveyed 2019 Spaniards and climate change. The conclusion is that the Spanish population is very concerned about climate change, which they consider to be the most significant environmental threat facing the world today. They do not believe that technology alone, with some innovative solution, can reverse the environmental and climate damage if measures are not taken to modify the human behaviors that have produced this deterioration.

The severity of climate change impacts requires a profound social transformation or metamorphosis as an adaptation. How can this be done?

Are we willing to live with less? What is our capacity for renunciation both individually as individuals and globally as a society?

Ana R.: It is not easy to renounce, both individually and collectively, the use of energy: On the one hand, there are discourses, but practices often need to be more consistent, showing inconsistencies. From the humanities and social sciences, studies have begun to be carried out on how we consume individually and collectively, from industry, commerce, transport, and even public services. The results of these studies provide clues and help us think of strategies that seek sustainability and allow us to show other ways of doing things. We are facing a situation that we all have to learn together. Learning by doing is essential because this is the first time we have been in similar or similar cases. Here the social sciences have an exciting space to work, not only to learn about ways of consuming and try to change them but also to learn how society perceives and experiences new technologies.

Jesús G.: Droughts, floods, or storms can destroy crops and property, which in turn can hurt both individual and collective economies, thus affecting the entire economy of a country and increasing poverty through migration. One way to avoid such situations is to provide people with local productive systems with more excellent social protection by encouraging settlement and maintaining environmental protection.

We must consider our capacity for resilience and adaptation as a society in the face of increasingly intense and frequent impacts. We need to be able to transform our society towards more cohesive organisational models that allow us to defend ourselves against environmental impacts better.

Adaptation through Governance and public policy

Are the current governance and policy models appropriate for the necessary social transformations resulting from the energy transition to occur in an orderly and peaceful manner? How can adaptation and general and specific social measures to address vulnerabilities be combined?

Ana R.: Contextualising the problem has advantages. Studies on governance have shown that it makes more sense to connect the local with the general. But how do we make this journey from the small to the large? How do we connect them, favoring and establishing channels of interlocution; we have to listen to the different groups with other interests to seek conciliation because we learn a lot from the bottom up. We learn much from specific problems and cases to have a more globalised vision later.

Jesús G.: The Elcano Institute report shows that the social aspect must be taken into account along with the technological part to build trust and social cohesion.

Change must be bold, transformative, and sometimes disruptive and innovative. We can prevent climate-induced migration with more local social protection to settle on the ground. A society with more social security will also enable environmental protection and vice versa. We need more protected clubs because we foresee a future of scarcity. The era of abundance is over.

Ana R.: We must also look at the role played by public policies, industrial companies, the information that circulates, and how we all construct this information together. We must also analyse the actions of the press because this is an exciting example of disinformation. We must all be more responsible when handling data from different places. Today we are in an academic space, the School of Industrial Engineers in Madrid, which should include in its training and thus open up to new disciplinary areas, analysis, and reflection on how, by whom, and from where information on new technologies is being constructed. A broad group of people from different transdisciplinary spaces should participate in making this information.

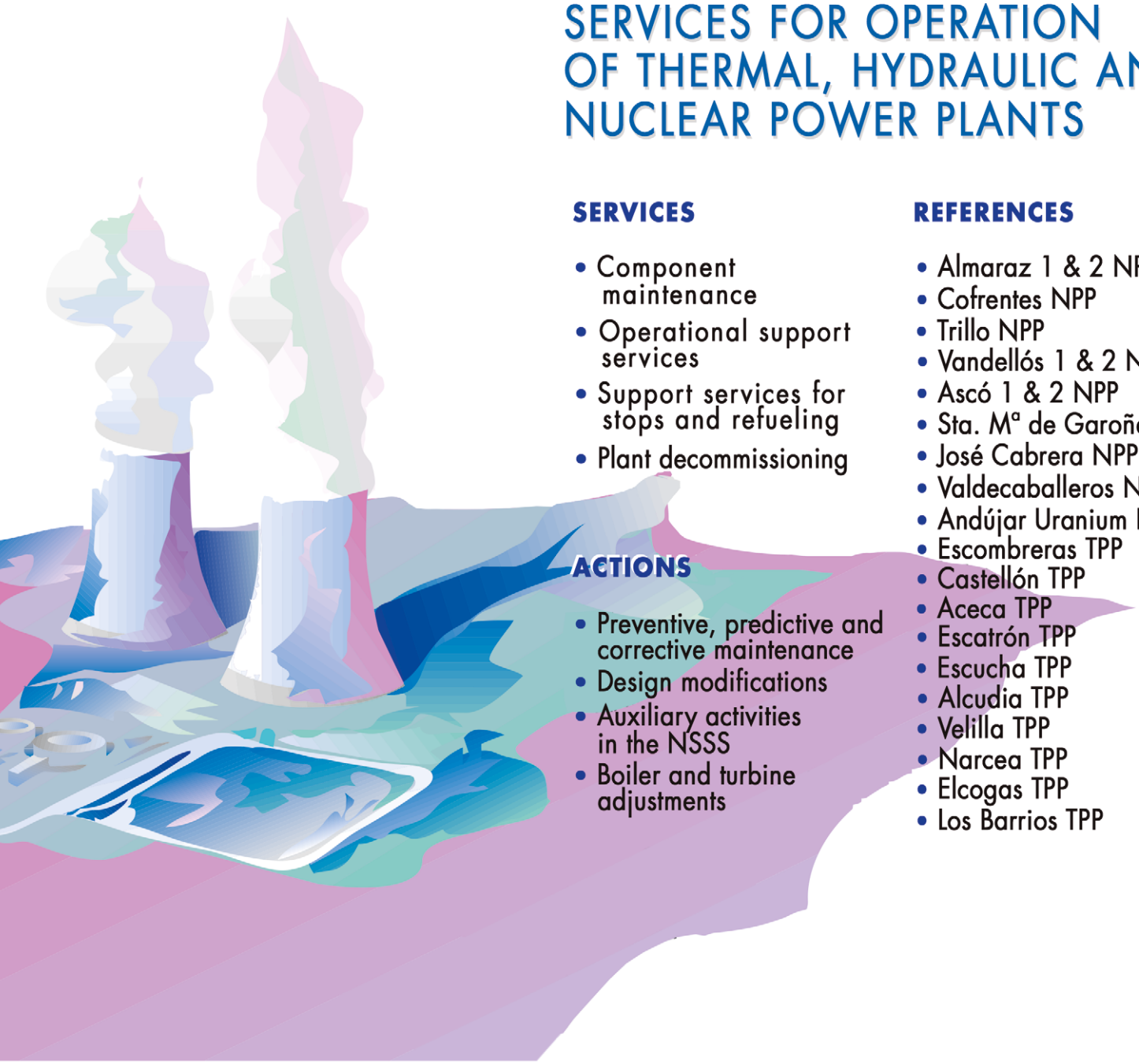
We have come to the end of the Special Session and would like to thank you for your collaboration in the Special Session and, finally, a message you would like to convey in closing.

Ana R.: I would like to thank you for the invitation and say that this colloquium is an example of how to tackle controversial problems.

Jesús G.: This colloquium has allowed us to expose some of the factors involved in environmental processes and the energy transition because of their importance, which should be included in university disciplines.

moncobra

MAINTENANCE AND SUPPORT SERVICES FOR OPERATION OF THERMAL, HYDRAULIC AND NUCLEAR POWER PLANTS



SERVICES

- Component maintenance
- Operational support services
- Support services for stops and refueling
- Plant decommissioning

ACTIONS

- Preventive, predictive and corrective maintenance
- Design modifications
- Auxiliary activities in the NSSS
- Boiler and turbine adjustments

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- José Cabrera NPP
- Valdecaballeros NPP
- Andújar Uranium Plant
- Escombreras TPP
- Castellón TPP
- Aceca TPP
- Escatrón TPP
- Escucha TPP
- Alcudia TPP
- Velilla TPP
- Narcea TPP
- Elcogas TPP
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GRUPO SENDA

FIRST SESSION

JAVIER SALA

DIRECTOR OF COFRENTES NUCLEAR POWER PLANT

As is customary in our industry, for nuclear professionals, safety comes first. I begin my speech by discussing the public nuclear safety results of the SISC (Integrated Plant Supervision System of the CSN).

The data published are those for the third quarter of 2022, which reflect that, for Cofrentes, both indicators and findings are in GREEN, the best condition for safety.

However, we have to say that, throughout the year, Cofrentes has been one quarter, the second of the year, with the indicator of unscheduled automatic stoppages in BLANK. This indicator has already returned to GREEN.

The forecast for what remains to be published until the end of the year is that we will continue to be in the licensee response column in the SISC action matrix, with all indicators and findings in green.

During 2022 we reported eight events, all of which were zero on the INES scale and of no safety significance.

In terms of accidents at work, 2022 was the first year since the plant was started up in 1984 in which we have achieved zero accidents with and without sick leave, a double zero that for us is a significant milestone, a great success that we would like to share with all of you in this session. The challenge is maintaining this order of results, which we know will require much effort.

In radiation protection, 2022 has been a good year, although we have had significant interventions. We have consumed 191 mSv/person out of a total of 325 mSv that we had planned. We continuously put a lot of effort into trying to reduce these levels for the workers at our facility.

Regarding environmental protection, we have ended 2022 without any environmental incidents or events. We have also managed to renew the EMAS III certification, which we at Cofrentes and Iberdrola are very proud of.

Moderated by

PABLO MARTÍNEZ

VOCAL OF THE SNE

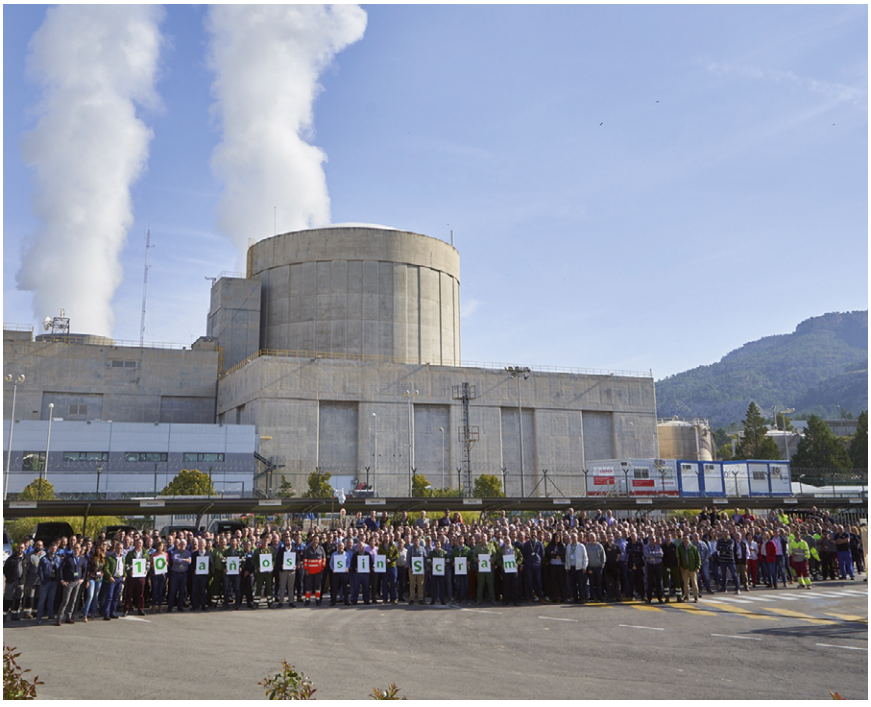
“In the nuclear industry, to achieve a high level of safety and reliability in the plants, we can never stop striving”

The EMAS III certification is one of the most prestigious worldwide in environmental management.

Concerning electricity generation and operational incidents we have had during the year, I would like to point out that in the last refuelling, we installed a generation switch that allowed us to modernise the installation.

However, after four months of operation, this equipment failed on 12 March following a significant short circuit that caused the plant to shut down.

After analysis, we realised that the failure was not immediately repairable. This occurred during a global energy crisis and when there were fears of gas supply shortages and high electricity prices. Initially, when Cofrentes started up, it had a configuration without a generation switch, so our engineering team set to work to see how we could replace the switch with isolated phase bars, i.e., connections that would allow us to return the plant to its original configuration and will enable us to operate safely until the next shutdown with a temporary modification. This modification had to be licensed with the Nuclear Safety Council, which, following the established processes, analysed the implications of the change and positively assessed the proposed temporary modification. The temporary isolated phase busbars will have to be removed during the next refuelling outage in October 2023, and the new generation switch will have to be installed permanently.



Regarding production data, this year, we produced 8327 GWh, almost 90% of our capacity factor, with a forced unavailability of 9.32% affected by the shutdown of the generation switch I mentioned.

These are not good figures for us, but they reflect the stability of a nuclear power plant in the system, which has provided 90% of all the energy that could be produced.

I want to remind you of the phrase that Einstein uttered in 1933 in California where he said that in life, to maintain equilibrium, what we have to do is to keep moving, and I wanted to use it as an analogy to remind us that in the nuclear industry, to achieve excellent safety and reliability in the power plants, we can never stop making an effort.

This leads me to comment on three experiences, one of which is that the physical configuration of the facility has changed continuously over the years, and the plant we see today has little to do with the plant that started up in 1984, as the equipment and systems have undergone constant modernization.

This year we have had an external evaluation of Safety Culture, which using the same methodology as the assessments carried out in 2003, 2009, and 2015, has confirmed that the Cofrentes organisation is evolving positively in the perception that safety is the most important thing. So we have

seen that on a scale of 7, we are approaching 6, and we continue to improve.

Another relevant aspect developed in 2022 was the launch of a risk management improvement plan to detect and mitigate possible threats. This affects all types inherent to our activity: operational, personal, project, business, etc., and risk.

I would also like to refer to a milestone we reached this year, in which we surpassed the 300 TWh generated since inception, and our leading technologist, General Electric Hitachi recognized with the presentation of a commemorative plaque commemorating this significant achievement.

But it is not only a question of reaching milestones but also of continuing to evolve, and proof of this is that, from 6 to 24 March, we will receive 25 experts from WANO on the Peer Review mission, through which they will observe how we carry out maintenance, how we develop the operation, how we work in radiological protection, in engineering..., to help us continue to improve. As you can see, our industry's scrutiny level is constant to achieve continuous improvement.

On the more operational aspects, we continue to develop essential activities associated with spent fuel management. We will complete a second loading campaign of five casks before the next refueling to have sufficient space in our fuel storage pools.

Also, for 2023, as another of the main projects, at the end of the year, we will have the twenty-fourth refuelling, which we will start on 6 October, where we will refuel 216 fuel assemblies, we will check the vessel internals, will also check the turbo group, we will carry out chemical decontamination of the reactor water cleaning system, and we will carry out the integrated containment test that we perform every ten years, among other activities.

Finally, I would like to highlight two critical projects that we will also undertake in our refuelling; the first is the installation of a new generation switchgear for which we have already selected a supplier and have ensured the alignment of the entire supply chain, as well as the appropriate quality controls to ensure its reliability and safe operation.

Another example of the improvement activities we will undertake in the refuelling in line with the latest periodic safety review is the connection of our essential water system to the reactor cooling system, thus enabling new operational strategies and tools in case of need.

I want to end by sharing a picture of the incredible human team at Cofrentes NPP, without whom none of what we have been discussing during this day would be possible.

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SECOND SESSION

JORGE MARTÍNEZ

DIRECTOR OF ASCÓ NUCLEAR POWER PLANT

SAFETY

In 2022, the Ascó nuclear power plant notified the Nuclear Safety Council (CSN), following the protocols established in Safety Instruction IS-10, of 5 reportable events for group 1 and 6 for group 2, all classified at level 0 of the INES Scale. Regarding outages, on 28th July, there was an unscheduled outage at Ascó I due to an automatic shutdown of the alternator. Ascó II carried out the scheduled outage for the performance of refueling work between 22nd April and 31st May.

As regards the SISC indicators, the plant has remained in the "Licensee response" column, with all the indicators in green.

Regarding accidents, the total frequency rate of events (ANAV and collaborating companies added together) has remained below the target set for 2022.

PRODUCTION

Ascó I registered a load factor of 98.15% in 2022, with 8877.66 gross GWh produced, representing 20.4% of the total energy generated in Catalonia and a saving in CO_2 emissions of 3.1 Mton.

For its part, Ascó II registered a load factor of 88.17% in 2022, with a total of 7,993.71 gross GWh produced, representing 18.2% of the total energy generated in Catalonia and a saving in CO_2 emissions of 2.8 Mton.

Moderada por

LOURDES GUZMÁN

VOCAL DE LA SNE

27th ASCÓ II FUEL REFUELLING AND OPERATING EXPERIENCE

During the 27th fuel outage, 64 fuel assemblies of the Ascó II reactor were refurbished. Over 17,000 work orders were executed, and 47 design modifications were implemented to improve the plant's reliability and safety. The work included:

- Inspections of the reactor internals under IS-22.
- Assessing the upper internals' guide tubes and lower welds.
- Replacing the "C" Reactor Coolant Pump motor, among others.

On the other hand, Ascó NPP carried out the densification of the ATI in 2022. This involves repositioning the casks to make more efficient use of the physical space available on both slabs to locate two more casks on each of them.

OUTLOOK FOR 2023

Ascó NPP faces 2023 with the main challenge of executing two refueling outages in one year (the 29th refueling outage of Ascó I is scheduled to start on 29 April, and the 28th outage of Ascó II on 21 October), which include essential works related to the long-term operation committed to in the PSR of the recent renewal of the Operating Permit for the two units, as well as significant tasks such as the replacement of the alternator rotor in both teams. In addition, the Ascó NPP will face a new campaign to transfer spent fuel to the ATI.

ANTONIO MARTINAVARRO

DIRECTOR OF THE VANDELLÓS II NUCLEAR POWER PLANT

SAFETY

During 2022, the Vandellós II nuclear power plant reported a total of 5 reportable events to the Nuclear Safety Council (CSN), following the protocols established in Safety Instruction IS-10. Concerning the SISC indicators, the plant has remained in the "Licensee response" column with all the indicators in green.

Regarding accidents, the overall frequency rate of all events (ANAV and collaborating companies added together) has remained below the target set for 2022.

PRODUCTION

During cycle 25, which ended in October 2022, the Vandellós II nuclear power plant set an all-time record operating factor of 99.2%. In 2022, the plant produced 8221.96 GWh gross, which meant 18.9% of the total energy generated in Catalonia and a saving in CO_2 emissions of 2.9 Mton.

25TH REFUELLING AND OPERATING EXPERIENCE

Vandellós II NPP shut down on a scheduled basis on 15 October to carry out its 25th refuelling outage. After completing the work, the plant was reconnected to the grid on 24 November. During 40 days of activities, more than 9500 work orders were executed, and 34 physical and three software design modifications were implemented to keep the plant in the best safety and reliability conditions to face the new operating cycle and to intensify the plant's readiness for long-term operation.

Among the relevant work carried out, in addition to the renewal of 60 fuel assemblies in the reactor core, of note in the primary circuit was the eddy current inspection of the steam generator 'C,' the replacement of the continuous section plate of 25 guide tubes, the replacement of the reactor coolant pump "A" motor and the replacement of the three safety valves of the pressuriser.

OUTLOOK 2023

The main challenges for 2023 at the Vandellós II nuclear power plant are the preparation for constructing the new ATI100 spent fuel storage facility and developing the WANO Peer Review mission to be carried out between the end of May and the first fortnight of June.

The plant also continues to improve its operational reliability with specific plans aimed at detecting and resolving problems of equipment obsolescence and strict compliance with the facility's maintenance plan with a view to its path toward long-term operation.

THIRD SESSION

FRANCISCO JAVIER VALLEJO

DIRECTOR OF THE TRILLO NUCLEAR POWER PLANT

OPERATION SUMMARY YEAR 2022

During 2022, the gross electricity production generated by the Trillo Nuclear Power Plant was 8224.07 GWh, and the net output was 7679.74 GWh.

C.N. Trillo generated 4.5% of the CO2 emission-free energy produced in Spain in 2022, according to official data published by Red Eléctrica Española (REE).

From 23 May 1988 to 31 December 2022, the cumulative gross electricity production is 280 177.93 GWh with 268 439.0 hours coupled to the Spanish electricity grid.

The Trillo nuclear power plant has been operating stably throughout 2022 except for the Refuelling period (14 May - 18 June).

OTHER INFORMATION OF INTEREST

There has been no automatic reactor shutdown in 2022.

During 2022, there were no lost-time accidents and 612 days without lost-time accidents.

During the year 2022, no containers have been transferred to the ITA. Hence, as of 31 December, 356.24 tonnes of total uranium are stored in the 36 containers containing a total of 800 elements: 32 DPT containers and 4 ENUN32P containers.

XXXIV REFUELLING

The thirty-fourth refueling and general maintenance outage at Trillo NPP began on 14 May and ended on 18 June 2022, thus lasting 35.2 days.

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ÁNGELA CORTÉS
VOCAL OF THE SNE

During this period, more than forty specialized companies serviced the plant.

The most critical reloading data include the execution of 4298 activities, the most representative of which are as follows:

- Replacement of 40 fuel assemblies.
- Spring testing of the upper internals of the reactor pressure vessel.
- Visual inspection of fuel element flow restrictors.
- Overhaul of reactor coolant pump YD30D001.
- Inspection of seals on reactor coolant pump YD10D001.
- Capacity test on 2/6 redundancy batteries.
- Electrical and mechanical review of redundancy 1/5.
- Overhaul of main steam loop 20 valves.
- Overhaul the quick closing valve of train 10 of the nuclear component cooling system (TF).
- Replacement of the AQ generation switch.
- Inspection and sanitisation of essential cooling system lines (EV).
- Overhaul of low-pressure turbine body 1.
- On the secondary side, steam generators' sludge cleaning and visual inspection of the tube sheet are carried out in all three generators. On the primary side, Eddy's current review of 100 % of tubes of YB10B001.

RELATIONS WITH THE CSN

Data from the SISC (Sistema Integrado de Supervisión de Centrales) show that the Trillo plant has all indicators in green. No findings were detected until the third quarter of 2022, higher than green.

In 2022, 5 events were reported to the regulatory body (Nuclear Safety Council).

INTERNATIONAL MISSIONS

The WANO Peer Review took place in March 2022. The international experts highlighted as strengths the activation system of the Emergency Response Organisation (ERO), the procedure for access to high dose areas, the improved method for reporting events to WANO, the process for the control of the added fire risk and management, and the evaluation of changes in plant configuration, design, and licensing basis. Following the Peer Review, C.N. Trillo was recognized as WANO 1.

The Trillo plant is part of a pilot group of nuclear power plants working on WANO's Action for Excellence (AFE) project. This is an industry initiative to help nuclear facilities achieve and maintain excellence in safety and reliability. Its aim is that by 2030 all plants will be operating at high-performance levels, which will be reflected by a rating of 1 or 2 in the WANO assessment, with only a rating of 3 allowed in one-off situations.

CHALLENGES 2023

During the year 2023, the main challenges to be undertaken by the plant include the application for the Operating Permit for ten years (until November 2034) and the continuation of the actions associated with the most critical projects: ZERO ACCIDENTS, the Trillo NPP Future Plan, the execution of refueling outage number 35 during May and June, the major equipment upgrade plan and the loading of spent fuel casks at the ATI.

All this is to be achieved thanks to the work and commitment of the excellent team of professionals that comprise the Trillo Nuclear Power Plant and CNAT.

RAFAEL CAMPOS
DIRECTOR OF THE ALMARAZ NUCLEAR POWER PLANT

ACTIVITIES YEAR 2022

In 2022, Almaraz Nuclear Power Plant achieved the 4th best historical production record and continued contributing electricity to the system, accounting for more than 6.50% of national electricity consumption. The Almaraz nuclear power plant units generated 16,682 million kWh during 2022, with a refueling outage at Unit II and the first nine days of January when the 28th refuelling outage of Unit I was completed. Between the two units, they have accumulated a gross production of 594,048 million kWh at the source.

During 2022, the best accumulated historical record of 1126 days and more than 6.9 million hours worked without lost-time accidents was achieved. The last four refueling activities were carried out without any lost-time accidents at the facility.

By Unit, the main activities were as follows:

UNIT I

Unit I has been operating stably throughout the entire period, except for the first nine days of January when, as mentioned above, the outage was extended for the 28th refueling and maintenance, which began on 21 November 2021.

Regarding power reductions to be considered, there was a minimum load reduction at the beginning of April for the revision of the FW recirculation valve and another on 23 June when the turbine was tested for preventive maintenance.

The gross electricity generation of the U-I was 8766.60 million kWh, with a cumulative production at the source of 299,183.27 million kWh.

UNIT II

Unit II operated stably throughout the period up to 26th September, when the 27th refueling began, with a duration of 40 days (39.5 planned), and an automatic shutdown on 6th December due to the generator's electrical protection being activated as a result of moisture lodging in a watertight junction box. After identifying the source and replacing the junction box, the generator was reconnected to the grid 32 hours later.

Gross electricity generation was 7916.35 million kWh, accumulating 294,865.13 million kWh at the source.

OTHER ACTIVITIES

On 21 April, the annual drill of the Internal Emergency Plan (PEI) was carried out, declaring different events of categories 1 to 3 and requiring the action of the Civil Guard Response Unit present at the facility.

It is worth noting that, up to 18 September 2022, the best accident rate has been achieved at the facility, with 1126 days and more than 6.9 million hours worked without lost-time accidents.

A total of 2 casks of fuel assemblies have been deposited at the ATI during the year 2022. On 19th December, the eighth ENUN 32P cask, loaded with 32 spent fuel assemblies, was transferred from the Unit I Fuel Building to the Individualised Temporary Storage Facility and is currently at 40% of its capacity, with the loading of a further four casks from Unit II scheduled for 2023.

TWENTY-SEVENTH REFUELLING UNIT II

As indicated above, this outage for the twenty-seventh refueling and maintenance of Unit II took place between 26th September and 5th November and lasted 40 days. During this outage, 1,039 contracts were made in addition to the regular staff of professionals employed in the facility's normal operation.

The most important activities carried out during the refueling outage were the following:

- Reactor core fuel element loading.
- Execution of more than 12.700 work orders, compared to the usual 11.000.
- UT inspection of reactor vessel nozzles and penetrations.
- Visual inspection of the lower inner part of the reactor vessel.
- Replacement of the central cooling pumps No. 2.
- Eddy's current review of the tubes of the three steam generators.
- Maintenance of diesel generators 2 and 5.

- Overhaul of primary feedwater turbopump B (FW).
- Replacement of the three safety valves of the pressurizer.
- Implementation of 22 design modifications linked to requirements and commitments with the CSN.

REPORTABLE OCCURRENCES

During 2022, the regulatory body (Nuclear Safety Council) was notified of 1 1-hour event and two 24-hour events at Unit-I, and two 1-hour events and another two 24-hour events at Unit-II, all at level zero on the INES scale (of no significance for safety). The list of these is shown in the attached tables.

INTERNATIONAL MISSIONS

Between 3 and 9 May, 2022, the Follow Up mission of the Peer-Review that took place in January and February 2020 took place at CNA. The WANO evaluation team assessed that CNA is at the highest levels of excellence in the nuclear industry in most areas evaluated, identifying its performance as exemplary and recognised by the World Association of Nuclear Operators as WANO 1.

CHALLENGES 2023

During the year 2023, the main challenges to be undertaken by the plant will be to continue with the actions associated with the facility's most important project on occupational safety: ZERO ACCIDENTS, improvements in working practices, the execution of Refuelling 29 of Unit I during April and May, the refueling reliability program, the Preveo plan of the operating experience program, continuing with the loading of 4 spent fuel casks at the ATI and operational waste management.

All this is to be achieved thanks to the work and commitment of the excellent team of professionals that comprise the Almaraz Nuclear Power Plant and CNAT.

UNIT I

REFERENCE	DATE	TYPE	DESCRIPTION
ISN1-22/001 (COMMON)	15/07/2022	ISN 1HOUR	Forest fire near the power plant (<5km) close to the village of Casas de Miravete and the Monfragüe National Park
ISN1-22/002	25/072022	ISN 24 HOURS	Automatic start of the emergency diesel generator 3DG due to under-voltage at busbar 1A4 due to a transient in the external grid
ISN1-22/003 (COMMON)	21/12/2022	ISN 24 HOURS	Pressure and flow values set in the ETFs are inconsistent with the speed at which the AF turbopump monitoring procedure is performed

UNIT II

REFERENCE	DATE	TYPE	DESCRIPTION
ISN2-22/001 (COMMON)	15/07/2022	ISN 1HOUR	Forest fire near the power plant (<5km) close to the village of Casas de Miravete and the Monfragüe National Park.
ISN2-22/002	25/10/2022	ISN 24 HOURS	Automatic start of 2DG emergency diesel generator during B-train safeguards sequence tests on reloading
ISN2-22/003	06/12/2022	ISN 1HOUR	The automatic shutdown of unit 2 by activating the trip and group blocking relay 86-2/G2 was caused by a spurious trip signal from the safety valve 63L of transformer TA2-T2A1
ISN2-22/004 (COMMON)	21/12/2022	ISN 24 HOURS	Pressure and flow values set in the ETFs are inconsistent with the speed at which the AF turbopump monitoring procedure is performed.

CLOSURE SESSION

HÉCTOR DOMINGUIS

PRESIDENT OF THE SPANISH NUCLEAR SOCIETY (SNE)

We will proceed to the closing of our Conference on Operational Experiences in the presence of Juan Carlos Lentijo, President of the Nuclear Safety Council, and Emilio Mínguez, Vice-President of the Spanish Nuclear Society, to whom I will give the floor in a few moments.

But first, and taking advantage of the fact that my presidency will end in a few hours, I would not want to leave without thanking you for the opportunity to represent the SNE during these two years.

Working hand in hand with top-level professionals in such a worthy task as promoting knowledge about nuclear energy and defending our contribution to society... It has been a great responsibility and a great source of pride.

As of this afternoon, a task is in the best hands with Emilio Mínguez at the head of the new Board of Directors, giving continuity to all the initiatives that the society and its committees have promoted... to shed light on the debate about the continuity of our operation. Forward Emilio...

> **"It has been a great responsibility and a great pride to work hand in hand with top professionals in such a worthy task as promoting knowledge about nuclear energy and defending our contribution to society... It has been a great responsibility and a great pride"**

EMILIO MÍNGUEZ

VICE PRESIDENT OF THE SPANISH NUCLEAR SOCIETY (SNE)*

Thank you very much, Héctor, and many thanks to the Security Council President for joining us for this closing ceremony.

I have little to say. Practically all of you who have been here have heard how healthy our nuclear power plants are. And the truth is that to summarise the operation and the work that is carried out 365 days a year, 24 hours a day, seven days a week, in the time that you have done it and how you have established it, and to show how healthy the plants are, there is little I can add to what you have said here.

I want to applaud them all for their extraordinary work. And, of course, because after three years in which we have not been present, the fact that they have been able to come here to present us and that we are here with all of you deserves a round of applause for all of them.

I will therefore be very brief. I want to thank José Manuel Redondo, the Deputy Director of Nuclear Energy, for being here with us and explaining the activities and actions the Ministry is carrying out. He has not told us the essential thing that is on everyone's mind, but let us hope that, in time, this initiative will finally be carried out.

"In 2022, we have had some critical production data. We are at approximately 8,000 GWh on average, practically, in almost all the plants and with operating factors exceeding 85%, especially those that have had some stoppage for recharging"

The special session on "A sociological approach to energy transition." It was exciting, and we will have to continue to look at some issues related to our technical activities and sociological skills, especially concerning the human factor, social awareness, governance, and public policies. It is necessary to have a social and academic culture to deal with the essential aspects of the energy transition and, above all, the sociological ones.

I will refer to only some of the activities presented by the directors of the different power plants. Still, I would like to refer to the words with which our chairman opened the day, referring fundamentally to the manifesto that has been drawn up by the SNE's Board of Directors in recent months and which was presented to the press yesterday and is having a good impact in the media. Let us hope that it is heard, as he has said, and that some of the aspects written in this manifesto are fulfilled.

Of course, the work on the activities scheduled for 2023 has also been presented. And this is fundamentally connected to the movement of the power plants. In 2022 we had some critical production data. We are at approximately 8,000 gigawatt-hours on average, practically in almost all the plants, and with operating factors exceeding 85%, especially those that have had an outage for refueling. More and more work is being done, and investment is being made to improve safety. And this is the message you have conveyed to us: the reduction in work-related incidents, the operation's reliability, and all the plant systems.

Juan Carlos Lentijo, Héctor Dominguis, Emilio Mínguez y Pedro Ortega, secretario general de la SNE.

*At the closing ceremony of the Jornada de Experiencias operatives, Emilio Mínguez became the new president of the SNE, which is why he appears in that capacity in the interview published in this issue.

I want to thank all of you for your warm welcome to this conference which, as I said, after three years we are holding in person; I would also like to thank the three moderators who have been involved with the different centers, Ángela, Lourdes and Pablo.

Thanks also to the directors, of course. I repeat I am the leading actor. Your presence in recent years has been deferred, but seeing you here and all you do gives us more courage to continue defending this nuclear energy as professionals.

To Jesús Fornieles for moderating this exciting session with two sociology experts, which we will take up again for some of the Programme Commission's activities.

I want to thank Eva Celma and the entire Programme Commission for their tenacity in making all this work well. And, of course, for organizing this meeting.

Thanks to Óscar García, director of the School, of course, because otherwise, I would give him a hard time for not giving us this significant room. And, of course, to all the staff of the School who have helped the Programmes Committee to organize this.

Thank you to the Deputy Director of Nuclear Energy and the President of the Council for being here with us.

I now give the floor to the President of the CSN, Juan Carlos Lentijo. As Héctor has done a great job during these two years as president, I think I will take many of the things he has done. I continue, and I only change those things that don't work. And therefore, as everything has worked very well, we are going to be continuous and continue to promote nuclear energy so that we have the same presence and excellent news at next year's Conference of Operational Experiences. And that is all. Thank you very much to all of you.

JUAN CARLOS LENTIJO

CHAIRMAN OF THE NUCLEAR SAFETY COUNCIL (CSN)

On behalf of the Nuclear Safety Council Plenary, I would like to thank you for the invitation to this closing ceremony of the 34th Conference on the Experiences and Perspectives of Nuclear Power Plants in 2022, organized by the Spanish Nuclear Society. It is a pleasure to join you in the auditorium of my former Faculty, the School of Industrial Engineering.

With 34 editions, this conference is an unmissable annual event in the sector's calendar. And without a doubt, it is a very appropriate forum to review the activity that has taken place over the last year about nuclear power plants.

Just as the directors of the different plants have been here to present the most relevant aspects of their operations during the past year, allow me to do the same about the role of the regulatory body over which I preside.

As you all know, 2022 was a year of change for the Council. A year in which a new president, a new secretary general, a technical director of Nuclear Safety, a technical director of Radiation Protection, and six new heads of the sub-directorates that make up the technical directorates were elected.

In addition to routine inspection work, reports on compliance with standards, design modifications, technical operating specifications, simulations, etc., we also reported favorably on the Spent Fuel Management Plan for the Santa María de Garoña nuclear power plant in Burgos, as well as the mandatory report on the 7th General Radioactive Waste Plan.

In another area, also crucial for the CSN's institutional activity, approval was given to the International Relations Strategy for 2020-2025, the Communication Plan 2022-2025, the R&D&I Plan 2021-2025, and the first Equality Plan 2023-2006.

Under the presidency of the CSN, we celebrated the 25th anniversary of the Ibero-American Forum of Radiological and Nuclear Regulatory Bodies (FORO) at an event attended by the Director General of the IAEA, Rafael Grossi. We also strengthened relations with civil society, organizing activities with the Association of Municipalities of Areas with Nuclear Power Plants

and Radioactive Waste Storage Sites (AMAC) and visiting the institutional representatives of different autonomous communities.

And for the new year in which we are already immersed, the main milestones of activity foreseen, in addition to the day-to-day actions of our regulatory body, are not trivial.

The long-term operation of nuclear power plants and their scheduled closure, by the Integrated National Energy and Climate Plan (PNIEC), over the decade between 2025 and 2035 requires specific efforts related to the renewal of operating permits.

Thus, this year, the application to renew the operating permit for the Trillo nuclear power plant in Guadalajara is expected to be processed.

Once the program for the orderly and staggered shutdown and closure of the nuclear fleet has begun, a program for the orderly and sequential decommissioning of the nuclear power plants will have to be initiated. This program will include issuing decommissioning permits and declarations of decommissioning of the facilities, establishing a process for the supervision and control of decommissioning activities, and, finally, the restoration of the nuclear power plant sites before the declaration of decommissioning.

In addition, tackling this challenge will necessarily involve reviewing and adopting new regulations and improving supervision and control processes to optimize operations. By 2023 and until 2027, we plan to start decommissioning the Santa María de Garoña nuclear power plant.

Another important aspect is managing spent fuel (temporarily or permanently). The need to ensure responsible and safe management of spent fuel and radioactive waste is closely linked to the long-term operation, decommissioning, and dismantling processes.

The 7th General Radioactive Waste Plan (GRWP) is in its last phase before its approval, and, depending on the national strategy for radioactive waste and spent fuel management to be defined, the CSN will have to address at least the following activities:

"Spain has installations and five nuclear power plants, so it is clear that nuclear energy is important, which obliges us to manage this reality. And this is the responsibility of all of us here. There is no other alternative"

- The development of complementary legislation;
- the assessment for the issuing of the mandatory report for the authorization of storage and transport containers, as well as the facilities to be defined (ATI, ATD);
- monitoring and control processes;
- the potential safety assessment (siting, design, regulations) and issuing of the mandatory report for the authorization of the deep geological repository (AGP);
- and evaluating and approving the spent fuel transport process since transport is a critical element of spent fuel management.

Among the CSN's primary functions is proposing and drawing up regulations and standards. Thus, for this year, our regulatory plan foresees the drawing up of six safety instructions. Four of these are new initiatives; the other two will revise instructions currently in force. These are the revision of IS-20 on safety requirements relating to spent fuel storage casks; and IS-10, which establishes the criteria for event reporting by nuclear power plants.

The new SIs will address different subjects ranging from the security of working experience or the characterization and assessment of the site of nuclear facilities to the security requirements for transporting nuclear materials and radioactive sources.

Furthermore, following the entry into force of the new Royal Decree 1029/2022, of 20th December, approving the Regulation on health protection against the risks deriving from exposure to ionizing radiation, the CSN will draw up an instruction aimed at es-

"The Spanish Nuclear Society is a fundamental agent in our country for the promotion of knowledge of nuclear science and technology. And this conference is a magnificent example of this"

tablishing the list of municipalities for priority action against radon and at developing the requirements of the Regulation on health protection against the risks deriving from these radiations about safety in the work centers located in these municipalities.

And as you will also be aware, we are working on the allegations received on the draft Royal Decree on the new Regulation on Nuclear and radioactive facilities (RINR).

The fundamental role of regulation in the nuclear sector is to reduce the risks of using ionizing radiation or atomic energy. As a regulatory body, our primary task is maximizing safety to reduce risks, leading to increased public confidence.

For this reason, in the face of one of the current challenges we are experiencing, such as the energy crisis resulting from the invasion of Ukraine, the Nuclear Safety Council should not take a position on the matter. Still, our contribution should be limited to a solid and independent technical perspective, safeguarding the safety and protection of people and the environment.

But our country has nuclear facilities and five nuclear power plants. It is, therefore, clear that atomic energy is essential in our country, which obliges us to manage this reality, regardless of our opinion of nuclear power. And it must be managed well, and this is the responsibility of all of us here. There is no alternative.

The Spanish Nuclear Society is a fundamental agent in our country for promoting knowledge of nuclear science and technology. And this conference is a magnificent example of this.

Therefore, thank you for organizing it, congratulating you on this new edition, and proceeding to its closure. Thank you very much.

2022 SNE AWARDS

At the end of the Operational Experiences Day, the SNE 2022 awards were presented, which on this occasion were:

- **NUCLEAR SPAIN AWARD FOR THE BEST TECHNICAL ARTICLE**
  "Application of deep neural networks in automatic visual inspection of UO_2 pellets" to **David Verdejo, Pablo Ramírez, Ángel Ramos, Sergio Álvarez, and Doroteo Torre**
- **NUCLEAR SPAIN AWARD FOR THE BEST INFORMATIVE ARTICLE**
  "Hydrogen, you will be the first. A radioactive story about Bohr" to **Gonzalo Jiménez Varas**
- **BEST DOCTORAL THESIS ON NUCLEAR SCIENCE AND TECHNOLOGY 2022**
  "Characterization of main ion properties for the optimization of future fusion power plants" by **Pilar Cano Megías**
- **BEST PAPERS OF THE 47TH ANNUAL MEETING 2022**
  - QUALITY, REGULATION, ORGANISATION, AND HUMAN FACTORS
    "Immaterial Incentives" **Francisco Moragas Moreno**
  - FUEL
    "Evaluation of BWR fuel isotopic composition measurements by laser ablation" **Marta Berrios Torres**
  - COMMUNICATION
    "The great leap" **Manuel Fernández Ordóñez**
  - DECOMMISSIONING
    "Autonomous Unmanned Aerial Vehicle (UAV) applied to the radiological characterization and release of nuclear sites" **Alejandro Soria Velasco.**
  - ESC DESIGN AND BEHAVIOUR
    "The response of Cofrentes NPP to the incident of loss of interconnection with France on 24 July 2021 reveals the importance of the grid stability of Spanish NPPs" **Jacobo Archilla Martín-Sanz.**
  - TRAINING
    "Use of virtual reality in practical training in emergencies" **Rafael Díaz Heredia**
  - FUSION
    "Isotopic influence on hydrogen transport parameters in structural materials of thermonuclear fusion reactors" **María Urrestizala**
  - WASTE MANAGEMENT
    "New metallic waste treatment facility at Cofrentes NPP" **Susana Gutiérrez Martínez**
  - ENGINEERING AND INNOVATION
    "Neutronet: machine learning applied to the optimization of refueling schemes" **Alejandro Carrasco Sánchez**
  - MAINTENANCE, INSPECTION, AND TESTING
    "Profitability of reliability-centered maintenance (RCM)-a case study" **Laura Martín Huete**
  - MEDICINE AND HEALTH IN THE NUCLEAR FIELD
    "Computational generation of phase spaces at the output of the MLC of a Linac for Monte-Carlo simulation" **Rafael Miró Herrero**
  - OPERATION
    "Digitalisation of nuclear power plant operating procedures. Implementation strategy" **Mateo Ramos Ramos**
  - RADIOLOGICAL AND ENVIRONMENTAL PROTECTION
    "Radon detection in a Spanish natural gas well" **Aína Noverques Medina**
  - NUCLEAR SAFETY
    "Analysis of venting strategies and H_2 concentration evolution during a so in a bwr-6 containment with Gothic 8.3" **María del Pino Díez Álvarez-Buylla**
  - SIMULATION WITH NUMERICAL CODES + 3D
    "Numerical simulation of hydrogen combustion accident sequences with Large-Eddy Simulation and detailed chemistry. Capabilities to simulate flame acceleration and the transition from deflagration to detonation" **Ramón A. Otón Martínez**
  - THERMOHYDRAULICS AND NEUTRONICS
    "Design of a burner version of the esfr-Smart reactor" **Francisco Álvarez Velarde**
  - POSTER
    "Experimental study of the effect of temperature on interfacial waves in downward annular air-water flow" **Yaisel Córdova Chavez**
- **NUCLEAR MASTER'S DEGREE 2022**
  - BEST MASTER'S THESIS AND FINAL PROJECTS

    Winner: **Santiago López García**
    "Study of the amplification of high order harmonics with angular momentum in krypton plasmas."

    Finalists: **Jesús Poley Sanjuán**
    "Feasibility study of a thermal ion loss detector in a magnetic confinement fusion device."
    Sofía Arfinengo del Carpio
    "Preventive methodology: a priori geometric simplifications for the optimization of containment models with the GOTHIC code."
  - BEST DOSSIER

    Cindy del Carmen Bello Barradás
    Pau Aragón Grabiel
    Elena de la Fuente Garcia
    José Luis García León
- **TALENT ATTRACTION COMPETITION 2022**

  First prize: **Fernando Burón Fernández**, **Sofía Arfinengo del Carpio**

  Second prize: **Alex Ramiro Guerrero**, **Ana Sofía Miura Djordjevic**, **Gerard Domingo Alós**, **Iván Martínez Fernández**

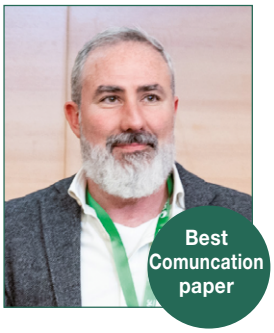
  Third prize: **Tania Carreira Couto**, **Candela García Fernández**, **Rafael Sandoval Ferrandis**, **Rafael Antonio Torres Márquez**


Best informative article


Best technical article


Best doctoral thesis


Best Fuel paper

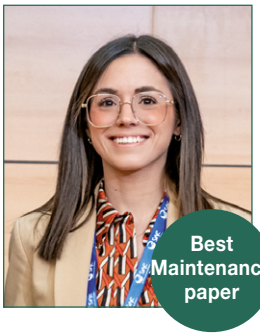

Best Comuncation paper


Best Decommissioning paper


Best Desing paper


Best Fusion paper


Best waste paper


Best Maintenance paper

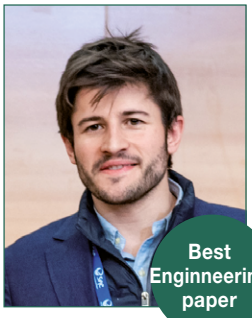

Best Medicine paper

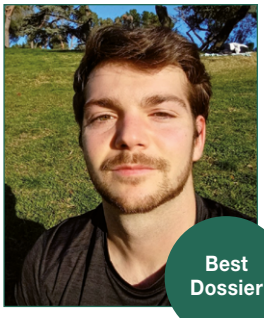

Best Operation paper


Best RP paper


Best Safety paper


Best Thermohidraulic paper


Best Enginneering paper


Best Dossier


Best Dossier


Talent Atraction 1º


Talent Atraction 2º


Talent Atraction 3º

PHOTO COMPETITION
SNE-FRAMATOME 2022

EXPERT JURY AWARDS GENERAL CATEGORY

First Prize:
SALT
Iván Sánchez Hernández

Second Prize:
THE PLEASURE OF FLYING
Manuel Muñoz García

Third Prize:
STORM ON DUNES
Fernando Ortega Pascual

EXPERT JURY AWARDS ENERGY CATEGORY

First Prize:
DUGARADAR
Rabel Leonardo Maes

Second Prize:
SIMULACRO UME ASCÓ
Roberto Bueno Hernández

Third Prize:
14 TRAMS
Josep Miquel Biarnes Sanz

POPULAR JURY AWARDS

First Prize:
SUMMER STORMS
Roberto del Sol Marcos

Second Prize:
THE WAY
Francisco Javier Hernáez Delgado

Third Prize:
TOWARDS WINTER
Iván Sánchez Fernández

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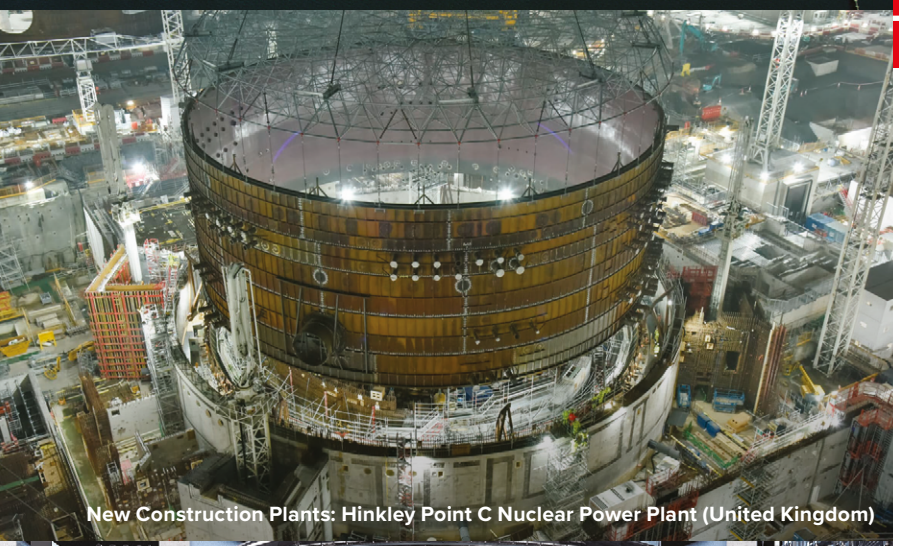
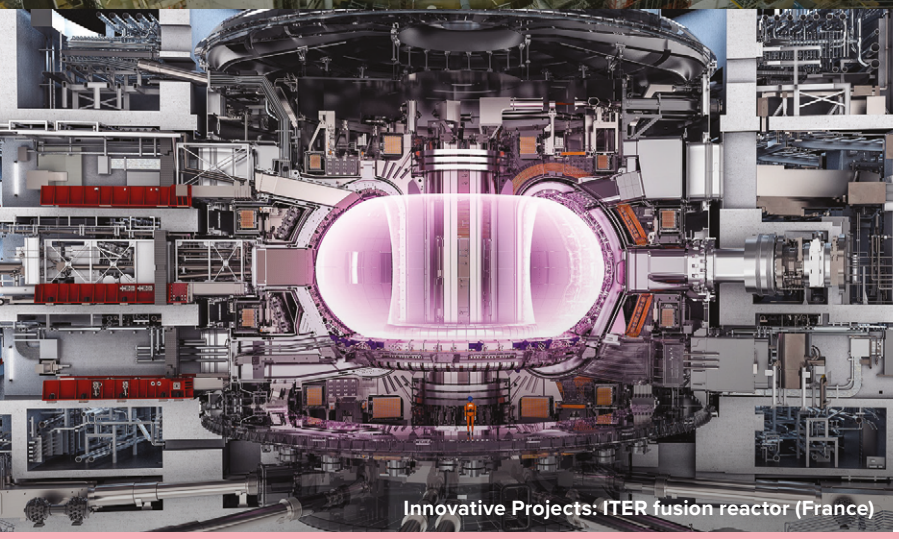
TECHNOLOGICAL CAPABILITIES FOR THE DEVELOPMENT OF COMPLEX PROJECTS

Operating Plants: Almaraz Nuclear Power Plant (Spain)



New Construction Plants: Hinkley Point C Nuclear Power Plant (United Kingdom)



Innovative Projects: ITER fusion reactor (France)

Empresarios Agrupados generates quality and development through our engineering services in all phases of the life cycle of power generation projects:

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- **Conventional Thermal:** Coal, fuel oil, gas in open or combined cycles.
- **Renewable energies:** Parabolic solar, concentrating tower solar, photovoltaic solar and wind power.

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PROJECTS

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PEOPLE

80
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